# University of Baghdad

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|---|---|---|---|---|
| College Name | College of ibn-al-haitham | | | |
| Department | Department of physics | | | |
| Full Name as written in Passport | Abbas Karem saadoon | | | |
| e-mail | Not exist | | | |
| Career | ◌ Assistant Lecturer | ● Lecturer | ◌ Assistant Professor | ◌ Professor |
| | ◌ Master | ● PhD | | |
| Thesis Title | Perpartion and study of some physical feature of the ceramic compound of titanium zircium and lead (PZT) | | | |
| Year | 2004 | | | |
| Abstract | The material of lead titanate (PBTiO3) WASPERPARED BU MIXING THE COMPOUND OF THE LEAD MONOXIDE (PBO) AND TITANIUM DIOXIDE (TiO2) AT A RATE OF MOL "m" AND PREPARD ALSO THE MATERIAL OF LEAD ZIRCONATE BY MIXING THE COMPOUND OF LEAD MPNPXIDE AND ZICONIUM DIOXIDE ALSO AT A RATE OF MOL (1:1).<br>THE RESULT OF THE DIFFERENT SERVE SHOWED THE INCREMENT OF THE PHASE CLEARLY.<br>THE COMPOUND OF THE LEAD ZIRCONATE LIQUITE (PZT) WAS PREPARD BY USING THE TWO MATERIAL OF LEAD TITANATE AND LEAD ZIRCONATE AND THE RESULT OF THIS PROCESS WAS MADE PELET OF THIS COMPOUND WITH LENGTH (1X1) cm AND ITS CENTRAED IN DIFFERENT PERIODES AND TEMPERATURE.<br>THE COMPOUND OF LEAD ZERCONATE LIQUATE PZT WAS INCLOUSION WITH COLONIUM OXIDE NIOBIUM OXIDE AND IN THE SAME WAY SOME OF THESE SAMPLES WHERE MANUFACTURE FROM THESE MIXED MATERIALS AND THESE ARE CENTERED BY MET TEMPERATURE 1200 C AND IN THREE HOURS.<br>THE ELECTRIC FEATURE WHERE MEASURED LIKE DIELECTRIC CONSTANT LOSS FACTOR DISSIPATION FACTOR, ALTERNING ELECTRIC CONDUCTIVITY IN ADDIYION TO RESISTIVITY AND CONTINOUS ELECTRICAL CONNECTION.<br>ABOUT THE LOSS FACTOR DISSIPATION FACTOR AND ALTERNING ELECTRICAL CONDUCITIVITY AND CONTINUITY THE FEATURE ARE DIFFERENT FROM THE OTHER ONE BECAUSE THEIR WAS DECREASING THE VALUE EACH TO THE LOSS AT TEMPERATURE 1200 C ALSO IN CENTERING THE COMPOUND PZT IN DIFFERENT PERIODES THERE WAS ALSO DESCREASING IN THE VALUE OF EACH ONE WITH INCREASING IN CENTERING PERIODES ALSO TIN THEY REACH TO LESS VALUE IN CENTERING PERIODES WITH IN 3 HPURS. | | | |

| University of Baghdad | | | | |
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| College Name | College of Education Ibn Al- Haitham | | | |
| Department | Department of Physics | | | |
| Full Name as written in | Abdul Hameed Raheem Mahdi Al- Sarraf | | | |
| e-mail | Ahmed.alssaraf@yahoo.com | | | |
| Career | ◌ Assistant | ◌ Lecturer | ✓ Assistant | ◌ Professor |
| | ◌ Master | | ✓ PhD | |
| Thesis Title | Effect of Preparation conditions on Structural, Electrical, Magnatical and Mechanical Properties of Superconductor Phase Type (1212), (123) and (1222). | | | |
| Year | 2002 | | | |
| Abstract | This Present work involves preparation of two Parts: (Y-based and Cr or Ru- based). Superconducting series with different preparation conditions.<br>Y-based as: $Y_1$ $Ba_2$ $(Cu, M)_3$ $Cu_2$ $O_y$ where M= Ag, Fe, Hg which known YBCO or (123). Also new series of high Tc superconductor Cr or Ru based superconductors as:<br>$(Cr,Cu)$ $(Sr,La)_2$ $(Gd,Sr)_1$ $Cu_2$ $O_y$- (1212) where<br>A= Ca, Sr.<br>$(Ru, Cu)_1$ $(Sr, Gd)_2$$(Gd,Sr)_1$ $Cu_2$ $O_y$- (1212) and$(Cr,Cu)_1$ $Sr_2$ $(y,Ce)_2$ $Cu_2$ $O_y$- (1212) has been synthesised. Thermal analysis technique (TG, DTA) has been used to preparation above series ceramic superconductor compounds. X-Ray analysis was carried out to examine the solid samples.<br>To measure the critical temperature (Tc) of samples, we suggested a simple design which can performance two systems in one, the first to measure the electro- conductivity as a function of temperature and | | | |

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| | the second depends on Missner effect.<br>The result of the test will be clear in comparation between this design and diamagnetic susceptibility results, it's showed the proved successfully of this suggested design .<br>As well as we studied the superconductor properties include electrical and magnatical properties which involves electrical resistivity data as function of temperature I- V carstaristic critical current (Ic) and ΔTc.<br>Structural superconducting properties which includes X.R.D analysis, Phase analysis, Lattice parameter, SEM, Grain size, Density, Porosity and oxygen content.<br>More over mechanical properties which includes Vickers microhardness and Young modules have been studied.<br>It was found from the results that the highest Tc= 105 k and Ic= 1.2 A recorded in Y-based superconductor series for $Y_1$ $Ba_2$ (Cu, Hg)$_3$ $O_y$ where the concentration of Hg= 0.15 and it's recorded best mechanical properties. But in Cr-based superconductor series Tc= 85k recorded for (Cr,Cu) $_1$ (Sr,La)$_2$ (La, Ca) $_1$ $Cu_2O_y$ - (1212) where the concentration of Ca= 0.3 and the best mechanical properties recorded for (Cr,Cu) $_1$ $Sr_2$ (Y,Ce)$_2$ $Cu_2O_y$- (1212).<br>The results obtained from this work are encouraging for continue in this filed, It's showed the strong relation ship between superconductivity and microstructure of superconducting ceramic materials, which depending on the sintering behaviour and the preparation conditions.<br>All results have discussed in details. |

# University of Baghdad

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|---|---|
| College Name | College of Science, University of Baghdad, Iraq. |
| Department | Department of Physics |
| Full Name as written in Passport | Ahlam Hussein Jaafar Al-Musawi |
| e-mail | dr.ahlam@uobaghdad.edu.iq |
| Career | ◌ Assistant Lecturer ◌ Lecturer ● Assistant Professor ◌ Professor |
| | ● Master ◌ PhD |
| Thesis Title | Experimental Investigation of Tunneling Effect Through a Barrier containing Magnetic Material. |
| Year | 1977 |
| Abstract | Results on tunneling current flow in samples with sandwich structure are studied. The sandwich structure consist of metal – Insulator – metal junction. Al has been used as a metal electrode and the Al – oxide ($Al_2O_3$) used as insulator. The data are reported for the case in which the junctions are doped with a magnetic material. Dysprosium has been used as a dopant and is deposited on the $Al_2O_3$ – Al interface. It's thickness varied from 10 Å to 60 Å.<br><br>The standard modulation technique has been used to measure the dynamic resistance as a function of bias voltage, concentration of the dopant and the temperature. The results obtained show strong zero-bias anomaly corresponding to a resistance peak. The size of resistance peak decresed with increasing the bias voltage and the concentration of the dopant. The resistance peak shows strong temperature dependence and it increases with decreasing the temperature. This behaviour, appears to be a particle effect and explained in terms of the capacitor model.<br><br>The current – voltage characteristics has been measured and compared with that of the undoped junction. The general feature is the non-ohmic behaviour at low voltage and the temperature dependence of the tunnel current at relatively high voltage. Current – Temperature characteristic at constant applied voltage are studied in the temperature range 83 – 300 K. The results of this measurement together with that of the current – voltage characteristic, determined the transport mechanisms in the junction under study. It is found that on the range of bias voltage (0 – 2.8 volts) the predominant transport mechanism can be divided in to two important mechanisms;<br>a) Tunneling which is found to be the predominant process at liquid nitrogen temperature range.<br>b) Thermionic emission which is found to be the predominant process at high temperature. |

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| | The barrier heights of the metal – insulator and the insulator – metal interface have been estimated from the Schottky plot (ln I – $V^{1/2}$). It is appeared that their values are much smaller than that of the undoped junction. Thus the presence of the dopant lower the potential barrier in spite of producing the anomalous tunneling behaviour. It is observed that the low barrier height enhanced the thermionic (Schottky) emission and made it appear at voltages much lower than that of undoped junction for the same temperature. The reduction in the barrier heights can be explained in term of the ionized states in the barrier. |

# University of Baghdad

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| College Name | College of ibn al haitham | | | |
| Department | Department of physics | | | |
| Full Name as written in Passport | ADBUL RAHMAAN MAHMOOD HUSAIN | | | |
| e-mail | | | | |
| Career | ◌ Assistant Lecturer | ◌ Lecturer | ◌ Assistant Professor | ◌ Professor |
| | ◌ Master | | ◌ PhD | |
| Thesis Title | D0UBLE BEAM AMMONIA MASER OPERATED WITH AN OPEN RESONATOR | | | |
| Year | 1979 | | | |
| Abstract | The construction of a double beam ammonia maser employing an open resonator of advanced design is described. The operation of this maser as an oscillator permitted a strong oscillation to be obtained which has led to the observation of several noval phenomena. These include a biharmonic effect with a best frequency of a few kilohertz which has remained as an unsolved problem since the original observation in 1964; injection priming of a pulsed ammonia meam maser oscillator and oscillation of the weak ammonia inversion line J=K=1 . also the operation of the maser as a spectrometer has permitted a study of the weak field stark effect and a beatiog of beats phenomenon by operation of the cavity in the $TEM_{\square 01}$ mode.<br>Other experimental work of a general nature is also described. Including a comparison between effuse-diaphragm and nozzle – skimmer combination and the oscillation amplitude characteristics of the inversion lines of ammonia J=K=1,2,3 WITH $TEM_{\square 01}$ AND $TEM_{\square 01}$<br>Open cavity modes. | | | |

| University of Baghdad | | | | |
|---|---|---|---|---|
| College Name | College of Education/ Ibn al-Haithem | | | |
| Department | PHYSICS | | | |
| Full Name as written in Passport | AHLAM RASHEED KHZAAL | | | |
| e-mail | | | | |
| Career | (X) Assistant Lecturer | ( ) Lecturer | ( ) Assistant Professor | ( ) Professor |
| | (X) Master | ( ) PhD | | |
| Thesis Title | ADAPTIVE LINEAR CHANNEL EQUALIZATION FOR WIRELESS COMMUNICATION SYSTEMS | | | |
| Year | 2008 | | | |

Abstract

The aim of this thesis is to remove or reduce the intersymbol interference (IS!) phenomena through suppression echoes that arise from non-line-of-sight (NLOS) components in wireless communication systems.

Equalization technique is used for processing (IS!) phenomena. The principles of LMS adaptive linear equalizer are investigated, which use the LMS channel estimator to estimate the NLOS components and subsequently suppress these components. This estimator includes LMS algorithm and finite impulse response (FIR) filter. In order to increase the performance of the LMS estimator through reducing the unfavorable effect of "channel dimension" on this estimator, a zero tap detection technique is incorporated with LMS algorithm. Zero tap detection technique is successful under white input conditions, however, it fails under colored input signal conditions because the colored input signal is highly correlated which leads to the interactions between the active and inactive taps. Hence, the detection LMS algorithm is modified to include a tap decoupling technique, which reduces the tap coupling effect.

The simulation results in this thesis are based on the asymptotic mean squared error, root mean squared error, and convergence speed. Different types of adaptive equalizer are presented depending on the techniques that incorporating with LMS algorithm. Zero tap detection guided LMS equalizer is the best under white signal model that improves an asymptotic performance to $10^{-5}$ and detection tap decoupling guided LMS equalizer is the best under colored signal model that improves an asymptotic performance to $10^{-6}$ for the other types of adaptive linear equalizers in this thesis then the effect of number of taps, noise variance, and LMS step- size factors is studied for the two best types of equalizers.

From the results of these factors, the increasing of number of taps leads to a faster convergence rate but the increasing of noise variance leads to increase of asymptotic error, and the increasing of LMS step-size leads to a faster convergence rate and less stability but a very large or low value of LMS step-size leads to un accountable highly asymptotic error.

The present study is presented in instruction form in order to make it useful for the postgraduate, undergraduate students and engineers in communication field using Power Point and depends on the instructional design models (Addie model).

# University of Baghdad

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| College Name | College of Education (Iben Al-Haitham) |
| Department | Department of Physics |
| Full Name as written in Passport | AHMED FADHIL MKHAIBER |
| e-mail | ahmfad2002@yahoo.com |
| Career | ◌ Assistant Lecturer ● Lecturer ◌ Assistant Professor ◌ Professor |
| | ◌ Master ◌ PhD |
| Thesis Title | Physical Properties Study of Luminous Infrared and Megamaser Galaxies. |
| Year | 2002 |


Abstract

## *Abstract*

The present thesis is interested in studying the physical properties of one kind of extra galaxies, which named luminous infrared and megamaser galaxies this is discovered and observed by the infrared astronomical satellite ( IRAS ) . This type of galaxies emits most of their energy within infrared wavelength . The spectral energy distribution ( SEDs ) of 16 object have been studied and plotted depending on the observational data for the flux density at many frequencies (from radio wave to x- rays ) , the spectral energy distribution of megamaser gakaxies have the same form Considerable emission is observed in the 3μm range , which evidently indicants the presence of read giants & supergiants stars in these galaxies

An analysis of a sample of OH megamaser galaxies is presented . It is shown that the dependence of Loh on Lfir is not quadratic but closer to linear . On the basis of the linear relationship between OH & FIR luminosities , depending on this formula , the estimated equation of the expected number of these galaxies have been deduced . This equation has been plotted and compared with the luminosity distribution of ( 84 ) galaxies . From this comparison we must expect that future observation will find new megamaser . The relation between flux density at the line ( 18 cm ) and flux density at ( 1.4 MHz ) has been studied also . It was found that there is no correlation between them , which leads to saturate emission of OH

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| | molecules in megamser galaxies . |

# University of Baghdad

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| College Name | Education (Ibn Al-Haitham), of University of Baghdad |
| Department | Physics |
| Full Name as written in Passport | **Ahmed Musa Shweikh** |
| e-mail | ahmed_shweikh@yahoo.com |
| Career | ◌ Assistant Lecturer ● Lecturer ◌ Assistant Professor ◌ Professor |
| | ◌ Master ● PhD |
| Thesis Title | Calculation the delta mixing ratios using constant statistical tenser (CST),$a_2$-ratios and least squares fitting (LSF) methods |
| Year | 2005 |
| Abstract ٩ | The delta ratios of gamma transitions from low –and high –spin states populated in the following nuclear reaction : 1- 2-$^{77}_{34}Se(\alpha,2n\gamma)^{79}_{36}Kr$ 3- $^{80}_{34}Se(\alpha,2n\gamma)^{83}_{36}Kr$ 4- 5-$^{132}_{53}I(P,n\gamma)^{132}_{54}Xe$ Are calculated in the present work by using the constant statistical tensor (CST), $a_2$-ratios and least squares fitting (LSF) methods .the obtained results confirm the validity of these methods in calculated the delta values and their capabilities in predicting any inaccuracies the experimental data. The $\delta$ -values of 2 transition in $^{56}_{26}Fe$ ,17 transition in $^{79}_{36}Kr$ ,4 transition in $^{83}_{36}Kr$ and 5 transition in $^{101}_{47}Ag$ are calculated for the first time . the weight of averages of the delta values calculated for mixed gamma transition in $^{56}_{26}Fe$ , $^{79}_{36}Kr$ , $^{83}_{36}Kr$ , $^{101}_{47}Ag$ , and $^{132}_{54}Xe$ are presented as adopted values . |

| University of Baghdad | | | | |
|---|---|---|---|---|
| College Name | College of Education Ibn Al-Haitham | | | |
| Department | Physics | | | |
| Full Name as written in Passport | AHMED RAFEEQ ABDUL MAJEED | | | |
| e-mail | Ahmrafeeq67@yahoo.com | | | |
| Career | ◌ Assistant Lecturer | ◉ Lecturer | ◌ Assistant Professor | ◌ Professor |
| | ◌ Master | ◉ PhD | | |
| Thesis Title | **Studying the Effect of Adding Zinc Oxide on the Magnetic and Electric Properties of $Zn_xNi_{1-x-y}Cu_yFe_2O_4$** | | | |
| Year | 2004 | | | |

Abstract

# ABSTRACT

**The synthesis ($ZnFe_2O_4$) was prepared by mixing the two compositions ( $Fe_2O_3$ ) and ZnO with the mole proportion [1:1] . Also the synthesis ( $NiFe_2O_4$ ) by mixing the two compositions ($Fe_2$ $O_4$) and ($NiCO_3$) with the mole proportion [1:1],While synthesis ($CuFe_2O_4$) prepared by mixing the two composition ( CuO ) and ( $Fe_2O_4$) with the mole proportion [1:1] , while had emphasized the crystallize synthesis accurately and sort by these synthesis by using the technique of ( X-rays diffraction ) .**

**By using the synthesis ( $ZnFe_2O_4$ ) , ( $NiFe_2O_4$ ), ( $CuFe_2O_4$ ) the composition was prepared ( $Zn_xNi_{1-x-y}$ $CuFe_2O_4$ ) at the values ( x = 0, 0.1,0.2, ……,1 mole %) which divided into two groups. The first one was get as rings which related to magnetic measures while the second was get as discs which related to the electrical measures that flocculated at the temperature ( 1250îC) for ( 4 hr).**

**The aparent density for the tow groups, which is composed of the composition $Zn_xNi_{1-x-y}$ $CuFe_2O_4$, was measured at the values (x= 0,0.1,0.2…….1 mol %) and flocculated at the temprature (1250 $^0$C) for (4hr)**

**The Aluminum was prepared on both sides of each disc of second group's discs by using the thermovaporation at the space to get ceramic capacitor**

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| | **from each disc.**<br>**The magnetic characteristics for above synthesis was studied which these magnetic characteristics included the maximum magnetic field strength ( $H_{max}$) , maximum magnetic flux density ($B_{max}$) , remnance ( $B_r$) , coercivity ( $H_c$) , relative permeability ( $\mu_r$ ) and losses ($P_s$) .**<br>**Also the electrical characteristics for the same synthesis which these electrical characteristics included the measures of Dielectric constant, Dielectric loss coefficient and Dissipation factor.**<br>**The practical results of this synthesis ($Zn_xNi_{1-x-y}Cu_yFe_2O_4$) show that the increasing of apparent density value with the concentration increasing ( Zn ) . The results also show that the ratio(x=0.6) of chemical form ( $Zn_{0.6}Ni_{0.3}Cu_{0.1}Fe_2O_4$ ) which characterized by having highly relative permeability ( $\mu_r$ ) as for other specimen and less coercivity ( $H_c$ ) which can be used in ( Transformer core ) and electrical engines at low reiterations .**<br>**While the electrical testing showed decreasing in Dielectric constant with increasing in reiteration at room temperature. These testing also showed the increasing of Dielectric constant at specific proportions and it's decreasing at other proportions. When increasing the reiterations the Dielectric loss coefficient is decreasing till it reaches the lower value at the high reiterations. The increasing of Zn proportion leads to increase and decrease the value of Dielectric loss coefficient, while the increasing of the reiteration leads decrease the value of Dissipation** |

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| | **factor till it reaches the lower value at specific reiteration and when the proportion of Zn is increasing the values of Dissipation factor are increasing and decreasing.**<br>**The results showed that the relative permeability ($«_r$ ) would be decreased while the coercivity ( $H_c$) would be increased when the synthesis ($Zn_{0.6}Ni_{0.3}Cu_{0.1}$ $Fe_2O_4$) is exposing to Gama rays.** |

| University of Baghdad | | | | |
|---|---|---|---|---|
| College Name | **Education/Ibn ALhaitham** | | | |
| Department | **physics** | | | |
| Full Name as written in Passport | **Ahmed Zaid Obaid** | | | |
| e-mail | az19669463@yahoo.com | | | |
| Career | Assistant Lecturer | Lecturer | Assistant Professor | Professor |
| | Master | PhD | | |
| Thesis Title | Study the durability of ceramic materials for electrical potential | | | |
| Year | 16-12-2004 | | | |

Abstract


# Abstract

This research is consist four chapters. Chapter one include a brief about the ceramic materials and the electrical Insulation properties and a review of some previous studies in electrical insulation properties field and definition the goal of this research.

Chapter two is consist of the theoretical side of this research, it's include concepts of electrical capacitors, electrical permittivity, electrical insulation strength and some of the physical properties ( outward porosity ).

Chapter three is consist the practical side of this research which include preparing porcelain body consist of different mixtures in different sintering temperatures to study their properties, designing and building up the measurements

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| | **system of electrical insulation properties ( insulation constant, insulation loss and electric potential strength), studying the physical properties change (outward porosity ) with temperature, whereas; its seems that the outward porosity is decrease with the increasing of sintering temperature.**<br>**The fourth chapter is including an analytical study for the results and discussion it, so the research was proved that the electrical insulation properties of the first and second groups under the limited circumstances in this research are decreasing with the increasing in frequency, and the best mixture was (F3).**<br>**Where the prepared samples were divided into two groups, the first group ( F1,F2 ) its contents are ( kaolin, ) and the second group ( F3,F4 ) its contents are ( kaolin, glass sand, potassium fluorspar ) with different weight percentages and different grains sizes, and all the groups mixtures were burned at temperatures between ( 1200 – 1300 ) C º.**<br>**Also the change of the actual electrical insulation constant had been studied with the test temperature, from the results in the first group ( F1,F2 ) its seems that the insulation constant was decreased with the increase in test temperature, but; in the second group ( F3,F4 ) its seems that the actual electrical insulation constant was increased with the increase in test temperature.** |

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| | **Beside; this chapter was include the measuring of the electrical potential strength under the limited circumstances in this research as shown that the second group ( F3,F4 ) given higher potential strength at room temperature.** |

# University of Baghdad

| | |
|---|---|
| College Name | Ibn-Al Haitham |
| Department | Physics |
| Full Name as written in Passport | Aisha Ali Hussen |
| e-mail | Aisha _Ali _83@Yahoo. com |
| Career | ● Assistant Lecturer ○ Lecturer ○ Assistant Professor ○ Professor |
| | ○ Master ○ PhD |
| Thesis Title | Study of proton momentum distribution for the $(¥, p)$ reaction from the cross section for the excited states for oxygen and nitrogen |
| Year | 2011 |
| Abstract | The technique developed by Findlay and Owens was used for the extraction of a consistently effective momentum distribution for the two reactions $^{14}N(¥, p)^{13}C$, $^{16}O(¥, p)^{15}N$ from the cross sections which are measured practically obtained for each of the discrete low lying excited states $E_x = 6.3MeV$, $E_x = 5.3MeV$, $E_x = 0.0MeV$ for the reaction $^{16}O(¥, p)^{15}N$ at energies $E_¥ = 72MeV$, $E_¥ = 60MeV$ and the angular range covered of approximately 35 to 95. Also the angular distribution of ground state to the same reaction at energies $E¥ = 100MeV$, $E¥ = 80MeV$, $E¥ = 60MeV$ was measured.And the angular distribution for the reaction $^{14}N(¥, p)^{13}C$ energy approximately $E_¥ = 57.5MeV$ to the six excited states.<br>The momentum density and momentum mismatch have been calculated by using the method of Findlay and Owens for each excited state fort ran (77) language has been employed to write program for this purpose .<br>The momentum scaled distribution would illustrate that the single direct knockout model (DKO)behavior is observed in the $(¥, p)$ . Two reactions could be regarded as evidence for the importance of the (DKO) model in the $(¥, p)$ reaction. Clearly the application of the procedure given by Findlay and Owens leads to a more consistent momentum distribution. |

# University of Baghdad

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| College Name | **Education Ibn Al-Haitham** | | | |
| Department | **physics** | | | |
| Full Name as written in Passport | **Alaa Badr Hassan Al-Jizany** | | | |
| e-mail | **alaajizany@yahoo.com** | | | |
| Career | ◌ Assistant Lecturer | ◌ Lecturer | ● Assistant Professor | ◌ Professor |
| | ● Master | ◌ PhD | | |
| Thesis Title | **Studying and evaluation of image intensity and aberrations effectiveness for triangle object** | | | |
| Year | **2001** | | | |

Abstract


## *ABSTRACT*

The performance testing of an optical system depends on spread function is one of important subjects , the aberrations quantities and it's effectiveness on spread function has been considered . This work includes studying of image of triangle object for aberrated optical system in order to show the difference between the intensity distribution in image of triangle object and another images of uniform objects like line , slit , disk and so on ..

The triangle spread function can be calculated by supposing that the triangle objects includes of many line objects.

In this work, the intensity distribution of image of triangle object has been calculated, (special equation has been derived called triangle spread function ( TSF ) by using the pupil function technique ) for two optical systems , The first system includes circular aperture , and the second system includes annular aperture , in order to study the effect of these apertures on some important optical facts , such as resolving power , depth of focus , and the performance of optical systems containing spherical and coma aberrations , focus error and moving factor .

The equation of intensity distribution has been solved by using Gauss method of numerical integration for circular and annular aperture and for ideal or aberrated systems or containing moving factor .

The annular aperture show better resolving power and relative decrease in depth of focus .

Results also show that in aberrated optical system the circular aperture has more efficiency . also show that the triangle object's nature has the benefit of canceling all secondary maximum from intensity distribution curve in image plane .

# University of Baghdad

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| College Name | **– Ibn.Alhaitham/** |
| Department | **Physics Department** |
| Full Name as written in Passport | ALI HUSSEIN ABDAL-RAZAK ALMALANI |
| e-mail | Ali_mealany@yahoo.com |
| Career | ◌ Assistant Lecturer ● Lecturer ◌ AssistantProfessor ◌ Professor |
| | ● Master ◌ PhD |
| Thesis Title | Preparation of intermetallic compound (MnSb) and compositional analysis |
| Year | 2001 |
| Abstract | |

| University of Baghdad | | | | |
|---|---|---|---|---|
| College Name | **College of Education /Ibn Al-Haitham** | | | |
| Department | **physics department** | | | |
| Full Name as written in Passport | Ammal jabar | | | |
| e-mail | Dr_amaalj2012@yahoo.com | | | |
| Career | ◌ Assistant Lecturer | ◉ Lecturer | ◌ Assistant Professor | ◌ Professor |
| | ◌ Master | ◉ PhD | | |
| Thesis Title | Position Evaluation for a distance point using GPS & LRF Techniques | | | |
| Year | 2007 | | | |
| Abstract | This thesis trait the very important problem concerning the determination of the Cartesian and geographical coordinates of a points or site situated at a far distance from the observer by using the international system WGS-84 and the local system Clarke-1880. A mathematical model was build in order to derive the necessary equations capable to calculate the Cartesian coordinates of a fixed site faraway from the observer position. Using visual C$^{++}$ language, a computer programs (ARK-P) was written for WGS-84 and Clarcke-1880 systems. In order to transform the geographical coordinates of the observer positions ($\varphi_{obs.}$,$\lambda_{obs.}$) to Cartesian coordinates ($X_{obs.}$, $Y_{obs.}$, $Z_{obs.}$) and vice versa. The Cartesian coordinates of the unknown site ($X_{unk.}$, $Y_{unk..}$, $Z_{unk.}$) are then could be determined and transformed, if needed, to geographical coordinates ($\varphi_{unk.}$, $\lambda_{unk.}$). This program was tested experimentally using different positions. The results of the geographical coordinates ($\varphi_{unk.}$,$\lambda_{unk.}$) shows a very good agreement with the real coordinates for positions of the sites (space image or registered coordinates). In addition, calculations of the residuals of the unknown positions, where measure the geographical coordinates of the positions many time , by use GPS receiver and finding the average of this measuring to calculate the residual between this averages and the obtained value from the program. | | | |

# University of Baghdad

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|---|---|
| College Name | Education Ibn al-Haitham |
| Department | Physics |
| Full Name as written in Passport | ANAAM WADI WATAN AL-MALIKI |
| e-mail | anaam_watan2007@yahoo.com |
| Career | ◌ Assistant Lecturer ◌ Lecturer ◌ Assistant Professor ◌ Professor |
| | ◌ Master ◌ PhD |
| Thesis Title | Ultrasonic waves attenuation in ceramic mediums |
| Year | 2000 |
| Abstract | In this study, a number of porous ceramic bodies were manufactured by compression, and their final microstructures were controlled via the preparation process. Sintering temperatures and the water content of the original pastes were varied to achieve this control. Physical parameters like density and water absorption were determined for all specimens.Moreover,the attenuation behaviour of ultrasonic wave traveling through these ceramics was monitored .This allowed for the determination of dynamical mechanics parameters like Young's modulus, shear modulus and poisons ratio. On the other hand, static parameters like hardness and compressive strength were also measured for all specimens. From the behaviour of the various parameters with the varying controlling conditions, one many conclude that the microstructure is playing the major role in shaping the physical and mechanical nature of the ceramic, the porosity seam to act as scattering centers to the traveling ultrasonic waves, leading to the observed attenuation |

# University of Baghdad

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|---|---|
| College Name | **Education (Ibn Al-Haitham)** |
| Department | **Physics** |
| Full Name as written in Passport | **Dr. Aqeel Razzaq Salih** |
| e-mail | **dr_aq2el_phy_ez_80@yahoo.com** |
| Career | ◌ Assistant Lecturer ● Lecturer ◌ Assistant Professor ◌ Professor |
| | ◌ Master ● PhD |
| Thesis Title | *Design and Study of Fractal Optical Modulator for Infrared Transmitted Signal* |
| Year | **2008** |
| Abstract | The optical modulator has been designed using iterated function systems (IFSs) by IFS Construction Kit program. The modulator has been inserted into the optical system using ZEMAX optical design program. In this program, it is assumed that the modulator is made from one of the infrared transmitting materials. Eight materials at room temperature have been used in this study; these are IRTRAN materials, Si, and Ge for the range of 3-9 μm.<br>Systems have been evaluated and analyzed using different criteria, including spot diagram, modulation transfer function (MTF), and point spread function (PSF). The effect of optical modulator change with changing its material results in focusing of functions and frequencies as required. Root mean square (RMS) and geometrical spot sizes decrease with increasing refractive index. This study showed that the effect of the increase in the material refractive index is to increase the maximum spatial frequency. |

# University of Baghdad

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|---|---|
| College Name | COLLEGE OF EDUCATION IBN AL-HAITHAM |
| Department | DEPARTMENT OF PHYSICS |
| Full Name as written in Passport | Auday Hattem Shaban Alhamdani |
| e-mail | audayhattem@yahoo.com |
| Career | ● Assistant ◌ Lecturer ◌ Assistant Professor ◌ Professor |
| | ● Master ◌ PhD |
| Thesis Title | D.C. Sputtering Hydrogenated Amorphous Silicon Shottky Diode Solar Cells |
| Year | 23/1/1995 |
| Abstract | In this work, we report on results of a detailed study of the electrical characteristics of Al/a-Si/a-Si:H/Au Schottky barrier produced by D.C. reactive sputtering in an argon and Hydrogen atmosphere. Several samples of Schottky diodes were prepared and studied as a fuction of two ratio [H/Ar] and substrate temperature $T_s$.<br>Te results of X-ray diffraction and R absorption show the existence o the amorphous structure and the presence of Si-H bonds in the a-Si:H films respectively.<br>After too many samples, the dark (j-v) characteristics shows that the optimum conditions, which give high performance devices, appear at [H/Ar]=5/10 and $T_s=250^0$C. Such devices give an ideal factor n=1.05, saturation current $J_0=8x10^{-11}A/cm^2$ and a rectification ratio about three order of magnitude. On the other hand, samples, prepared under non- optimum conditions, gives an ideal factor n=3.5, $J_0=2x10^{-9}A/cm^2$ and a rectification ratio less than one order of magnitude.<br>It has been found that, the high performance devices give an efficiency (ŋ) about 1% after AM1 white light illumination, solar cell structures, fabricated at the optimum conditions, have show values of short circuit current density, $J_0=2.25mA/cm^2$, an open circuit voltage, $V_0=0.57V$ and full factor, FF=0.66. |

| University of Baghdad | | | | |
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| College Name | College of Education / ibn Al-Haitham | | | |
| Department | Physics | | | |
| Full Name as written in Passport | Auday Tariq Subhi AL-bayati | | | |
| e-mail | Auday_tarek@yahoo.com | | | |
| Career | ● Assistant Lecturer | ○ Lecturer | ○ Assistant Professor | ○ Professor |
| | ● Master | ○ PhD | | |
| Thesis Title | Study of the Concentrations of Depleted Uranium in The Material used for the Manufacture of Alternative Dental and Fillings With Use of Nuclear Track Detector CR-39 | | | |
| Year | **2010** | | | |


Abstract

The purpose of this study is to determine the concentrations of depleted uranium in types of alternative teeth and fillings that have been obtained from hospitals , laboratories , the popular clinics and selling bureaus of dental materials in Iraq .

In this work 40 samples of industrial materials, dental and fillings for the different types including acrylic , porcelain , ivory , composite fillings and amalgam fillings were examined .

The concentrations of depleted uranium in these types are determined using the nuclear track detector CR-39 through the recording of the fission fragments tracks , resulted from the reaction $^{238}U$ (n, f) , by bombarding samples with fast neutrons emitted from the neutron isotopic source ($^{241}Am$-Be) with neutron flux about ($10^5$ n. $cm^{-2}$. $s^{-1}$).

A period of (5) hours is determined as the best etching period to show the effects of fission fragments using NaOH solution in

normalization (6.25N) , and temperature($60^0$C).

The concentrations of depleted uranium are calculated by comparing them with standard samples , the results obtained showed that the value of the weighted average of the concentrations of uranium in the samples of alternative artificial teeth and fillings is (2.917 ± 0.8) ppm for acrylic, (6.88 ± 0.97) ppm for porcelain , (5.725±1.02) ppm for ivory , (5.33 ± 0.6) ppm for composite fillings and (5.54 ± 1.05) ppm for the amalgam .

Also the hazard-index , the absorbed dose and the effective dose for the concentrations are calculated , and the results of effective dose for each of the surface of the bone and skin (as the most affected areas by these prosthodontics) are (0.3 mSv /y) for the acrylic , (0.7mSv/y) for the porcelain , (0.58 mSv/ y) for the ivory , (0.54 mSv/y) , to composite fillings and (0.56 mSv/y) to amalgam fillings.

The results of this study show that the highest effective dose rate is to a sample of porcelain (0.7 mSv / y ) which is less than the limit allowed to people exposure dose as recommended by the World Health Organization (WHO) which is (1 mSv / y).

| University of Baghdad | | | | |
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| College Name | Ibn Al-Haytham Education college. | | | |
| Department | Physics. | | | |
| Full Name as written in Passport | Ayad Ahmed Salih. | | | |
| e-mail | Ayad.phy@gmail.com | | | |
| Career | ◌ Assistant Lecturer | ● Lecturer | ◌ Assistant Professor | ◌ Professor |
| | ● Master | ◌ PhD | | |
| Thesis Title | Electrical Properties of Poly(Ethylene Oxide) Polymer doped by $MnCl_2$ . | | | |
| Year | 2002. | | | |
| Abstract | This thesis deals with some electrical properties of poly (ethylene oxide)-$MnCl_2$ composite with different filler concentrations as a function of frequency in the range from 10 Hz to 13 MHz at room temperature. The $MnCl_2$ salt concentration ranged from 0% to 20% by weight. These properties were studied through impedance technique. Impedance, dielectric constant, relaxation time, AC-conductivity showed frequency and salt concentration dependence. It was found that the dielectric constant and dielectric loss of prepared films increase with increasing the $MnCl_2$ concentration, the AC-conductivity increases with increasing the applied frequency, and the $MnCl_2$ contents in the composite membrane and enhancement of the ionic conduction is confirmed by increasing the AC- conductivity. The results were explained on the basis of the interfacial (space-charge) polarization, dipolar polarization and the decrease of the hindrance of the polymer matrix with the ionic mobility and impurities in the composite. | | | |

# University of Baghdad

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|---|---|---|---|---|
| College Name | College of education ibn-al-haitham | | | |
| Department | | | | |
| Full Name as written in Passport | Bashair mohammed saied | | | |
| e-mail | Bashair.ms@gmail.com | | | |
| Career | ◌ Assistant Lecturer | ◌ Lecturer | ◌ Assistant Professor | ◌ Professor |
| | ◌ Master | | ◌ PhD | |
| Thesis Title | MS.C)Determination of radon concentration in bulding s by using the nuclear track detector CR-39 | | | |
| Year | 1998 | | | |
| Abstract | Studying the charactertics of organic nuclear track detector cr-39 .the second part is the determination of radon concentration in dwelling building by utilizing the cr-39 detector<br>PH.d(analysis of angular distribution of gamma rays and gamma –gamma &partical-gamma angular correlations | | | |

# University of Baghdad

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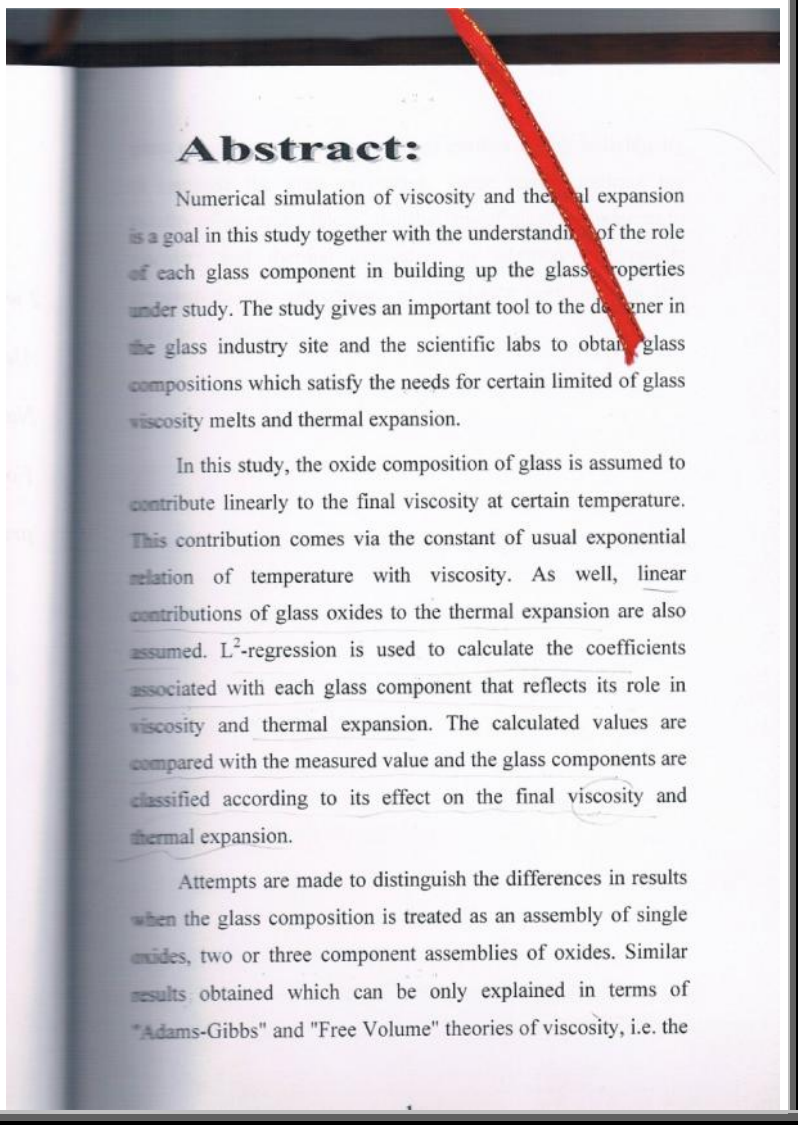
|---|---|---|---|---|
| College Name | IBN_AL_HAITHAM | | | |
| Department | PHYSICES | | | |
| Full Name as written in Passport | AYSAR JUMMAH IBRAHIM | | | |
| e-mail | ayseraladhmi@yahoo.com | | | |
| Career | ◌ Assistant Lecturer | ◌ Lecturer | ◌ Assistant Professor | ◌ Professor |
| | ◌ Master | | ◌ PhD | |
| Thesis Title | Modeling of Viscosity for Liquid Feldspar at Different Temperature | | | |
| Year | 2006 | | | |
| Abstract |  | | | |


## Abstract:

Numerical simulation of viscosity and thermal expansion is a goal in this study together with the understanding of the role of each glass component in building up the glass properties under study. The study gives an important tool to the designer in the glass industry site and the scientific labs to obtain glass compositions which satisfy the needs for certain limited of glass viscosity melts and thermal expansion.

In this study, the oxide composition of glass is assumed to contribute linearly to the final viscosity at certain temperature. This contribution comes via the constant of usual exponential relation of temperature with viscosity. As well, linear contributions of glass oxides to the thermal expansion are also assumed. $L^2$-regression is used to calculate the coefficients associated with each glass component that reflects its role in viscosity and thermal expansion. The calculated values are compared with the measured value and the glass components are classified according to its effect on the final viscosity and thermal expansion.

Attempts are made to distinguish the differences in results when the glass composition is treated as an assembly of single oxides, two or three component assemblies of oxides. Similar results obtained which can be only explained in terms of "Adams-Gibbs" and "Free Volume" theories of viscosity, i.e. the

# University of Baghdad

| | |
|---|---|
| College Name | **College of education Ibn AL-Haithem** |
| Department | **Physics department** |
| Full Name as written in Passport | Bushra hashim hussien |
| e-mail | bushrahhz@yahoo.com |
| Career | ◌ Assistant ● Lecturer ◌ Assistant ◌ |
| | ● Master ◌ |
| Thesis Title | design of a system of electrostatic lenses operated under magnification conditions. |
| Year | 2001 |
| Abstract | A computational investigation is carried out in the field of charged – particle optics with the aid of numerical analysis method and using the personal computer. The work is concerned with the design of a system of electrostatic lenses for focusing charged – particle beams.<br>The system comprises of two lenses unipotential lens operated under the telescopic mode of operation and an immersion lens operated under zero magnification condition.<br>The axial electrostatic potential distribution is determined by using polynomial functions of the third and fourth order from which the paraxial-ray equation is solved to obtain the trajectory of particles that satisfy the suggested potential function.<br>From the knowledge of the first and second derivatives of the axial potential distribution the optical properties such as the focal length and the spherical and chromatic aberration coefficients are determined.The electrode shape of the electrostatic lens was then determined from the solution of Laplace's equation. |

# University of Baghdad

| | |
|---|---|
| College Name | ***College of Education Ibn Al-Haitham*** |
| Department | Physics |
| Full Name as written in Passport | Bushra Kadhim Hassoon |
| e-mail | Dr.bushrd2099@Yahoo.com |
| Career | ◌ Assistant Lecturer ◌ Lecturer ● Assistant Professor ◌ Professor |
| | ◌ Master ● PhD |
| Thesis Title | **Study the Effect of Annealing and Doping by Halogens on the Optical and Electrical Properties of $Fe_2O_3$ & $Co_3O_4$ Oxide Films and Their Mixture** |
| Year | **2007** |
| Abstract | This research including studying the optical and electrical properties of thin films from Iron Oxide $Fe_2O_3$, Cobalt Oxide $Co_3O_4$ and<br>a mixture of both compounds in different ratio (75:25, 50:50, 25:75) for<br>a pure before and after annealing, [they were annealed at different temperature (773, 823, 873)K for one hour] and doped by Halogens<br>(F, Cl, Br, I) with different doping ratios (3, 6, 9)% .<br>These films of (200±25)nm thickness, had been prepared by the method of chemical spry pyrolysis deposition on glass substrates at temperature (673±20)K.<br>The results of X-ray diffraction have showed that the films of $Fe_2O_3$ & $Co_3O_4$ and their mixture are amorphous structure, and the doping operations by Halogens don't show any obvious difference on the crystalline structure of these films while annealing |

operations led to transition the structure films from the amorphous to polycrystalline state.

This research also includes studying the optical properties of all samples prepared (pure and doped), by recording the absorption and transmission spectrum in range of wave length (300-900)nm, the optical energy gap for allowed direct transition were evaluated. In general the optical energy gap decreases as the percentage of $Co_3O_4$ increases in the sample, and it increases after annealing. The optical energy gap for $Fe_2O_3$ thin films increases as the doping percentage by Halogens increases, while it decreases as doping ratio increases for $Co_3O_4$ films and for mixture of both compounds.

We calculated the optical constant (absorption coefficient, refractive index, extinction coefficient, the real and imaginary parts of dielectric constant) as a function of photon energy, the width of localized states were calculated too.

The electrical properties for all films (pure and doped), includes studying the variation of resistivity with temperature range
(298-473)K, then calculated the conductivity and activation energy, which shows two mechanisms for electrical conductivity with two activation energies for all films, it is found that the electrical conductivity increases, whereas the activation energy would decrease as the percentage of $Co_3O_4$ increases in the sample, and decreases whereas the activation energy would increases after annealing.

The electrical conductivity of $Fe_2O_3$ thin films is decreases

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| | with increasing doping percentage by Halogens, while it increases for $Co_3O_4$ films and for the mixture of both compounds as doping ratio increases.<br>Hall and Seebeck effect have shown that all films were (p-type), It is also noticed that both the mobility and concentration of the charge carriers increases with the increasing of $Co_3O_4$ percentage in the sample, and they are decreases after annealing.<br>The A.C. conductivity of all films was measured in the frequency range (100Hz-10MHz) and in the temperature range (298-473)K, the A.C. data discussed interims of the (CBH) model. |

# University of Baghdad

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|---|---|---|---|---|
| College Name | ibn al-haitham education college | | | |
| Department | physics | | | |
| Full Name as written in Passport | dhuha saadi abdulmajeed | | | |
| e-mail | | | | |
| Career | ● Assistant Lecturer | ○ Lecturer | ○ Assistant Professor | ○ Professor |
| | ● Master | ○ PhD | | |
| Thesis Title | Theoretical study of the drift velocity of electron in sf6 – n2 | | | |
| Year | 2002 | | | |


**Abstract**

Calculations have been measured and conculusion mathematical relations of drift velocity for electron in gaseous medium and identify distribution function of electron in two gases (n2) and (sf6) and their mixtures in different concentration for both.

The calculations have been performed by using numerical solution of two-term boltzman transport equation by projecting electrical fields on the gases relation to(nomad) investigating program for one of transport parameters that is drift velocity of electron in gaseous medium . its very important to mention that numerical solutions of boltzman transport equation dependent basically on cross section for each elastic encounters and inelastic encounters for electrons with these gases . therefore selecting suitable cross sections is more parameters which effect on correcting calculated results.

To confirm suitable selecting suitable cross sections, electrons distribution function should be calculated , as well as studying its behavior till sure of depending of cross sections in calculations.

The results of this study was conclusion of mathematical relation between drift velocity of electrons and the gas number density for mixture which was explaining the decrease of drift velocity of electron with increase of concentration of gas (sf6) in the mixture.

We noted from results increase of drift velocity of electron at high concen tration for (n2) comparing with gas (sf6) , the important of mixtures appears with more uses in electrical industries as generators,dielectrics...ets . and other applications.

# University of Baghdad

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|---|---|
| College Name | College of Ibn –AL-Haithem |
| Department | Department of physics |
| Full Name as written in Passport | Duha Mawlood Abdul-Lateef |
| e-mail | Duha_Mawlood @ yahoo.com |
| Career | ◌ Assistant Lecturer ● Lecturer ◌ Assistant Professor ◌ Professor |
| | ● Master ◌ PhD |
| Thesis Title | Study of the physical properties of $cu_2s$-cds heterojunction |
| Year | 2004 |
| Abstract | In the present work,$cu_2s$-cds heterojunction has been fabricated by chemical spray pyrolsis method and chemical displacement method for cds film respectively. Optical transmittance was studied for the prepared diod .It is found that transmittance is greater in the case back-wall illumination (cds-side) andthe results were interpreted in the base of refractive index.<br><br>I-V and C-V characteristics of fabricated hetrodiode have been studied and the rectification factor that extracted from I-V curve found to be greatly depended on the dipping time, this result was attributed to the decreas of series resistance of the hetrodiode with increasing dipping time.<br><br>Optoelectronic characteristics have been investigations approved through I-V curve under illumination . These investigations approved the existence of high density of interface states coming from the lattice.<br><br>Photovoltaic performance was evaluated through Isc, Voc , and photosensitivity . The results revealed that this performance is largely depending on the dipping time and cds thickness , and the resultants improved in the case of front-wall illumination.<br>Near – ideal hetrojunction diod with ideally factor close to unity was determined photoelectric method. |

# University of Baghdad

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|---|---|---|---|---|
| College Name | College of Education (Ibn Al-Haitham) | | | |
| Department | Department of Physics | | | |
| Full Name as written in Passport | Ebtisam M-T. Salman | | | |
| e-mail | emtaki66@yahoo.com | | | |
| Career | ◌ Assistant Lecturer | ● Lecturer | ◌ Assistant Professor | ◌ Professor |
| | ◌ Master | ● PhD | | |
| Thesis Title | Investigation Study Of Heat Exchange Intensification in High Power Laser Diode Bar | | | |
| Year | 2008 | | | |


**Abstract**

In this work an internal cooling mechanisem for laser diode junction is proposed depending on thermoelectric Peltier effect. Peltier coefficient for short-length laser diode is theoretically investigated. Both homojunction and heterojunction devices are considered, and Particular attension is given for $Hg_{1-x}Cd_xTe$ as a semiconductor laser material.

It is found that the cooling power at the junction is governed by the doping level, current density and the ratio of n-type region width to p-type region width. The optimal value of cooling power at the junction is found to be $2 \times 10^4 \frac{W}{cm^2}$ ( $1 \times \frac{10^4 W}{c\square^2}$ ) for $Hg_{0.8}Cd_{0.2}Te$ ($Hg_{0.5}Cd_{0.5}Te$ ) homojunction at optimal current density $1.4 \times \frac{10^6 A}{c\square^2}$ ( $1 \times \frac{10^6 A}{c\square^2}$ ), when the symmetrically doping level $1 \times 10^{19} cm^{-\square}$.

Temperature difference between the contact and the junction of $Hg_{0.8}Cd_{0.2}Te$ is higher than that of $Hg_{0.5}Cd_{0.5}Te$ by 60% .

Dimensionless figure of merit for $Hg_{0.8}Cd_{0.2}Te$ is higher than that of $Hg_{0.5}Cd_{0.5}Te$ by 70% .

The cooling power at the junction, temperature difference and dimensionless figure of merit are found in $Hg_{1-x}Cd_xTe$ to be higher than those of other homojunction laser material systems (GaAs, Si, AlGaAs, InSp, InAs, GaInAs, GaSb, and InP).

$Hg_{0.5}Cd_{0.5}Te$/CdTe single and double heterjunction laser diode are simulated (by using a software MATLAB version 7) and the Peltier coefficient for each layer in the devices is numericaly calculated. It has been

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| | found that heterjunction introduce a significant improvement in the internal cooling performance, so that, the cooling power increases to $8.85\times10^{7}W/cm^{2}$. |

# University of Baghdad

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|---|---|
| College Name | **Ibnul-Haithem** |
| Department | **physics** |
| Full Name as written in Passport | **Ektiffa Naji Salman** |
| e-mail | **ektefaa@hotmail.com** |
| Career | ◌ Assistant Lecturer ● Lecturer ◌ Assistant Professor ◌ Professor |
| | ● Master ◌ PhD |
| Thesis Title | **A theoretical study of the size effect in fracture mechanics** |
| Year | **1984** |
| Abstract | In chapter one of this thesis , a brief description of fracture definition, classification and fracture transitions from brittle to ductile response were reviewed. The size effect on stages, i.e fracture stress and fracture strain and on the other mechanical properties which lead to the transition were also considered. In chapter two the scaling principle, laws were approached for three different tests ( C.C.P. , D.C.P. , hertzian ). The effect of none-linearities and geometrics similarity on the transition stage were also studied. The charectarestis length that was approached by puttick's theory to be a condition for the fracture transition was scaled for the first time in terms of the scaling factor and the degree of non-linearity. The formulated scaling laws for this length have been generalized to cover the necessary conditions relative to the flow size. The application of the formulated scaling laws has been covered in chapter three. Both the results and the discussion for these applications of those laws were sited in chapter three. The conclusion of the results is linearity of equation ( 2.10) which means that the fracture transition conditions can be covered also by the scaling of th characteristic length. Besides, the fracture transition is on energy scaling criterion rather than a critical stress criterion. |

# University of Baghdad

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|---|---|
| College Name | Ibn_ ALhatham Education Collage |
| Department | physic |
| Full Name as written in Passport | Enas A. Jawad |
| e-mail | Enas20072000@yahoo.com |
| Career | ◉ Assistant Lecturer ○ Lecturer ○ Assistant Professor ○ Professor |
| | ◉ Master ○ PhD |
| Thesis Title | **Theoretical Study For Calculation The Neutron - Proton Energy Emitted From D – D Thermal Nuclear Reaction** |
| Year | 2008 |

Abstract


## Abstract

The most important application in plasma physics deal with

Hydroge Isotopes ( Deuterium and Tritium ) in energy production fields ,

because of the greatest energy emitted from nuclear fusion reaction , ( in

general the two branches of the nuclear fusion reaction D ( d , p ) T and **3**

D ( d , n ) He have approximately equal probability ) .

it is hope In the future that Deuterium – Deuterium power plant will be

viable , as the requirement of Tritium and its radioactive problem would be

eliminated D – D reaction is the same fusion process used in stars , and

Deuterium is much more readily available than Tritium as it can be produced

from seawater . Anther benefit of D – D fusion reaction is all of the energy

released takes the form of charged particles , greatly increasing the

potential efficiency of a power station .

In our recent research, the energy of proton and neutron that emitted from

is calculated on equation nuclear fusion reaction ( D – D )

$$\mathbf{E}\ n,p = (3/4\ Q + 3/8\ Ed)\left[\left(1 - \gamma^{2}\sin^{2}\theta\right)^{1/2} + \gamma\cos\theta\right]^{2}$$

It is deriving in our recent research.

the energy of proton and neutron that emitted from nuclear fusion reaction

taken from the incident deuteron energy that be at ( 4 _ ( D – D ) 20 keV )

and angle of reaction at the lab. System ( $30^0$ - $90^0$ ) interval of 15

# University of Baghdad

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|---|---|
| College Name | Education of Ibn Alhaithem |
| Department | PHYSICS |
| Full Name as written in Passport | ENASE YASEEN ABED |
| e-mail | ENASEYASEEN@yahoo.com |
| Career | (●) Assistant Lecturer ( ) Lecturer ( ) Assistant Professor ( ) Professor |
| | (●) Master ( ) PhD |
| Thesis Title | Effect Temperature and annealing on the Structural and Optical Propeerties of Some Thin Oxide Semiconductors (Zno) |
| Year | 2010 |
| Abstract | In the present Work.We study the Structure and Optical Properties of Zno Which prepared by thermal evaporation technique.Where deposit on glass substrates at thickness (400+_ 50)nm at different substrate temperature (27 100 150 200 250 )$C^{o}$ with rate (10nm $sec^{-1}$)and then we make oxidation for Zn films at temperature 400 $C^{o}$ at used Oxygen gas for one hour and last annealed samples at temperature 500 $C^{o}$ at times (1 and 2)hour.<br>The investigation of (XRD)indicates that the (Zno)film is polycrystalline type of Hexagonal. |

| University of Baghdad | | | | |
|---|---|---|---|---|
| College Name | IBN _ ALhaithm College of Education | | | |
| Department | physics | | | |
| Full Name as written in Passport | Farouq I. Hussain | | | |
| e-mail | Farq_59@yahoo.com | | | |
| Career | ◌ Assistant Lecturer | ● Lecturer / | ◌ Assistant Professor | ◌ Professor |
| | ◌ Master | ● PhD/ | | |
| Thesis Title | PREPARATION AND STUDY OF VARIOUS RAMs IN X – BAND | | | |
| Year | 2005 | | | |

Abstract

Three types of ferromagnetic (Ferrite) materials were prepared in this work by solid state reaction technique in order to design multilayer microwave thin absorber.

Barium-ferrite doped with (Ti-Mn) with formula ($BaFe_{12-x-y}Ti_xMn_yO_{19}$) and Barium-ferrite doped with (Co-Ti) with formula ($BaFe_{12}$-2x$Co_x$TixO19) with x-value (0.25, 0.75, 0.9) while for the first compound (x = 0.5; 0.5, 2.5; y = 0.5; 0.5, 2.0) Spinel-ferrite with formula [$(Ni_{0.4}Zn_{0.6}O)_{1-x}$ $(Fe_2O_3)_{1+x}$] also prepared as values of x = 0.004, 0.08, 0.12, 0.16, X-Ray diffraction results showed that the structure was polycrystalline and the phase of barium – ferrite completed at presintering at (1150 $^oC$) and (1100 $^oC$) for Spinel ferrite.

Using wave guide method for the three compounds, we studied the electrical and magnetic properties, in order to understand their magnetic, electrical loss and resonant frequency with excess of (x,y) for Barium-ferrite doped with (Co -Ti) and Ni – Zn – ferrite and we found the excess of (Ti) is more effective than (Mn) in $BaFe_{12-x-y}Ti_xMn_yO_{19}$ in shifting Fr from 48 GHz to x-band range. The same results were observed for Ba-ferrite dopped with (Co-Ti) while Spinel – ferrite were not very good materials as microwave absorber in GHz – range.

Designing of simple thin layer and multi layer was done using matlab V. 6.5 program and we found that Ba-ferrite were a very perfect materials as microwave absorber in x-band range and $BaFe_{12-x-y}Ti_xMn_yO_{19}$ was better than $BaFe_{12}$-2x$Co_xTiO_{19}$ as a thin microwave absorber.

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# University of Baghdad

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|---|---|---|---|---|
| College Name | Education College /Ibn Al-Haitham | | | |
| Department | Physics | | | |
| Full Name as written in Passport | FATIMAH ABDUL- AMEER JASIM | | | |
| e-mail | drfatima24@yahoo.com | | | |
| Career | ◌ Assistant Lecturer | ◌ Lecturer | ● Assistant Professor | ◌ Professor |
| | ● Master | ◌ PhD | | |
| Thesis Title | The Study of Transition Strength[M(E2)]$^2$ for Gamma-Ray As a Function of Atomic Number $18 \leq Z \leq 44$ | | | |
| Year | 2010 | | | |

Abstract

The electric quadrupole transition strengths $|M(E2)|^2_{W.u.}\downarrow$ for gamma transition from the first excited $2^+_1$ states to the ground $0^+_1$ states in even-even nuclei having atomic number ranging between 18 and 44 are studied in the present work through a life time for $2^+_1$ excited states with the intensities of $\gamma_0$ - transitions calculations.

The behaviour of electric quadrupole transition in even-even nuclei provided good information about magic and closed shell nuclei properties such that, when $|M(E2)|^2_{W.u.}\downarrow$ is calculated and plotted as a function of neutron number (N), regular shapes with minimum values for $|M(E2)|^2_{W.u.}\downarrow$ were observed at magic neutron number N=20 , 28 and 50 ,in isotopic chains with magic neutron nuclei or with nuclei of neutron at which the shell is closed while the isotopic chains without magic neutron nuclei have shape without minimum values for $|M(E2)|^2_{W.u.}\downarrow$ , and when $|M(E2)|^2_{W.u.}\downarrow$ is plotted as a function for proton number Z to the following isotonic chains:

$20 \leq Z \leq 26$ for N=28 , $22 \leq Z \leq 28$ for N=30

$26 \leq Z \leq 32$ for N=34 and $28 \leq Z \leq 34$ for N=36

Minimum values for $|M(E2)|^2_{W.u.}\downarrow$ are obtained at magic proton number Z=20 , 28.

These results indicated the $|M(E2)|^2_{W.u.}\downarrow$ values will be reduced to minimum in nuclei with magic nucleon number

# University of Baghdad

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|---|---|
| College Name | **Education College- Ibn –Al-Haitham** |
| Department | **Physics** |
| Full Name as written in Passport | **Firas Mahmood Hady** |
| e-mail | **firas_1962@yahoo.com** |
| Career | ◌ Assistant Lecturer ◌ Lecturer ● Assistant Professor ◌ Professor |
| | ● Master ◌ PhD |
| Thesis Title | **ANALYSIS OF NATURAL MILK USING X-RAY FLUORESCENCE TECHNIQUE.** |
| Year | **October 1989** |
| Abstract | **The aim of this study is to determine the mineral composition of different samples cattle and human milk. since, milk is an important natural food for infants, children and adults, therefore, a study of elements composition of these milk samples has been conducted. A technique based on the use of x-ray fluorescence by radioactive excited annular sources (Fe-55 and Cd-109) have been applied to determine the composition of these samples. Silicon detector Si(Li) with energy resolution 173 eV at 5.9 KeV (Mn-$K_\alpha$)attached to multichannel analyzer (LABEN-MCA) is used to obtain the x-ray spectrum.**<br>**Concentrations of elements in the samples are measured using relative comparison method with standard sample of milk (A-11) supplied by International Atomic Energy Agency(IAEA).**<br>**By this method (13) elements have been detected in cattle milk , there are :**<br>**Cl , K, Ca, Ti , Mn , Fe , Ni, Cu , Zn , Br , Rb , Sr , Mo .**<br>**While (14) elements have been detected in human milk there are :**<br>**Cl , K , Ca , Cr , Mn , Fe , Co , Cu , Zn , Br , Rb , Sr , Zr , Mo .** |

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| | **From the results we conclude the following:**<br>**1-Cow milk is rich with Ca , Ti and Ni elements.**<br>**2-Sheap milk is rich with Ca , Mn and Sr elements.**<br>**3-Goat milk is rich with Ti , Cu and Rb elements.**<br>**4-Buffalo milk is rich with Mn and Zn elements.**<br>**5-Camel milk is rich with Cl , K and Br elements.**<br>**6-Human milk is rich with Cl , Mn elements.** |

# University of Baghdad

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| College Name | **College of Education Ibn Al-Haitham** |
| Department | **physics** |
| Full Name as written in Passport | **Fudwa abbass mustafa** |
| e-mail | **fudwaabass@yahoo.com** |
| Career | ◌ Assistant Lecturer ◌ Lecturer ◌ Assistant Professor ● Professor |
| | ◌ Master ● PhD |
| Thesis Title | **CONSTRUCTING APROGRAM FOR THE PRACTICAL EDUCATION TO TRAIN THE PRACTICING –STUDENT ON USING SOME MODERN TECHING STYLES AND ITS EFFECT ON HIS PERFORMANCE AND HIS STUDENT´S ACHIEVEMENT .** |
| Year | **1999** |
| Abstract | Tasks of a science teacher in general, and a teacher of physics in particular, and in the light of new trends in education, demand, on our part, providing all possible provisions and possibilities which reflect positively on the pre-service preparation. These tasks are subject to rapid changes, which are likely due to the scientific knowledge explosion, technology and recent educational concepts.<br>This state imposes on universities, and teacher preparation institutes to evaluate their policies and teaching programs, and to modify them so that they will be able to cope with the modern developments and changes that are ever continuous.<br>Theoretical aspect alone, is not sufficient, to secure success in teaching and acquiring its basic skills.<br>Thus, the present study is aiming at constructing a program for peactical education to train the practicing student on using concept-mapping, pictorial riddles, and the discrepant events in teaching. It, also aiming at knowing the effect of the proposed program on the practing student's performance, and the achievement of students whom he is teaching during the collective practicing period.<br>The research sample consisted of two classes of the fourth year in the physics department of the college of education "Ibn Al-Haitham" – university of Baghdad. They were chosen randomly , one of them was considered to be the experimental group (30 students) on which the proposed training program was applied, and the other became the control group (30 students) on which the ordinary training program was applied.<br>The experimental design of partial control (post test) was chosen. The equivalency of the sample groups in (age, general achievement, achievement in methods of teaching science, and in curriculum for the academic year 1997 / 1998) was performed.<br>The researcher prepared the research tools which composed of the constructed proposed program. Its validity and suitability for the fourth-year |

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| | students of the research was ascertained by exposing it to specialists in the field of education (introductory evaluation). The proposed program included the way of building and preparing (concept mapping, pictorial riddles, and discrepant events), and their use in teaching. Therefore, the researcher analyzed the chapters of physics textbook for the second intermediate class, and then he designed the concepts maps. The validity of these maps was ascertained by presenting them to group of specialists in education; it was, then, adopted as a standardized maps to evaluate the maps that the practicing-students carry out during the individualized practicing period.<br>The researcher, also, prepared a group of pictorial riddles and discrepant events. Their validity and suitability for the second-intermediate pupils, were ascertained by presenting them to a group of specialists in education.<br>The proposed program was implemented in the academic year 1998 / 1999 . A formative evaluation was used to evaluate the proposed program when the performance of practicing students were evaluated through out individualized practicing period. A summative evaluation was, also, used when the performance of practicing students were evaluated at the collective practicing period. Two check lists sheets were used for this purpose: one of them used by the educational supervisor, and the other used by the scientific supervisor. The validity and reliability of the two check lists were verified. The program was also evaluated by applying the achievement test which was constructed by the researcher herself in the second-intermediate students who were taught by the practicing students through the collective practicing period, after assuring its validity, reliability, and the power of discuimination of its items and the coefficient of its difficulty. The two checklists sheets were used to assess the performance of the practicing students. (The summative evaluation), in the control group to whom the ordinary training program, was applied. The achievement test was also employed for the same purpose.<br>The data were processed statistically by using the t-test the results revealed that there was a significant difference at (0.05) level of significancy between the performance mean of practicing students of the experimental group, and the performance mean of practicing students of the control group in favour of the experimental group on the basis of the two check lists observation.<br>A significant difference was also, revealed between the marks mean of students whom the practicing students in the experimental group taught and the marks mean of students whom the practicing students in the control group during the collective practicing period, in the achievement test and in favour of experimental group. Thus, the nill hypo these of the research were rejected.<br>In the light of the research findings, the researcher recommended, to train the practicing students in the physics departments college of education Ibn Al-Haitham, and other similar colleges in accord to the proposed training program.<br>A number of suggestions were also presented. |

# University of Baghdad

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|---|---|
| College Name | Education of Ibn Al Haitham |
| Department | Physics |
| Full Name as written in Passport | GHUZLAN SARHAN AHMED |
| e-mail | GHZLANSA@YAHOO.COM |
| Career | ◉ Assistant Lecturer ○ Lecturer ○ Assistant Professor ○ Professor |
| | ◉ Master ○ PhD |
| Thesis Title | AStudy of spectro properties of coumrin -2 pigmnent and for polymer film PMMA dopped with this pigmnent |
| Year | 2009 |
| Abstract | The absorption And fluorescence spectrum of coumarin($C_2$)laser dye have been studied.This type of laser dye is belong to the coumarin family dissolved in dimethyl formamide (DMF)at the concentrations of ($1*10^{-5}$ ,$5*10^{-5}$ $1*10^{-4}$)molary measured at room temperature.<br>In this project a thin film of coumarin-2 laser dye has been made by dissolving the dye in(DMF)with poly methyl-metha acrylate(PMMA)with the same solvent at concentration of ($1*10^{-4}$,$5*10^{-4}$,$1*10^{-3}$) molary.All samples has been dried in a vacuum oven for five hours at a temperature of $80^{\circ}c$ .the quantum efficiency has been calculated to be (60.5%,66.4%,70.36%)respectively. |

| University of Baghdad | | | | |
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| College Name | Education (Ibn Al-Haitham), of University of Baghdad | | | |
| Department | Physics | | | |
| Full Name as written in Passport | Hadi Jabbar Mujbil Al-Agealy | | | |
| e-mail | Hadi_alagealy@yahoo.com | | | |
| Career | ◌ Assistant Lecturer | ◌ Lecturer | ◉ Assistant Professor | ◌ Professor |
| | ◌ Master | | ◉ PhD | |
| Thesis Title | ***Quantum Mechanical Model for Electron Transfer In Q-Switched Dye Used*** | | | |
| Year | 2004 | | | |


Abstract

A new quantum mechanical model, depending on Golden rule and spin-Boson Hamiltonian has been derived according to the perturbation theory. The model has been utilized to calculate the rate of electron transfer through a donor-acceptor system. Many solvents like chloroform, dichloroethane, benzene, acetone, and dioxane have been used as donors. BDN-I has been used as an acceptor.

For non-adiabatic system of donor-acceptor, a Q-Basic program has been written to compute the reorganization energy, driving force, and activation free energy. Coupling coefficients from Mulkin-Hush theory and the prior three parameters, have been used in the program to compute the rate of electron transfer.

The results have been discussed according to two assumptions, coincidence theoretically with Marcus theory, they are: (a) the solvents molecules in the emidite vicinity change their positions. (b) the atoms of the donor and acceptor are very loosely

bonded to each other during the very short electron transfer time.

The rate of electron transfer which is proportional to the donor electronic activity has been studied as a function of donor surface tension, dielectric constant and dipole moment.

Our results of the rate electron transfer are coincident with the theoretical aspect of the experimental observation for passively Q-Switched pulses using BDN-I dissolved in many solvents with Nd:YAG laser. The proposed quantum model has been used to calculate the rate of electron transfer at wavelength of 1060 nm for 0.0073 eV coupling coefficient. The values are $4.88 \times 10^{9}$, $2.65 \times 10^{9}$, $1.75 \times 10^{9}$, and $3.94 \times 10^{-20}$ $s^{-1}$ for chloroform, diochloroethane, acetone, and dioxane as solvents for the nickel dye respectively. These values are according to their observed electronic activity. High electronic activity, solvent pocceses high rate electron transfer.

Finally, the value of electron transfer rate obtained by using dioxane as an acceptor to the BDN-I is very low compared with the other solvents as donors due to its height barrier.

# University of Baghdad

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|---|---|
| College Name | College of Education Ibn Al-Haitham |
| Department | Physics |
| Full Name as written in Passport | Hameed Majeed Abdul Jabar |
| e-mail | h_majeed2003@yahoo.com |
| Career | ◌ Assistant Lecturer ◌ Lecturer ● Assistant Professor ◌ Professor |
| | ◌ Master ● PhD |
| Thesis Title | ***FUSION TECHNIQUES FOR GLOBALIZING THE FEATURES OF SATELLITE IMAGES*** |
| Year | 2007 |
| Abstract | Satellite images fusion techniques is one of the new branches in the remote sensing studies, its goal is to produce more informative image for interpretation, classification, segmentation, compression …etc purposes. This research work aims to enhance the available fusion methods and propose new fusion methods. In the case of fusion multispectral with panchromatic images, the substitution PCA fusion method and the perceptual color spaces are studied as fusion methods. In the perceptual color spaces, seven color spaces were tested using the available models and algorithms that mentioned in the most literatures, the Lab color space gave the best results among them. The filtering that proposed to adjust altering in the achromatic information and to override the over saturation artifact that the HIS color space suffers and to enhance the fusion performance. The effect of using different resampling method were studied, where the bilinear resampling method that mentioned by Niblack gave the best results.<br><br>In the case of fusing panchromatic images, three groups of |

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| | fusion methods were used, they are arithmetic, spatial, and statistical methods. For arithmetic and spatial fusion methods, the regular and the modified methods failed to produce fused images which convey equal features of the original images, in the wavelet fusion method, changing the basis vectors didn't change the performance of the fusion method since it was failed. For the statistical fusion methods, the FPF & LFF fusion method succeeded to produce images that convey equal features of the original images.<br><br>The proposed fusion methods (pseudo multiband generation and wavelet mapping using PCA fusion methods) succeeded to fuse the original images; the first method produced tunable feature superiority for the original images, while the second had high potential for adjustment to produce equal features.<br><br>To evaluate the results, two achromatic image quality criteria were used; the first is SNR for multispectral-panchromatic images fusion methods and zero mean SNR for panchromatic images fusion method. To evaluate the chromatic image quality; the average dispersion angle was used. |

# University of Baghdad

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| College Name | Education Ibn Al-Haitham |
| Department | Physics |
| Full Name as written in Passport | Hanaa Ibraheem Mohammed Abd-Ullah Al-Kubassi |
| e-mail | Hanaa.physics@yahoo.com |
| Career | ● Assistant Lecturer ○ Lecturer ○ Assistant Professor ○ Professor |
| | ● Master ○ PhD |
| Thesis Title | Opto-Electronic Properties of CdTe:Zn Thin Films |
| Year | 2008 |


Abstract

Some of structural, electrical and optical properties of pure and zinc (Zn) doped cadmium telluride (CdTe) thin films with impurity percentages (0.5, 1, 1.5)%, deposited on hot glass substrate (temperature equal to 423K) by thermal co-evaporation technique under vacuum of $2\times10^{-5}$ torr in thickness of 300nm and rate deposition of $0.5nm.s^{-1}$ have been investigates.

The composition properties for the prepared films were studied before and after doping process through tets of the X-ray diffraction, and it appeared that pure and dopant CdTe thin films are polycrystalline and have the cubic structure with preferential orientation in the [111] direction, and the crystal structure of the films were improved due to doping process.

And through d.c. conductivity measurements using Arrhenius plot [$\ln\sigma=f(10^3/T)$] in range of (291-495)K, we noticed that there are two activation energies $Ea_1$ and $Ea_2$, and their values decrease with increasing of Zn percentages, so the electrical conductivity ($\sigma$) of those thin films increases.

Hall effect data showed that the electrical conductivity for CdTe thin film is of n-type and converted to p-type when they adopted with Zn, and charge carrier concentration (n) increases with increasing of Zn percentages, so Hall mobility ($\mu_H$) decreases.

The photocurrent is observed to increase with increasing radiation intensity and impurity percentages.

From optical measurements we showed that pure and dopant prepared CdTe thin films have low transmission at high energies in the area of VIR And Near-IR spectrum, and all prepared films have high an absorption coefficient ($\alpha$) of ($\alpha>10^4$)$cm^{-1}$, and $\alpha$ value increase with increasing Zn percentages. Pure and dopant CdTe thin films have only direct energy gap ($E_g^{opt}$) for allowed electronic transition, and it is shifted to lower energies when Zn percentages increases, so it changes from 1.61eV for pure CdTe thin films to 1.48eV for doping CdTe thin films with 1.5%Zn.

# University of Baghdad

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| College Name | Education ,Ibn AL-Haithem |
| Department | Department of physics |
| Full Name as written in Passport | HANAN KADHEM HASSUN |
| e-mail | hanannsa@yahoo.com |
| Career | ◌ Assistant Lecturer ● Lecturer ◌ Assistant Professor ◌ Professor |
| | ● Master ◌ PhD |
| Thesis Title | Analysis The Three Stages of Sintering using Linear Programming |
| Year | 2005 |
| Abstract | Linear programming, namely L2- regression has been used to analyze the three stages of sintering process mathematically .<br>This was done via processing of the densification equations for the three stages of sintering . The wong equations were used for the initial and intermediate stage of sintering whi e Zaho and Harmar equations were used for the final stages of sintering.The processing of densification equations of the three stages of sintering was done so that to make utilization of L2-regression method possible .<br>Data for α - cristobilite is used to analye the effect of grain size and doping on densification ininitial and intermediate stage of sintering .<br>This was done for three particle sizes (6.12 ,8.92 ,13.6 ) μm withundoped initial powder and also with $La_2O_3$ and $Nd_2O_3$ dopants. α- Alumina were used to study the effect of grain size for the final stage .The initial particle sizes were (1.44 ,2.54 ,0.7-2.54,1.15-3.53).<br>The mathematical simulation showes that the densification increases as the initial particles sizes decreases and vice versa.<br>This reflects that the densification depends directly on the initial compact density with reflects the contacts area between the particle where the densification rates in the intermediate stage enhanced compared with that of the initial stage.<br>This due to completion of neck growth that facilitate the mass transport between the grains and also the presence of the massive grains due to the grain growth. Its shown also that the doping enhances the densification rates in the intermediate stage .The densification rates were reflected via coefficients of the mathematical simulation . These coefficients shows directly the relation of the grain sizes and doping with densification rates . |

# University of Baghdad

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|---|---|
| College Name | Education Ibn-Al-Haitham |
| Department | Physics |
| Full Name as written in Passport | Hayat Khalaf Hameed Al-Kubassi |
| e-mail | / |
| Career | ● Assistant Lecturer ○ Lecturer ○ Assistant Professor ○ Professor |
| | ● Master ○ PhD |
| Thesis Title | Study of Mechnical Test and Behavior of Unsaturated Polyester Resin Materil Reinforced by Fibers |
| Year | 2007 |


Abstract

Due to the increasing of the importance, which was occUlTed in the last year of using composite materials in general and polymers in special in different advanced
industrial applications. Therefore, this research came to explain the importance of the mechanical and physical properties and the temperature effect on the composite

polymers.

Unsaturated polyester resin was used as a matrix for composite materials, with
Jute fiber, PYC fiber, and fiber which was woven roving fiber and silica powder mat as reinforcement with volume fraction (Yf= 30 %). There are three types prepared:

1. Unsaturated polyester
2. Unsaturated polyester reinforced with Jute, PYC, and glass fibers
3. Unsaturated polyester reinforced with Jute, PYC fibers and Silica powder The Mechanical tests included (compression, bending, impact, creep and

hardness), which were carried out at different temperatures to study the influence of temperature on the properties.

The Physical tests included using Lee's disc method to calculate the temperature coefficient and after immersion in the water at the same time.

The Absorption te'T5t, was carried out to calculate the diffusion coefficient for all samples (before and after reinforcement), after soaking the samples at the same time
for a limited period in distilled water and solutions of (HCI and KOH) with (0.5) Normality.

Results show that UP reinforced with (Jute + PYC + G.F) possessed mechanical properties, the results showed good improvement of the impact strength (2.71- 68.26) MPa, Creep strength, Hardness strength (31.8 - 193) MPa and Young's modules (235
- 1765.8) MPa, while the physics test of thermal conductivity (0.167- 0.259) Watt/m. °C before immersion and (0.223 - 0.384) Watt/m.oc after immersion.

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| | The UP reinforced with (Jute+PYC+ SiO2) the results showed good improvement -n' compression strength (75 - 756.75) MPa, while high absorption of solutions HCI (1.85 - 4.62) x 10-13 (m2. Sec.l) and KOH (1.89 - 8.2) x 1 0-13(m2. See-'). |

# University of Baghdad

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|---|---|---|---|---|
| College Name | Education Ibn Al-Haitham. | | | |
| Department | Physics | | | |
| Full Name as written in Passport | Hind Abdulmajeed Mahdi | | | |
| e-mail | hinmut_ ph555@yahoo.com | | | |
| Career | (X) Assistant Lecturer | ( ) Lecturer | ( ) Assistant Professor | ( ) Professor |
| | (X) Master | | ( ) PhD | |
| Thesis Title | A study of infrared ray spectrum using the fermi resonance to discribe the large absorption in overtone frequencies of some molecules. | | | |
| Year | 2005 | | | |
| Abstract | In present IR spectroscopy study the propionic molecule ($CH_3CH_2COOH$) was used as proton donor molecule and group of different strength acceptors with varying concentratuions were used.<br>From stidy the following topics were confirmed.<br>1. Several spectra indicated a classification for fundamental frequencies $(3N-6)$ were obtained for ($CH_3CH_2COOH$) molecule and the other bands ranging $(400 \rightarrow 4000)$ cm-1.<br>2. Studying of the stretching frequencies $\upsilon$OH, and the causes of $\upsilon$OH broading and the appearance of the fine structure.<br>3. Calculation of the frequency shift $(\Delta\upsilon)$ due to produced hydrogen bonding which is consider as ameasure of strength of the hydrogen bonding.<br>4. Calculating the length R, the energy $(\Delta\upsilon)$ of the hydrogenic bond, integral absorption intensity A, (which is raises because of the forming hydrogen bond) through the frquency shifting $(\Delta\upsilon)$, and the force constant for (o – H) bond.<br>Chapter one includes the followings; Molecular symmetry, it's relation with radiation activity for the bonded molecles in bonding method towords infrared rays field, identify of vibration modes for multi-atomes molecules, and investigation of the active and inactive towards infrared and Raman rays according to anharmonic vibration model of diatomic molecules (Morse's potential).<br>In chapter two; the conditions for hydrogen bond, kind of banding, in addition to the vibrations of hydrogen bridge, Fermi – resonance concept and conditions.<br>Chapter three includes preparation of the solutions, (by mixing a quantity of proton donor acid with volume ratios of proton acceptor), and the description of FTIR instrument and the obtained IR Spectra.<br>Chapter four includes the results and discussion, frequency classification for the molecules under studying, discussion of the experimental relations according to the obtained result, it concludes the future work also. | | | |

# University of Baghdad

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|---|---|
| College Name | College of Education/Ibn Al-Haytham |
| Department | Physics |
| Full Name as written in Passport | Huda Dhia Jaafar Shkara |
| e-mail | hudashkara@yahoo,com |
| Career | ◌ Assistant Lecturer ◌ Lecturer ◌ Assistant Professor ◌ Professor |
| | ◌ Master ◉ PhD |
| Thesis Title | Using Iraqi Bauxite Waste Resulted from Alumina Extraction for Light Weight Building regarding Refractories |
| Year | 2008 |
| Abstract | Iraqi Bauxite was used as a raw material in this research. Alumina extraction experiments were done according to the Bayer process. The remains resulted from extraction were mixed with Volcanic Ash (in variable rations) and processed to form ceramic materials. .<br><br>Bauxite had been crushed at start, then sieved (according to Ginnie Scale)to produce (75 µm) particles. These particles were mixed with (1%, 3% , 5%, 10% and 15%) of Sodium Hydroxide (NAOH) respectively, then went through filtering and drying processes.<br><br>The remains (mostly Silica) were taken, crushes, sieved, (according to Ginnie Scale) and mixed with varying rations Volcanic Ash. The n samples were formed by using a special piston according to the semi-dry Axis process.<br><br>Samples were classified according to NAOH rations and the Volcanic Ash rations. Then they were burnt in different temperatures for two hours. The temperatures were (1100 °C , 1200 °C , 1300 °C).<br><br>Thermal conductivity, porosity, apparent density and water absorption of the samples have been measured.<br><br>The conclusion was that it is possible to produce good insulating ceramic of low density and thermal conductivity from the Iraqi Bauxite after processing it with NOAH. |

# University of Baghdad

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|---|---|
| College Name | **College of Education Ibn Al-Haitham** |
| Department | **physics** |
| Full Name as written in Passport | **Huda Majeed Tawfeek** |
| e-mail | **hudamajeed70@yahoo.com** |
| Career | ◌ Assistant Lecturer ● Lecturer ◌ Assistant Professor ◌ Professor |
| | ◌ Master ● PhD |
| Thesis Title | **Evaluation of the Nuclear Data on (α,n) Reaction for some of the isotopes used in shielding materials** |
| Year | **2008** |

Abstract


***ABSTRACT***

In this study , the experimental (α,n) cross section of the isotopes of $^{9}Be$ , $^{10}B$ , $^{11}B$ , $^{12}C$ , $^{13}C$ , $^{14}N$ , $^{19}F$ , $^{23}Na$ , $^{27}Al$ , $^{28}Si$ , $^{29}Si$ , $^{30}Si$ , $^{41}K$ , $^{45}Sc$ , $^{46}Ti$ , $^{48}Ti$ , $^{54}Fe$ , $^{56}Fe$ , $^{50}Cr$ , $^{55}Mn$ , $^{59}Co$ , $^{63}Cu$ , $^{65}Cu$ , $^{60}Ni$ , $^{62}Ni$ , $^{92}Mo$ , $^{94}Mo$ and $^{100}Mo$ which are important in the shield calculation of fuel are considered .

The basic data of the different isotopes was taken from the recent available publication and especially from the International atomic energy agency data .

In order to find the average cross section for each isotope from threshold energy to (15) or (25) MeV , the corresponding cross section were calculated in steps of (0.1) or (0.01) MeV , as needed , using the interpolation function .

Two kind of average cross section for each isotopes was calculated for the first time , the first one takes into account the error and second is a simple arithmetic mean .

The average cross section for the elements are calculated from the average cross sections of their isotopes taken into consideration of their abundance and mathematical formula are proposed for evaluation of these W.A cross section for each isotope and element .

The evaluated cross section are used to calculate the neutron yield using the stopping power of Zeiglar .

# University of Baghdad

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| College Name | **College Of Education Ibn Al-Haitham** | | | |
| Department | physics | | | |
| Full Name as written in Passport | Hussein ali jan miran | | | |
| e-mail | husseinjhan@yahoo.com | | | |
| Career | ⊘ Assistant Lecturer | ◌ Lecturer | ◌ Assistant Professor | ◌ Professor |
| | ⊘ Master | ◌ PhD | | |
| Thesis Title | **The Study Of Transition Strength $\|M(E2)\|^2$ For Gamma-Rays As A Function Of Atomic Number $18 \leq Z \leq 44$** | | | |
| Year | 2010 | | | |
| Abstract | The electric quadrupole transition strengths \|M(E2)\|_(W.u.)^2↓ for gamma transition from the first excited 2_1^+ states to the ground 0_1^+ states in even-even nuclei having atomic number ranging between 18 and 44 are studied in the present work through a life time for 2_1^+ excited states with the intensities of γ_0- transitions calculations.<br>The behavior of electric quadrupole transition in even-even nuclei provided good information about magic and closed shell nuclei properties such that, when \|M(E2)\|_(W.u.)^2↓ is calculated and plotted as a function of neutron number (N), regular shapes with minimum values for \|M(E2)\|_(W.u.)^2↓ were observed at magic neutron number N=20 , 28 and 50 ,in isotopic chains with magic neutron nuclei or with nuclei of neutron at which the shell is closed while the isotopic chains without magic neutron nuclei have shape without minimum values for \|M(E2)\|_(W.u.)^2↓ , and when \|M(E2)\|_(W.u.)^2↓ is plotted as a function for proton number Z to the following isotonic chains:<br><br>$20 \leq Z \leq 26$ for N=28 , $22 \leq Z \leq 28$ for N=30<br>$26 \leq Z \leq 32$ for N=34 and $28 \leq Z \leq 34$ for N=36<br>Minimum values for \|M(E2)\|_(W.u.)^2↓ are obtained at magic proton number Z=20 , 28.<br>These results indicated the \|M(E2)\|_(W.u.)^2↓ values will be reduced to minimum in nuclei with magic nucleon number.<br>For sake of comparison with the reduced transition probabilities B(E2) e2b2↑values reported in recent publication, the present values of the transition strengths \|M(E2)\|_(W.u.)^2↓ are converted to B(E2)e2b2↑ values. The present results are compared with the recent experimental data and other theoretical models and give good agreement with the experimental results , it provide the most accurate comparison to other theoretical models. | | | |

| University of Baghdad | | | | |
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| College Name | college of sciencecollege ib- al haithem | | | |
| Department | physics | | | |
| Full Name as written in Passport | Ikhlas hameem shelal | | | |
| e-mail | ehameem@yahoo.com | | | |
| Career | Assistant Lecturer | Lecturer | Assistant Professor | Professor |
| | Master | | PhD | |
| Thesis Title | A Study of the Electronic TransporEvaporationtation of $Cd_{1-x}Zn_xTe$ Films by Thermal | | | |
| Year | 2009 | | | |

Abstract

In this study ZnTe and $Cd_{1-x}Zn_xTe$ alloys with different zinc content (0.00, 0.02, 0.04, 0.06, 0.08) wt% have been successfully prepared from which $Cd_{1-x}Zn_xTe$ thin films were prepared by thermal evaporation technique under vacuum pressure $8x10^{-6}$ Torr ,with 700±30nm thickness and of 1.17 nm/sec rate of deposition. They are deposited on glass substrates at various substrate temperature (303,373 and 423) K, Then annealed at different temperature (423,473) K.

The results of XRD have proved that the structure of $Cd_{1-x}Zn_xTe$ alloys were polycrystalline with cubic zincblende phase and with (111),(200),(220) and (311) planes ,while the $Cd_{1-x}Zn_xTe$ thin films are found to be nearly single phase and strong oriented along the [111]direction with cubic zincblende structure. The EDAX measurements showed that the ternary alloys of $Cd_{1-x}Zn_xTe$, where ($0 \le x \le 0.08$), and thin films are prepared very well and have a good stoichiometry and nearly in agreement with the expected values.

The optical investigations of $Cd_{1-x}Zn_xTe$ thin films showed that the absorption edges shifted toward higher energies with increasing zinc content. The direct optical energy bandgap was observed to decrease with increasing substrate temperature from 303K to 423K.The refractive index increased and extinction coefficient decreased with increasing of (x) and ($T_a$).

The electrical D.C conductivity $\sigma_{dc}$ investigations of $Cd_{1-x}Zn_xTe$ thin films showed that $\sigma_{dc}$ occurred in one or two modes of conduction depending on the conduction mechanisms. The values of $\sigma_{dc}$ decreased with increasing zinc content(x),and annealing temperature($T_a$), while it increased one order of magnitude with increasing the substrate temperature($T_s$).Consequently, the D.C activation energies $E_{a1}$, $E_{a2}$ increased with increasing (x) and ($T_a$), while $\sigma_{dc}$ decreased

with increasing ($T_s$). The Hall Effect measurements indicated that $Cd_{1-x}Zn_xTe$ thin films were p-type for all (x) values, and the charge carriers concentration decreased three orders of magnitude with increasing zinc content.

It was noticed that the A.C conductivity $\sigma_{ac}$ and capacitance progressively decreased with increasing(x) values and ($T_a$), in contrast they increased with increasing ($T_s$). The A.C activation energies $E_{ac1}$, $E_{ac2}$ declared same behavior and lower values of these of D.C activation energies $E_{a1}$ and $E_{a2}$.The exponent (s) decreased from 0.971 to 0.689 when (x) increased from 0.00 to 0.08 and from 0.971 to 0.887 when ($T_a$), increased from 303 K to 423 K .Such behaviors indicate that the Correlated Barrier Hopping model (CBH) was the most suitable model to explain our data. The dielectric constant $\varepsilon_1$ results showed that the values of $\varepsilon_1$ was frequency dependent and decreased with increasing of frequency, also $\varepsilon_1$ increased with increasing $T_s$ ,and decreased with increasing (x ) and $T_a$.

The C-V characteristics for $Al/CdS/Cd_{1-x}Zn_xTe/Al$ structure deposited at 423K and annealed at 473K, were studied at the frequency $10^5$ Hz .These characteristics showed that the measured built-in potential and the carrier density decreased three order of magnitude, with increasing zinc content from ($1.41x10^{14}$ to $1.88x10^{11}$) $cm^{-3}$ for un- annealed samples and from ($4.45x10^{13}$ to $1.5x10^{10}$ ) $cm^{-3}$ for samples annealed at 473K.

The I-V characteristics for $Al/CdS/Cd_{1-x}Zn_xTe/Al$ structure deposited at 423K showed that the junction behavior is a good diode, and the forward current changes nearly exponentially .The effect of illumination on the junction properties has been studied and showed that (η), the ideality factor increased from (2.57– 5.24), for x=0.00 (pure CdTe), while (η) showed a non-systematic variation with (x) for residual (x) values.

# University of Baghdad

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| College Name | College of Education Ibn Al-Haitham | | | |
| Department | Physics | | | |
| Full Name as written in Passport | Ikram Jameel Abdulghani | | | |
| e-mail | | | | |
| Career | ◌ Assistant Lecturer | ● Lecturer | ◌ Assistant Professor | ◌ Professor |
| | ● Master | ◌ PhD | | |
| Thesis Title | Ultrasonic Studies of The Elastic Properties of Lead Germanate Under Pressure | | | |
| Year | 1985 | | | |


Abstract

Ultrasonic wave velocities in single crystals $Pb_5Ge_3O_{11}$ and $Pb_{4.7}Ba_{0.3}Ge_3O_{11}$ are measured as function of pressure by means of the pulse echo overlap technique at room temperature. The measurements of these velocities are used to obtain the second order elastic constants and hydrostatic pressure derivatives of the elastics constants of lead germinate and barium doped lead germinate. The fourteen third order elastic constants at room temperature of both materials are determined from measurements of the hydrostatic pressure and uniaxial stress dependences of ultrasonic wave velocities. Using the generalised Grüneisen theory in the quasi-harmonic approximation , the mean Grüneisen gammas in the high temperature limit are computed and are found to be positive. This finding , together with the behaviour observed for the elastic constants and their pressure derivatives , indicate that there is no significant acoustic mode softening in these materials, although the barium doped lead germinate crystal in quite close to the ferroelectric phase transition which is known to be driven by optic mode softening. $Pb_5Ge_3O_{11}$ has a space group symmetry $C_3$ , the symmetry of the elastic constant tensors is therefore that of the RII Laue group. However , when the basis of reference is transformed to that of the “acoustic symmetry” axes , the symmetry of the second order elastic constants of this material belonging to the RII Laue group exhibit the higher symmetry of the RI Laue group. In $Pb_5Ge_3O_{11}$ and $Pb_{4.7}Ba_{0.3}Ge_3O_{11}$ the acoustic and crystallographic symmetry are so close that those materials can be treated to reasonable approximation as belonging to the RI Laue group.

# University of Baghdad

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| College Name | Ibn Al-Haitham Education College |
| Department | Physics |
| Full Name as written in Passport | IMAD HADI KHALEEL |
| e-mail | imad_hadi@yahoo.com |
| Career | ● Assistant Lecturer ○ Lecturer ○ Assistant Professor ○ Professor |
| | ● Master ○ PhD |
| Thesis Title | $H^+$-$O^+$ Collision Frequency in the Polar Wind |
| Year | 2000 |
| Abstract | The polar wind is an ambipolar outflow of thermal plasma from the terrestrial ionosphere at high latitudes to the magnetosphere along geomagnetic filed lines. Understanding the characteristics of the polar wind is important for many reasons.<br>In this work we studied the motion of hydrogen ion in the polar wind and our main aim was calculate the collision frequency between $H^+$ and $O^+$ in the polar wind. We considered that $H^+$ ions move under the gravity, electromagnetic forces and $H^+$-$O^+$ Coulomb collision, we found theoretical formula of collision frequency, it's depends on the density of $O^+$ ions and the temperature of $O^+$ and $H^+$ ions.<br>We use a Monte Carlo simulation to study the flow of $H^+$ ions through an $O^+$ background in the polar wind. The simulation region included the barospher (collision-dominated region) , the exosphere (collision less region) and the transition region. The effects of polarization electric field, diverging geomagnetic field, and $H^+$-$O^+$ collision were taken into consideration.<br>We used improve Coulomb collision model ( Fokker-Plank form) for the $H^+$-$O^+$ interpartical interaction. The main results that we had was that the collision frequency had maximum value at lower altitude, because of high density of $O^+$ ions at that altitude, and then the collision process had chief roll on the $H^+$ ions motions. As the altitude increases, the effect of the Coulomb collision decreases exponentially (due to the exponential decrease of $O^+$ ion density). We discuss the effect of diverging geomagnetic filed and we found that at low altitude there is no different between the two cases (since the effect of Coulomb collision are dominates), but at high altitude its effects will appear so it be responsible for increasing of collision frequency at high altitude. |

# University of Baghdad

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| College Name | **College of Science ibn al - haithem** |
| Department | **Physics** |
| Full Name as written in Passport | **Iman Hameed Khdayer** |
| e-mail | demanphd2005@gmail.com |
| Career | ◌ Assistant Lecturer ◌ Lecturer ● Assistant Professor ◌ Professor |
| | ◌ Master ● PhD |
| Thesis Title | ***Photoconducting properties of InSb Junction with some single crystal semiconductor*** |
| Year | **2005** |
| Abstract | InSb alloy has been prepared successfully. The InSb films are prepared by flash thermal<br>and the same result for the films at different substrate temperature, and (111) direction is the preferential direction. From AAS and XRF we found the alloy compounds concentration.<br>The optical measurement show that the InSb films have a direct energy gap, and it's in general decrease with increasing of the substrate temperature.<br>The absorption coefficient, refractive index, extinction coefficient and the dielectric constants for the wavelengths in the range (5-10) μm increase with increasing the substrate temperature when it rise from 423 K to 448 K than it decreases as the substrate temperature increase to 473 K, and 498 K for all the range of the spectrum but these parameters increase with the increasing of the substrate temperature for limits ranges.<br>The electrical properties of the films are studied with the varying the substrate temperature and it is found that the electrical conductivity increases with the increasing the substrate temperature while the activation energies of the films decrease with the increasing the substrate temperature. The Hall effect measurements showed that evaporation The technique at various substrate temperature such that (423,448,473, and 498) K on clean glass and Si single crystal wafer. The structures of the alloys, as well as of the deposited films at different substrate temperature have been studied by x-ray diffraction method.<br>X-ray analysis has shown that the InSb alloy has polycrystalline structure the type of the films was n-type for the substrate temperature of the range (423-473) K, than it exchange to p-type as the substrate temperature rise to 498 K. The charge carrier concentration decrease with increasing the substrate temperature whereas, the carriers mobility increases. The drift velocity, mean free path and life time of the deposited films for all the range of the substrate temperature have been determined. From the measurements of the |

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| | four point probe methods, we found that the sheet conductivity increases with the increasing the substrate temperature.<br>The photoconducting properties of the InSb photoconductive detectors has been studied such that the photoconductivity, I-V, spectral responsivity, quantum efficiency, noise equivalent power, and specific detectivity for different substrate temperature at room temperature and 77 K have been studied.<br>InSb/Si heterojunction detectors have been fabricated by flash thermal evaporation method at different substrate temperature. The reverse bias capacitance measurement as a function of bias voltage at fixed frequency 10kHz indicated that these heterojunctions are abrupt type .Also from C-V measurement, we deduced that the built-in potential and the depletion layer width increase with the increasing the substrate temperature, while the charge carrier concentration decreases. The current-voltage characteristic of InSb/Si heterojunction for the forward bias at dark condition, show that the ideality factor values varies with the varying of the substrate temperature. The tunneling factors decrease with increasing of substrate temperature but increase when the measurement temperature decrease from room temperature to 77 K .The rectification factor decreases with increasing the substrate temperature but it increase with the decreasing the measurement temperature from room temperature to 77 K.The short circuit current and open circuit voltage increase with increasing the substrate temperature. The spectral responsivity ,quantum efficiency and specific detectivity increase with the increasing the substrate temperature, and decrease the measurement temperature from room temperature to 77 K while the noise equivalent power decrease in these conditions .The energy band diagram for InSb/Si heterojunction has been constructed .The output voltages increase with increasing the substrate temperature for InSb photoconductive films and InSb/Si heterojunction photovoltaic detectors. The time parameters have been calculated from time of flight ( TOF) methods for these detectors at different substrate temperature . |

# University of Baghdad

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|---|---|
| College Name | College of Education ( Ibn Al – Haitham ) |
| Department | Physics |
| Full Name as written in Passport | Inbethaq Mohammed Ali |
| e-mail | inbmer@yahoo.com |
| Career | ◌ Assistant Lecturer ◌ Lecturer ◌ Assistant Professor ◌ Professor |
| | ◌ Master ◌ PhD |
| Thesis Title | The Effect of Logarithmic Based Quantization on Texture Classification |
| Year | 2007 |
| Abstract | Texture analysis is an important problem in machine vision, with application in many fields including medical imaging, remote sensing, automated flow detection in various products, and document analysis. Over the last four decades many techniques for the analysis of texture of textured images have been proposed in the literature for the purposes of classification, segmentation, synthesis and compression. Such approaches include analysis the properties of individual texture elements, using statistical features obtained from the grey level of the image itself, random field models, and multichannel filtering. The wavelet transform falls into the category of unified framework for the multiresolution decomposition of signals. It allows a texture to be examined at different resolution whilst maintaining spatial resolution.<br>This thesis explores the use of the wavelet transform to the specific task of texture classification, and proposes a number of improvements to some of the existing techniques, both in the area of feature extraction and classifier design. By applying a nonlinear transform to the wavelet coefficients, a better characterization can be obtained for many natural textures. An increase in the classification performance has occurred when using the first and second order statistics of the quantized wavelet coefficients as features. The second order statistics of the coefficients gave an excellent performance in the texture analysis task, including classification, and they are typically calculated using co-occurrence matrices, which require quantization of the wavelet coefficients. |

# University of Baghdad

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| College Name | College of education ibn al haitham |
| Department | physics |
| Full Name as written in Passport | Intehaa ahmed mohammed |
| e-mail | |
| Career | ● Assistant Lecturer ○ Lecturer ○ Assistant Professor ○ Professor |
| | ● Master ○ PhD |
| Thesis Title | Theoretical design of an electron gun lenses using numerical methods |
| Year | 2002 |
| Abstract | A computational study has been carried out in the field of charged- particle optics with the aid of numerical methods and personal computer (pc). The work has been concentrated on the design of electrostatic lenses with different shapes and number of electrodes used in electron and ion guns for focusing charged-particle beams.<br>Eight different electrostatic lenses (einzal and immersion lenses) operated under different magnification conditions (Zero, Infinite and finite magnification) have been considered in our work.<br>The axial potential and field distribution of the eight electrostatic lenses have been determined by solving Laplace's Equation using the Finite Element Method (FEM).<br>The Paraxial ray equation then solved using the fourth order Runge-Kutt method. From the solution of Laplace's and the paraxial ray equations the optical properties such as the focal length, magnification, the spherical and chromatic aberration coefficients have been computed.<br>Knowing the electric potential on the anode and the distance between the cathode and the anode the properties of the electron or ion guns such as current density of the beam, brightness, and charge density have been computed. |

# University of Baghdad

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| | College of Education (Ibn Al-Haitham) |
| ent | Department of Physics |
| e<br>n<br>ort | Kabbas Abdul Jabar |
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| | | | |
|---|---|---|---|
| ◌ Assistant Lecturer | ● Lecturer | ◌ Assistant Professor | ◌ Profes |
| ● Master | ◌ PhD | | |

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| | Radioactivity Measurements In National Iraqi Foods |
| | 1989 |

Radioactivity Measurments

In National Iraqi Foods

## S U M M A R Y

An attempts was made to show if and to what extent the national food supply in Iraq is contaminated with radionuclides due to the operation of nuclear facilites or as a result of nuclear fallout. Studies of radionuclides in food may assist in predicting the possible exposure levels and doses to the population. It also can be used as an indication of high radioactivity in the environment such as might be experienced during accidental releases. Environmental radioactive contamination may easily find its way to human food chains via several environmental pathways. Foods which represent the diet of an average adult were sampled.

These individual foods were then devided into seven main different categories, each one represents similar food type. Furthermore, Food samples were grouped according to their specific geographical region from which it had been collected and referred to as a market basket.

The samples were collected from various regions of the country in addition to tuwaitha nuclear site and were selected to cover the common foods consumed in Iraq. Analysis and measurements of samples were performed in the laboratory after samples preparation for radionuclides concentration.

University of Baghdad

**University of Baghdad College of Education Ibn-Al-Haithem**

**Department of Physics**

**Kareem Ali Jasim**

**Kaj_kaj6@yahoo.com**

| turer | Lecturer | Assistant Professor | Professor |
|---|---|---|---|
| | | PhD | |

# rison Study of $T_c$ Between the Superconducting Compounds $Bi_{2-x}(Hg,Pb)$ $Ba_yCa_2Cu_3O_{10+\delta}$ and $Hg_{1-x}Pb_xSr_{2-y}Ba_yCa_2Cu_3O_{8+\delta}$

**2005**

igh temperature superconductors namely $Bi_{2-x}Pb_xSr_{2-y}Ba_yCa_2Cu_3O_{10+\delta}$, $Bi_{2-x}Hg_xSr_{2-y}Ba_yCa_2Cu_3O_{10+\delta}$ and $Hg_{1-x}Pb_xSr_{2-y}Ba_yCa_2Cu_3O$ pared by solid state reaction. The substitution for all the three compounds were taken as x=0.1, 0.2 and 0.25 and y=0.1, 0.2 and every (y). The calcinations and Several sintering temperature were attempted. The optimum calcinations was 800 $C^0$ and for $C^0$. Electrical resistivity, using four probe technique, is used to find the transition temperature $T_c$. The highest $T_c$ were 125K, 12 $_9Ba_{0.1}Ca_2Cu_3O_{10.26}$, $Bi_{1.75}Hg_{0.25}Sr_{1.9}Ba_{0.1}Ca_2Cu_3O_{10.271}$ and $Hg_{0.75}Pb_{0.25}Sr_{1.75}Ba_{0.25}Ca_2Cu_3O_{8.31}$ respectively. Most of the samples pre out $O_2$ , we found that the $O_2$ flow in our samples produce high- Phase superconductors compare with the samples prepared v RD) analysis showed an orthorhombic structure with an increase of the c-axis lattice constant for the samples doped with Ba no barium content. It was found that the change of the Ba, Pb and Hg concentrations of all our samples produce a change in th fraction $V_{Ph(2223)}$. The oxygen content has been considered for determination the value of $T_c$, although it was not systematic but n $T_c$ . For example the optimum δ for the system $Bi_{1.75}Pb_{0.25}Sr_{1.9}Ba_{0.1}Ca_2Cu_3O_{10.26}$ was [0.26] and gave highest $T_c$ =125K, while th $i_{1.75}Hg_{0.25}Sr_{1.9}Ba_{0.1}Ca_2Cu_3O_{10.271}$ was [0.271] and $T_c$ = 129K, and for the system $Hg_{0.75}Pb_{0.25}Sr_{1.75}Ba_{0.25}Ca_2Cu_3O_{8.31}$ the best of $T_c$ equals 119K. The effect of Ba additives in the $Bi_{2-x}Pb_xSr_{2-y}Ba_yCa_2Cu_3O_{10+\delta}$ and $Bi_{2-x}Hg_xSr_{2-y}Ba_yCa_2Cu_3O_{10+\delta}$. compounds, the r of Ba raises the transition temperature $T_c$ while additive greater than those decreasing transition $a_2Cu_3O_{8+\delta}$ superconductor has the best transition temperature $T_c$ for (Ba=Pb=0.25),in this compound for most the samples inc $T_c$.

| University of Baghdad | | | | |
|---|---|---|---|---|
| College Name | College of education (Ibn-Alhaithem) | | | |
| Department | Physics | | | |
| Full Name as written in Passport | Kassem Aziz Mohammed | | | |
| e-mail | kassemaziz@gmail.com | | | |
| Career | Assistant Lecturer | Lecturer | Assistant Professor | Professor * |
| | Master | | * PhD | |
| Thesis Title | Studies of some metal phalocyanines for gas sensor applications\university of Lancaster . UK. | | | |
| Year | 1987 | | | |

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| Abstract | The electrical, structural and sensing properties of some metal phthalocyanines have deen studied. The structural properties of the deposited films made using TEM and SEM. The results indicate that the α –form takes the form of randomly oriented microcrystallites dut the β–form showed oriented needle-link and whisker growth. DSC, I.R and polarizing microscope studies have shown that phthalocyanines heated to progressively higher temperatures undergo a transition to the β–form associated with the growth of α –phase crystals.<br>The dark conductivity of phthalocyanine films has deen studied as a function of material purity. |

# University of Baghdad

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|---|---|---|---|---|
| College Name | IBN AL – Haithem | | | |
| Department | physics | | | |
| Full Name as written in Passport | Khalid Hilal Harbbi | | | |
| e-mail | | | | |
| Career | ◌ Assistant Lecturer | ◌ Lecturer | ◌ Assistant Professor | ◌ Professor |
| | ◌ Master | | ◌ PhD | |
| Thesis Title | Quantitative analy sis of solder alloy (pb – Sn ) using x – ray diffraction Techuigue. | | | |
| Year | 1995 | | | |
| Abstract | An x- ray bowder diffraction Techuique , x-ray fluorescence and energy dispersiue Spectromete and been usedasaq aantitatine analy Si to deter wine The Conceutratien of alead- Tin alloy. | | | |

# University of Baghdad

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|---|---|
| College Name | THE EDUCATION /IBN-ALHAITHEM |
| Department | PHYSICS |
| Full Name as written in Passport | MAY ABDUL SATTAR MOHAMMED |
| e-mail | MAY_ALUBAIDI 2006 |
| Career | ◌ Assistant Lecturer ◌ *Lecturer* ◌ Assistant Professor ◌ Professor |
| | ◌ Master ◌ *PhD* |
| Thesis Title | NDINVESTIGATION OF UNIT CELL AND DEGREE OF CRYSTALLINITY IN POLYMERS PET , PBT BY DIFFERENT METHODS AND THRIR EFFECTS ON STRESS – STRAIN CURUES |
| Year | 2006 |
| Abstract | *CRYSTALLINITY AND MECHANICAL BEHAVHAVIOR OF POLY ETHYLENE TEREPHTHALATE MOLDED UNDER TWO METHODS : CALANDERING AND EXTRUSION BLOW MOLDING HAVE BEEN STUDIED IN TERMS OF DIFFERELNT TEMPERATURES THERMAL TREATMENT USING POWDER DIFFRACTION ' DENSITY ' DIFFERERNTIAL SCANNING COLARIMETRY AND TENSILE TEST RESPECTIVELY .*<br>IN ORDER TO OBTAIN IMFORMATION ON THE CRYSTAL STRUCTURE OF PET,THE PRINICIPLE OF FIBER DIFFRACTION IS UTILIZED IN THE GEOMETRICAL CONSTRUCTION OF RECIPROCAL LATTICE , WHICH IS THEN USED TO FIND INTERPLANER SPACING AND MILLER INDICIES FROM THE DIFFRACTION PATTERN OF PET AND PBT (POLY BUTYLENE TEREPHTHALATE) . THE DATA FOR BOTH POLYMERS FED INTO LEAST SQUARES REFINEMENT PACKAGES (FIRESTAR AND CLEN ) TO CALCULATE UNIT CELL DIMENSIONS , VOLUME AND STANDARD DEVIATIONS. THE RESULTS SHOW THAT THE UNIT CELL FOR BOTH POLYMERS BELONG TO THE TRICILINIC SYSTEM WITH DIMENSIONS AND ANGLES CLOSELY SIMILAR EXPECT AN INCREASE STRESS ( IN THE DIMENSION OF THE PBT DUE TO THE PRESENCEOF ADDITIONAL CH2 MOLECULE ALONG THE POLYMERIC CHAIN . THE DEGREE OF CRYSTALLINITY FOR MYLAR FILMS PET (6JLIM THICK) AND SHEET PET ( 530 MRN THICK ) IS DETERMINED FROM SCATTERED INTENSITY OF POWDER DIFFERACTION PROFILE AND ALSO FROM DENSITY AND HEAT CONTENT (ENTHALPY OF FUSION). RESULTS SHOW THAT DEGREE OF CRYSTALLINITY IS AFFECTED BY POLYMER MOLDING METHOD , PROCDURE OF MANUPLATING HEAT TREATMENT AND SELECTED TEMPERTURES. IT ALSO SHOWS THAT BOTH POWDER DIFFRACTION AND DENSITY YIELD HIGHER CRYSTALLINITY VALUES FROM THAT OF DIFFERENTIAL SCANNING CALORIMETRY DUE TO THE SPECIFICITY OF EACH TESTING METHOD .<br><br>THE TENSILE TEST FOR FILMS AND SHEETS OF PET MANIFESTED VIA LOAD – ELONGATION CUIRVES ILLUSTRATE THE INFLUENCE OF THERMAL TREATMENT PROCEDURE ON THE TENSILE STESS ( AT YIELD AND AT BREAK ) . SUCH THAT IT DECREASES WITH INCREASING TREATMENT TEMPERATURES FOR FREE TO SHRINKE FILMS , AND INCREASE WITH ANNEALING TEMPERATURE FOR CONSTRAINED TO SHRINKE SHEETS . |

# University of Baghdad

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|---|---|
| College Name | College ibn al - haithem |
| Department | Department of Physics |
| Full Name as written in Passport | Moafak Cadim Abdulrida Al-Zaidy |
| e-mail | moafak@uobaghdad.edu.iq |
| Career | ◌ Assistant Lecturer ◌ Lecturer ● Assistant Professor ◌ Professor |
| | ● Master ◌ PhD |
| Thesis Title | **Some Transport Properties of Thin Dysprosium Films.** |
| Year | 1977 |


**Abstract**

The electrical resistivity of continuous polycrystalline dysprosium (Dy) films has been measured with thickness range of 250 Å to 1850 Å. The films are deposited onto soda-glass substrate at room temperature (300 K) by thermal evaporation method at pressure of 10-7 torr. All the films are protected by coating them with SiO. The resistivity has been measured between 80 K up to 300 K, the variation of resistance with temperature has been used to obtain the paramagnetic Curie temperature, Curie point and antiferromagnetic and Neel temperature. Results obtained for the hydrogen free Dy films found to be in agreement with the size effect theory.

The spin-disorder resistivity, $\rho_{sp}$, has also been studied, the results show that $\rho_{sp} \alpha T^{3/2}$ over an appreciable temperature range in the antiferromagnetic region. While at paramagnetic region it is temperature-independent.

The thickness dependence of the TCR at 300 K and its variation with temperature have been investigated at antiferromagentic and paramagnetic regions. It has been found that the value of the temperature coefficient of resistance decreases with decreasing in thickness (grain size). The ordinary Hall effect of the hydrogen free continuous Dy films has also been studied at ferromagnetic and paramagnetic regions. The measurement has been investigated in the presence of applied magnetic field up to 10 KOe. The Hall effect of these films, in ferromagnetic region, shows a positive and large value with respect to that at paramagnetic region for the difference thicknesses.

The conduction mechanism of discontinuous Dy films has been investigated with thickness range of 170 Å to 460 Å. The films are deposited at substrate temperature 450$^{o}$C with high rate of deposition to get large islands and small inter-island separations. The results of the electrical conductivity can be explained in term of quantum mechanical tunneling at high temperature and

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| | at $\Delta E \sim kT$. The validity of Ohm's law at low electric field is observed, hence, it can be explained readily in term of a field independent activation energy with the decreasing in thickness. The transition point, from negative to positive TCR, occurs at the critical thickness while above 460 Å the TCR shows a positive value. |

# University of Baghdad

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|---|---|
| College Name | College of education Ibn Al-Haitham |
| Department | Physics |
| Full Name as written in Passport | Mohammed Abdul-Nebi Thejeel |
| e-mail | DrmohammedA@yahoo.com |
| Career | ◌ Assistant Lecturer ◌ Lecturer ◌ Assistant Professor ◌ Professor |
| | ◌ Master ◌ PhD ✓ |
| Thesis Title | **The preparation and studying the structural and mechanical properties of high $T_c$ (Cr-1212) superconductors** |
| Year | 2006 |


Abstract

**ABSTRACT**

High $T_c$ Cr-1212 superconductors prepared successfully by the solid state reaction ,where they sintered at different temperatures and times. However, the results showed that the best sintering temperature and time were 1323K and 20h respectively.

Phase identification in the produced powders was carried out by X-Ray Diffraction technique. The theoretical density determined depending on the unit cell dimensions. In contrast, the experimental density has been measured by using Archimedes apparatus. Consequently, the porosity of samples has been measured by two methods. The first depends on theoretical results, and the latter depends on Archimedes apparatus.

The grain size of superconductor has been investigated by means of optical microscopy. The oxygen content of superconductors was determined by iodometic titration.

The influence of sintering temperature and time on the critical temperature, oxygen content, microstructure, and density have been investigated. Moreover, the mechanical properties such as, Vickers microhardness , Young modulus, fracture toughness, fracture energy and brittleness have been measured.

| University of Baghdad | | | | |
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| College Name | Education (Ibn Al-Haitham), of University of Baghdad | | | |
| Department | Physics | | | |
| Full Name as written in Passport | Mohsin Aneed Hassooni | | | |
| e-mail | Mh_sn@yahoo.com | | | |
| Career | ◉ Assistant Lecturer | ○ Lecturer | ○ Assistant Professor | ○ Professor |
| | ◉ Master | ○ PhD | | |
| Thesis Title | A Theoretical Model for Electron Transfer in Dye/ Semiconductor System Interface with Verity Solvents | | | |
| Year | 2010 | | | |
| Abstract | A theoretical model depending on quantum mechanical and Golden rule has been derived to formulated a formula the rate constant of ET in a dye – semiconductor system with variety solvent. This model is applied theoretically on a system which contains safranineT and coumarin dye with $TiO_2$ and ZnO semiconductor with many solvents like water, 1-propanol, Formamide, Acetonitrile and Ethanol.<br>The solvent reorganization energy, effective free energy, activation free energy, electronic coupling coefficient, and rate constant of electron transfer are calculated theoretically with a matlap soft ware solving the suitable formulas for the above parameters.<br>We concluded that the above described parameters ($\lambda, \Delta G^*, \Delta G^*, k_{ET}$), and rate constant of electron transfer is large in a system contains ZnO semiconductor in compare with a system contains $TiO_2$ semiconductor<br>with the same dye and solvent. Results of reorganization energy, , | | | |

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| | calculated theoretically are in a good agreement with experimental and theoretical research. |

# University of Baghdad

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| College Name | IBN AL - HAITHEM |
| Department | Arts in Arabic |
| Full Name as written inPassport | MowafakFatouhiDawod |
| e-mail | Salwan_1987m@yahoo.com |
| Career | ◌ Assistant Lecturer ◌ Lecturer ● AssistantProfessor ◌ Professor |
| | ● Master ◌ PhD |
| Thesis Title | AL- Soyoutti References in a book called samilarites and equals in eloquence |
| Year | 23 / 7 / 1989 |
| Abstract | This research is a complete study for a book of Arabic grammar, expression language as well as different general subjects in which we have managed to present a new information about many references which had been taken by Al – Soyoutti in writting his book semi – similarities and similarities of Arabic grammar . |

# University of Baghdad

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|---|---|---|---|---|
| College Name | College of ibnal - haithem | | | |
| Department | Physics | | | |
| Full Name as written in Passport | Mudhafar Jasim Sahib | | | |
| e-mail | | | | |
| Career | (×) Assistant Lecturer | ( ) Lecturer | ( ) Assistant Professor | ( ) Professor |
| | (×) Master | ( ) PhD | | |
| Thesis Title | The Representation of Geometry of Roche Limits on The Compact Objects | | | |
| Year | 1995 | | | |


Abstract

Compact objects (white dwarfs ,neutron stars & black holes) and their physics have been studied. A great dealing with black holes have been taken here to construct a physical model for them, depending on (Roche model) for contact binaries after expanding the range of the mass ratio to be contain various probable ratio for the two stars of the X-ray binary system, which one of its components is a visible normal star, where the other is the compact X-ray star.

According to our calculations, it is possible to compare the fractional radii $(r_o)_{1,2}$ for the X-ray binary stars with Roche limits $(R_{Roche})$ for both stars, and then, this gives whether one of the two stars fill Roche limits or both of them or neither of the two are not.

# University of Baghdad

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| College Name | Education (Ibn Al-Haitham), of University of Baghdad |
| Department | Physics |
| Full Name as written in Passport | Mudhir shihab Ahmed |
| e-mail | |
| Career | ◌ Assistant Lecturer ◉ Lecturer ◌ Assistant Professor ◌ Professor |
| | ◌ Master ◉ PhD |
| Thesis Title | Study some of the nonlinear effects in optical fiber lasers |
| Year | 2006 |


Abstract

The present study aims at depositing a mathematical model that include the effect of dispersion. Nonlinearity and noise for a single longitudinal mode optical fiber lasers by using Generalized nonlinear Schrodinger and Maxwell-Bloch equation .

According to the dispersion type, this model includes the state U,V,W respectively and because of Nonlinearity the state U includes three possibilities , where as for states V and W each of them includes six Possibilities. These fifteen possibilities give a vivid concept of these two effected whether the model neglects or includes the effect of noise.

The optical fiber lasers work in general, by multi longitudinal mode formula , therefore the equations of the formula have been derived and condition (m=n=p=q=1)has been used to obtain the single longitudinal mode formula equation . Lorenz-Haken notation have been used to normalized the single longitudinal mode formula in order to obtain an equation that describes the lasing outbut power of the single longitudinal mode optical fiber lasers, assuming that CW solution which verify the normalized single longitudinal mode formula. Finding the numerical solution of this eqution requires identifying the type of optical fibers lasers ,where Er- doped fiber ring laser EDFRL and Nd- doped fiber ring laser NDFRL have been adopted, and a special program me Matlab 6.5 has been prepared to find this solution for these teo lasers. According to both (p) values obtained via the numerical solution of the power equation in fifteen possibilities and selected values of the

variables , (wd)and $w_2$ for both lasers, the possibilities $u_1$ ,$v_2$ and $w_2$ have been adopted from the states U V and W respectively . a typical the

variables ,(wd)and $w_s$
Have been adopted for both lasers. The most important results, which have been obtained when using the typical values for $\delta$ , (wd)and $w_s$ to finding the numerical solution of the lasing output power equation in the possibilities $u_1$ ,$v_2$ and $w_2$ con be achieved by comparing (P) values in two possibilities ($u_1$)and $w_2$. However the dispersion and nonlinearity cause (P) values to increase in EDFRL and decrease in the NDFRLwhen the model neglects' the noise effect.where these decrease in both lasers when the model includes this effect. Also they make (P) values in EDFRL higher than that in NDFRL whether the model neglects or includes the noise the effect.

# University of Baghdad

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|---|---|
| College Name | College of Education (Iben Al-Haitham) |
| Department | Department of Physics |
| Full Name as written in Passport | Mustafa K. Jassim |
| e-mail | wwwww1961@yahoo.com |
| Career | ◌ Assistant Lecturer ◌ Lecturer ◉ Assistant Professor ◌ Professor |
| | ◌ Master ◉ PhD |
| Thesis Title | **Anomalous Diffusion due to Ionization Instability in Megnetohydrodynamic Generators** |
| Year | 2005 |
| Abstract | This work is done on simulated Hall MHD generator to determine whether there is any correlation between electron anomalous diffusion due to a ionization instability appearing in MHD generators. The anomalous diffusion, also called Bohm diffusion, recently applied to the instability of the plasma by considering that the factor of Bohm diffusion equation is not just a number but factor depending on instability of the plasma. We apply this approach on the ionization instability appeared in MHD generator. Firstly, the variation of wave vector with the absolute value of the real part has been studied and with the growth rate for both modes resulting from solving the dispersion relation of the electrothermal waves. It is found that the ionization mode is unstable under some conditions. Ignoring the fast thermal mode, which is always damp, we concentrate on the unstable mode that is responsible for ionization instability. The other parameters included in the instability on the growth rate and on the frequency of one mode of the instability. This |

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| | yields a background to study the anomalous diffusion by calculating the modified Bohm coefficient due to Sanduk approach through Sanduk factor, and then the current arises because of electron diffusion. The variation of both the growth rate and the frequency with the angle between the wave vector and steady state current density, magnetic field and electron temperatures are studied. It is found that the growth rate maximized at angle of $45^{o}$ for electron temperature of $2500^{o}$K and at fixed background gas temperature of $1500^{o}$K, wavelength of electrothermal wave and magnetic field value. This result is in complete agreement with the previous reported results. While the variation of the growth rate with magnetic field for different electron temperature is linear, the growth rate variation with electron temperature maximized at electron temperature of $2500^{o}$K for a value of magnetic field of 5T. To study the anomalous diffusion the variation absolute values of the growth rate to the frequency ratio with instability parameters: angle, magnetic field and electron temperature is calculated. This leads to calculate Sanduk factor and the modified Bohm coefficient. The perturbed current arising in this generator is calculated for entire cases. This result indicates that a correlation between anomalous diffusion and the ionization instability indeed existed. Finally we change the neutral gas density by fixing other variables to determine the range of increasing or decreasing of perturbed current. The last procedure is done by varying the seed number density with fixed other variables. |

# University of Baghdad

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|---|---|
| College Name | Ibn_AL Haitham /Baghdad University |
| Department | physics |
| Full Name as written in Passport | Mustafa Mohammed Ali |
| e-mail | Mustafaus20052001@yahoo.com.au |
| Career | ● Assistant Lecturer ○ Lecturer ○ Assistant Professor ○ Professor |
| | ● Master ○ PhD |
| Thesis Title | Preparation & study the physical & mechanical properties for classy porcelain |
| Year | 2004 |

Abstract


*Abstract*

Porcelain sample has been prepared using Duekla kaolin ,urthuma sand and potash feldspar as starting materials the qurtz particles of sand is melted in the feldspar before it mixed with kaolin, then the effect of sintering temerature on the physical properties of the porcelain has been studied. Three silica \ feldspar mixes (A,B,C) has been prepaired and burned at 1300°C with soaking time of 2hr. then, the resultant glass were milled. The particle size measured has been performed. Three groups of samples has been prepaired by adding kaolin (40,44,48,52,56,60)wt% to each type of glass. The samples were sintered at (1100-1300)°C with soaking of 2hr.

Shrinkage, density, porosity and water absorption were measured, the best dense samle were subjected to mechanical properties measument.

The results shows the density increases with sintering temperature as a resul for enhansing the sintering mechanism with temperature. The kaolin contents had not shown obvious effect on sintering. The samples C of 60% feldspar showed best densities at 1300°C because they provide enough glass phase which act as a jiont phase between particles and encourage closing of poros and to attain good packing which reflected in the microscopic photography.

Both porosity and water absorption was reduced with increasing sintering temperature espacially of samles type C.

The results of hardness and copression were coherent with density results. The best is with C samples espcially with that of 40% kaolin which reflects the importance of the glass phase in enhansing the mechanical properties of the ceramic body.

The results of bending and impact show no obvious effects of the glass phase on the stregth of the ceramic body, that the B samples, which has lower feldspar contents than that of C samples, shows the best results for bending especially at 56% kaolin.

# University of Baghdad

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|---|---|---|---|---|
| College Name | Education Ibn Al Haytham | | | |
| Department | Physics | | | |
| Full Name as written in Passport | Nabil N. Butrus RAMMO | | | |
| e-mail | nabilrammo@yahoo.com | | | |
| Career | ◌ Assistant Lecturer | ◌ Lecturer | Assistant Professor | ◌ Professor |
| | ◌ Master | | **PhD** | |
| Thesis Title | The Crystalline Structure and Mechanical Properties of Polypentamethylene Terephthalate | | | |
| Year | 1977 | | | |
| Abstract | Two crystalline structures of oriented fibers of poly(pentamethylene terephthalate) can be produced by choosing suitable annealing conditions. One is obtained when a fiber is annealed free to retract (the α-form), the other when it is restrained under high tension (the β-form). The unit cells of both forms are triclinic. The chain conformation of α–form changes reversibly to β–form with applied strain. | | | |

# University of Baghdad

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| College Name | Education IEducation Ibn Al Haythambn Al HaythammIbn Al Haythamon Ibn Al Haythame of EdEducation Ibn Al Haythamucation /Ibn AL-Haitham | | | |
| Department | Physics | | | |
| Full Name as written in Passport | NAZ TALAB JARULLAH | | | |
| e-mail | naztalab2005@yahoo.com | | | |
| Career | ◌ Assistant Lecturer | ● Lecturer | ◌ Assistant Professor | ◌ Professor |
| | ◌ Master | ● PhD | | |
| Thesis Title | Design of Digital Filters for Analysis of Electroencephalography EEG Signal | | | |
| Year | 2007 | | | |

Abstract


## *ABSTRACT*

In this study, the analytical sequence technique was designed and applied on normal and epileptically human EEG data. This technique was composed of three stages. **First** extraction of EEG spikes and rejection noise, slow and artifacts components. **Second** determining amplitude threshold which describe spike incidence. **Third** representation of spikes per second on a bar chart.

A set of band pass digital filter was developed for extraction of EEG spikes. An accurate detection of spikes was obtained with digital filter of double zero at ($z = \pm 1$), single pole placed on a circle of radius ($r_1$ and $r_2$) and $4^{th}$ order pole was placed at the origin.

A threshold program was successfully used to recognize the spikes incidence.

Bar chart program was carefully used to count the number of incidence spikes per second on EEG data.

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| | The analytical sequences technique was applied on one minute of EEG data for normal and epileptically subjects of both male and female during listening to impact sound and soft music.<br>A significant increase in the number of spikes per second of normal female during impact sound and soft music records comparing to the open eyes state .While a non- significant increase in the number of spikes per second of normal male during impact sound and soft music records comparing to the open eyes state .Further more, a non- significant increase in the number of spikes per second of epileptically female during impact sound and soft music records comparing to the open eyes state.<br>Finally, from the comparison between the number of spikes per second during listening to impact sound and soft music, it was found a non-significant decrease in the number of spikes per second in normal females, and significant decrease in the number of spikes per second in epileptically females and normal males. |

# University of Baghdad

| | |
|---|---|
| College Name | College of Education / Ibn Al-Haitham |
| Department | Physics |
| Full Name as written in Passport | Nidhal Moosa Abdul-Ameer |
| e-mail | nidmoosa@yahoo.com |
| Career | ◌ Assistant Lecturer ● Lecturer ◌ Assistant Professor ◌ Professor |
| | ◌ Master ● PhD |
| Thesis Title | Theoretical Investigation of Light Emission From a-SiQDs Nanostructures |
| Year | 2008 |
| Abstract | We present calculations using a simple model of radiative recombination in quantum dots from amorphous silicon, showing a significant size dependence of the photoluminescence. In this model, we suppose coexistence both the confinements (spatial and quantum). In contract to bulk a-Si structures, a-SiQDs exhibits visible luminescence peak energies and high radiative quantum efficiency at room temperature. The quantum efficiency is very sensitive to any changing in defect density. But, with small dot size, the quantum efficiency is insensitive. Our analysis shows that the photoluminescence intensity is increased or decreased by the effect of radiative quantum efficiency, while its style reflects the behavior of photon flux. Also, the emission energy can be tuned into the visible range of light from red to blue by controlling the size of a-SiQDs, in other words the blue shifting is attributed to quantum confinement effect. The spatial confinement effect is appeared clearly in red shifting for this model. We predict a decrease in radiative decay time as structure size shrinks, with taking into account the decay time is |

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| | independent on dispersion factor. We find a good agreement in comparison our results with the experimental data. From these results, we assert that a-SiQDs are promising candidates for visible, tunable, and high performance light emitting devices. |

| University of Baghdad | | | | |
|---|---|---|---|---|
| College Name | *college of Ibn- Al-Haithemy* | | | |
| Department | physics | | | |
| Full Name as written in Passport | NOORULHUA HASAN ABDULHUSSEIN | | | |
| e-mail | | | | |
| Career | ◉ Assistant Lecturer | ◌ Lecturer | ◌ Assistant Professor | ◌ Professor |
| | ◉ Master | ◌ PhD | | |
| Thesis Title | | | | |
| Year | 2009 | | | |

# Abstract


Abstract

We prepared PbS thin films by using chemical bath deposition method, we studying the structural Properties By using X-Ray diffraction and shows that the annealing temperature in the range (373-423)K and annealing time (1)hr improving the crystal structure of thin films.

The Atomic Force Microscopy (AFM) Measurements shows that the PbS thin film having homogenous nanocrystalline structure of grain size (37.67) nm.

From (UV-Vis ) spectra of PbS films deposited on glasses substrates and different thickness in the range (500-1000)nm and temperatures, we found that the absorpitivity, reflectivity and optical constants for this films

(absorption coefficient, extinction coefficient, refractive index and two partial dielectric constant real and imaginary). The high absorption value was measured at (400)nm wave length in the range (0.7-1)nm.

We found that the prepared films having high ,and having direct absorption coefficient (%>$10^4$)$cm^{-1}$ energy gap and allowed direct transition only in the range (1.5-2.1) eV the value of energy band gap will change by changing the time and temperature of deposition.

Finally, the results show that the films thickness increases with increasing the average growth velocity of these films in the range time (0.5-3.5)hr and in the range thickness (500-1000)nm.

# University of Baghdad

| | | | | |
|---|---|---|---|---|
| College Name | Education Ibn AL-Haitham | | | |
| Department | Physics | | | |
| Full Name as written in Passport | Orooba Jameel Taresh | | | |
| e-mail | Dania_ro2011@yahoo.om | | | |
| Career | ◌ Assistant Lecturer | ● Lecturer | ◌ Assistant Professor | ◌ Professor |
| | ◌ Master | ● PhD | | |
| Thesis Title | A Radiative Model to Study the Effects Atmospheric Aerosols Effects on Spectral solar Radiation | | | |
| Year | MAY 2010 | | | |


**Abstract**

Arosols are one of the important factor modulating the solar energy reaching The ground and trappd in the atmosphere. They thereby play ky roles in the Earth climate. The aim of this thesis is to develop an aerosoloptical database And solar spectral computer model to investigate the effects of relative Humidity,aerosols types, and aerosols concentration on the optical Properties (extinction coefficient,single scattering albedo, and Asymmetry parameter) of the aerosols and the effect of aerosols On spectral solar radiation.

# University of Baghdad

| | |
|---|---|
| College Name | **College of Education \ Ibn-Al-Haitham** |
| Department | **Department of Physics** |
| Full Name as written in Passport | **Raad Hameed Majeed** |
| e-mail | **Not exist** |
| Career | ◌ Assistant Lecturer ◌ Lecturer ● Assistant Professor ◌ Professor |
| | ◌ Master ● PhD |
| Thesis Title | The effect of gas density on electron mobility using transport equation |
| Year | 1998 |
| Abstract | Calculation of the electron energy distribution function and the transport parameters related to inert and active gases subject to different applied electric field intensity are carried out and mathematical relations related to some of these parameters are device using least-squares fit. The gases are pure inert gases and as a mixture of inert and/or active gases such as argon and helium for pure inert gases and argon –hydrogen ,argon-helium, and argon – helium- nitrogen as a mixture of gases with various mixing concentrations.<br>The execution of such calculations is achieved through the use of numerical solution of Boltzmann-transport equation for electrons in the presence of an applied electric field in the gases of interest. These numerical solution are utilized program called NOMAD.<br>The obtained result are tabulated and plotted as a function of the ratio of the applied electric field to the number density of the gas and / or the gas es of interest. These result of drift velocity exhibit high accuracy as compared with some of the available experimental results.<br>Emphasis on calculations of electrons mobility as a function of gas mixture number density at specified E/N value is concerned with different gas mixture as cited in the present work. Mathematical relations for these cases are obtained. These relations can be filling the incandescent lamps and halogen lamps or for discharge process in gases. |

# University of Baghdad

| | |
|---|---|
| College Name | **College of Education Ibn Al-Haithem** |
| Department | Physics |
| Full Name as written in Passport | Raghad Subhi Abbas |
| e-mail | Raghad Subhi Abbas@yahoo.com |
| Career | ◌ Assistant Lecturer ● Lecturer ◌ Assistant Professor ◌ Professor |
| | ◌ Master ● PhD |
| Thesis Title | **Study the effect of Iraqi Bentonite Clay addition on the Properties of Porcelain Body Prepared from Local Clays** |
| Year | 2010 |
| Abstract | This investigation is concerned on the effect of Iraqi bentonite clay addition on the properties of porcelain body . Porcelain body is prepared from local clays (Kaolin Duakhla and Arudhma sand glass) , potash feldspar , ball clay , and with addition of ZnO and electrolyte solution.<br>This effect was resulted from their dielectric properties (dielectric constant , loss factor , and dielectric break down ) as well as the other related properties such as porosity ,densification, thermal conductivity, and compressive strength. |

# University of Baghdad

| | |
|---|---|
| College Name | Education(Ibn Al –Haitham) |
| Department | Physics |
| Full Name as written in Passport | Rawnaq Qays Ghadhban |
| e-mail | Adil_satar@yahoo.com |
| Career | ◌ Assistant Lecturer ◌ Lecturer ◌ Assistant Professor ◌ Professor |
| | Master ◌ PhD |
| Thesis Title | Design Of Composit Shielding Material For Gamma-Ray Protection |
| Year | 2009 |


Abstract

The aim of this work to study theoretically the attenuation of Gamma-ray by different materials either pure or composited in one bulk body to attain certain desired properties needed in the field of radiation shielding. Gamma photons transmission through composites was simulated by using Monte Carlo programming method.

A computer program was designated and tested for some cases of elemental and composited materials. Composites density for the different formulations was selected to be the variable parameter upon which the results were weighed as compared to the pure elements. Polyethylene (P.E) was selected to be the matrix in which elemental (Tungsten, Lead, Copper and Iron) of different volume fractions' were embedded alone in one case and mixtures there off in another case.

The present work was designed to study the effect of density, thickness and source – detector distance on the

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| | attenuation of Gamma – ray by composites of proposed formulation in the energy rang (0.3 – 1) MeV. Also attenuation coefficient for such composites was calculated in the energy range (0.1- 20) MeV. For the Gamma – ray.<br><br>Finally it was concluded that this work could be used as a simple flexible tool which was studied for the first time locally to check the attenuation of Gamma – ray by different materials (pure and composited) and allowing for endless formulations<br>needed for designing with composites . |

# University of Baghdad

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|---|---|
| College Name | COLLEGE OF EDUCATION IBN AL-HAITHAM |
| Department | DEPARTMENT OF PHYSICS |
| Full Name as written in Passport | RIDHA H. RISAN |
| e-mail | han22rada@gmail.com |
| Career | ● Assistant ◌ Lecturer ◌ Assistant Professor ◌ Professor |
| | ● Master ◌ PhD |
| Thesis Title | Electrical Characterization of Treated Polylethylene oxide (PEO) |
| Year | 1998 |
| Abstract | This thesis deals with some electrical properties of poly (ethylene oxide) treated with salts complex of the Dead Sea water . These properties were studied as a function of in the frequency range from $10H_z$ to $13MH_z$ and temperature range from 25°c to 55°c . The salt complex concentration ranged from o% to 50% by weight. Impedance, dielectric constant, AC conductivity and activation energy showed frequency, temperature, and salt concentration dependence . It was found that the salts complex enhance the electrical conductivity through the ion conduction process . |

# University of Baghdad

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|---|---|---|---|---|
| College Name | AL-TARBIA – IBN AL-HAYTHAM | | | |
| Department | physics | | | |
| Full Name as written in Passport | Riyadh Saleem abdullah Habbaba | | | |
| e-mail | Riyadh_habbaba@yahoo.ca | | | |
| Career | ◌ Assistant Lecturer | ◌ Lecturer | ● Assistant Professor | ◌ Professor |
| | ● Master | | ◌ PhD | |
| Thesis Title | Single – mode fiber optics and lasers | | | |
| Year | 1982 | | | |
| Abstract | | | | |

# University of Baghdad

| | |
|---|---|
| College of Education for science ibn al - haithem | College Name |
| Physics | Department |
| Sameer Atta Makki | Full Name as written in Passport |
| dr_samirmaki@yahoo.com | e-mail |
| ● Professor ◌ AssistantProfessor ◌ Lecturer ◌ Assistant Lecturer | Career |
| ● PhD ◌ Master | |
| TRANSVERSAL RUN OF HOT ELECTRONS AND EFFECT OF GALVANOMETRICAL UNDER MIXED SCATTERING IMPULSE AND ENERGY. | Thesis Title |
| 1992 | Year |


In the present work we study the results of investigations into the transversal run of hot electrons in semiconducting materials subject to two strong perpendicular fields (magnetic and electric fields). The free path lengths for the impulse and energy inelastic parabolic scattering was found to determine two mechanisms responsible for two types of mechanical scattering(energy scattering designated by $S_k$ and impulse scattering designated by $t_i$) .

All so we optimized values of two types of scattering were used to determine the occurrence of transversal run. The values $t_1$ and $t_2$ were used for impulse scattering and $S_k$ for energy scattering. From calculation, values and special relationships were obtained for transversal run.

Research is in progress to investigate transversal run at different values of $t_i$ and $S_k$ parameters.


Abstract

# University of Baghdad

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|---|---|
| College Name | **College of Education Ibn Al-Haitham** |
| Department | **physics** |
| Full Name as written in Passport | **Sameera Ahmed Ebrahiem** |
| e-mail | husseinsh2007@yahoo.com |
| Career | ◌ Assistant Lecturer ● Lecturer ◌ Assistant Professor ◌ Professor |
| | ◌ Master ● PhD |
| Thesis Title | **Calculation the Cross Sections of *(n,α)* and *(n,p)* Reactions by Using the Reciprocity Theory for the First Exited State** |
| Year | **2011** |

Abstract


***ABSTRACT***

In this study, light elements ***($^{6}$Li , $^{7}$Li , $^{9}$Be , $^{10}$Be , $^{9}$B , $^{10}$B , $^{11}$B , $^{12}$C , $^{13}$C , $^{13}$N , $^{14}$N , $^{16}$O , $^{17}$F , $^{19}$F , $^{22}$Na , $^{23}$Na , $^{26}$Al , $^{22}$Ne , $^{26}$Mg)*** for *(α,n), (p,n)* reactions are recalculated. The cross sections which are published in world libraries ***(T-2 , EXFOR , ENDF-B-VI , ENDF-B-VII, JEF-2.2 , JEFF-3.0 , JENDL-3.2, JENDL-3.3 , BROND-2.2 , CENDL-2 )*** which are the most recent to select the suitable energies in calculating reverse reactions for first exited state. The results cross sections from semi-empirical formula were drown and listed in tables by depending computer programs (matlab-6.5 and Exal-2003).The cross sections of specific energies which were not calculated now. The cross sections are reproduced in fine steps of incident alpha , proton and neutron energy with their corresponding error. The ***($^{6}$Li(α,n)$^{9}$B , $^{7}$Li(α,n)$^{10}$B , $^{9}$Be(α,n)$^{12}$C , $^{11}$B(α,n)$^{14}$N , $^{13}$C(α,n)$^{16}$O , $^{14}$N(α,n)$^{17}$F , $^{19}$F(α,n)$^{22}$Na , $^{23}$Na(α,n)$^{26}$Al , $^{30}$Si(α,n)$^{33}$S , $^{7}$Li(p,n)$^{7}$Be , $^{10}$Be(p,n)$^{10}$B , $^{13}$C(p,n)$^{13}$N , $^{22}$Ne(p,n)$^{22}$Na , $^{26}$Mg(p,n)$^{26}$Al )*** reactions of cross sections values are derived from the data of *(n,α) , (n,p)* reactions and visa versa as a function of alpha, proton and neutron energies respectively by using the reciprocity theory and the principle of reverse reactions for first exited state.

The evaluate *(α,n) , (p,n) , (n,α)* and *(n,p)* cross sections which are used for the first time. In spite of the numerous data available, a limited number of studies concerning the light elements with very small half life are still very important in nuclear technology. They prove that our calculated values are in good agreement with the published data.

# University of Baghdad

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|---|---|
| College Name | College of Education Ibn Al-Haitham |
| Department | Physics |
| Full Name as written inPassport | Sarmad Mahdi Ali |
| e-mail | Sarmadphy1@yahoo.com |
| Career | ◉ Assistant Lecturer ◌ Lecturer ◌ AssistantProfessor ◌ Professor |
| | ● Master ◌ PhD |
| Thesis Title | **Study of Structural and Optical Properties CdTe Thin Films of Doped with Zn .** |
| Year | 2010-2011 |


Abstract

**In** this research thin films of (CdTe) have been prepared as pure and doped by Zn with different ratios (1,2,3,4,5)% at thickness (400+25)nmwithdepositionrate(2±0.1)nm/sec,deposited on glass substrate by using thermal evaporation in vacuum and a substrate temperature 300K . All samples were annealed at temperature (523,573,623,673)K

**All** the structural properties of prepared thin films, doped and undoped have been studied by using XRD. The analysis reveals that the structures of the films were polycrystalline and typed cubic with a preferred orientation along [111] plane for the undoped films with (2,3)% of zinc , and shifting (2Θ) for doped films . The annealing films at temperature 573 K and Zn:3% show decreasing in intensity at orientation along [111]with appearing new peaks for ZnTe&Te.

**The** surface topography was studied by using a microscope. It was found that the doping causes increasing in the size of crystalline grains and enhances the crystalline structure as compared with undoped samples. These results were in agreement with that of the X-rays analysis.

**Transmittance** spectra were recorded a function of wavelength with the range (400-1100) nm for all films in order to calculate (know) the energy gap, kind of transitions and optical constants as a function of photon energy. Those constants included absorption coefficient, extinction coefficient, refractive index, and real and imaginary part of dielectric constant. It found that the behavior of the two parts of the dielectric constant are similar to that of the refractive index and that it values decrease with increasing the rates of impurity (except for the ratio 5%) and annealing temperature (except 673 K) within visible spectrum. This coincides with extinction coefficient except that it increases with increasing photon energy which related to the absorption coefficient behaved similar.

**It** isfoundthat the energy gap for the allowed direct transition decreases as the doping percentage increase, such that its value for allowed direct transition was (1.62) eV for pure thin films , it decreased to (1.585) eV when it doped with 4%. It is found that the annealing process increases the energy gap.

# University of Baghdad

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| College Name | Education Ibn-Haitham |
| Department | Physics |
| Full Name as written in Passport | Shaimaa.Q.AbdlHussein |
| e-mail | pass ward:191973 Shama.Kasem@yahoo.com |
| Career | ◌ Assistant Lecturer ● Lecturer ◌ Assistant Professor ◌ Professor |
| | ● Master ◌ PhD |
| Thesis Title | Prepartion and study of Electrical Insualor Prepaed From Doped Alumina |
| Year | 1999 |


Abstract

Research were carried out on samples prepared from alumina and other doped with MgO(0.1%,0.3%,0.5%)and SiO2(2%,6%,10%).All samples were pressed under pressure of 5 ton and of diameter2cm. Samples were annealed to 1500C with rate of 300C per hours fof time of (2,4,6)hours.

Some of the physical properties were studied such as bulk density , porosity and water absorption . It is noticed that density was increased as the percentage of MgO increasedwhil the porosity and water absorption decrease because of continuous groth of the grain ,but when alumina doped with SiO2, it is noticed that decrease in density and increase in porosity and water absorption because of the discontinuous growth of the grain. Ingeneral a decrease in porosity and water absorption and an increase in density when the time of annealing increase .the electrical property for the insulation material were studied such as the real part of the dielectric and dielectric loss in the range of (1K-1M)Hz.The results showsthat the real dielectric constant increased when MgO and SiO2 added to the alumina .Also its noticed a decrease in the real part of the dielectric constant and dielectric loss when the freguency increased .X-ray diffraction results Show that a mollate compound introdcud when SiO2added and this becomes of the discontinuous growth of the grain.

| University of Baghdad | | | | |
|---|---|---|---|---|
| College Name | Education (Ibn Al-Haitham), of University of Baghdad | | | |
| Department | Physics | | | |
| Full Name as written in Passport | **Shatha Hashim Mahdi** | | | |
| e-mail | **ha_sh44@yahoo.com** | | | |
| Career | Assistant Lecturer | Lecturer | Assistant Professor | Professor |
| | Master | PhD | | |
| Thesis Title | ***Study of the additives effect on some properties Iraqi Bentonite*** | | | |
| Year | 2010 | | | |
| Abstract | Ceramic samples of bentonite as the base material are obtained by adding a finite amount of $Al_2O_3$and MgO. The prepared samples are standing for temperature up to 1300ºC, which is higher than the standing temperature of bentonite itself. According of x-rays diffraction pattern and optical microscopic studies on the prepared samples the phases of cristobolate , mullite , quartz , corderite , anorthayhat and the wallestait are presented . The phase percentage in each of the samples depends, on the quantity of the additer materials and on the firing temperature in the range (1000 -1300) ºC, with 100ºC in each step. So, excellence results are obtained in the in physical, mechanical and electrical properties. The best ceramic samples treated at (1300) ºC are $A_4$, $A_5$, $B_4$, $B_5$, $C_4$, $C_5$, $D_2$ and $D_3$. Tables of the apparent porosity (A.P) presented, it decreases with increasing firing temperature and the lowest value for the sample $B_5$ at temperature (1300) ºC.<br>The best result of the compressive strength (19.69MPa), thermal conductivity (0.47 W/m. ºC) and the dielectric constant (5.1 – 5.03) for the sample $B_5$ at (1300) ºC. | | | |

# University of Baghdad

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|---|---|
| College Name | Ibn Al_Haitham Education Collge |
| Department | physics |
| I Name as written in Passport | Sua'd H.Leabi |
| e-mail | Suad_200882@yahoo.com |
| Career | ◌ Assistant Lecturer ● Lecturer ◌ Assistant Professor ◌ Professor |
| | ◌ Master ● PhD |
| Thesis Title | The Preparation and Studying of Some Physical and Mechanical Properties for Hybrid Particular Composites Epoxsy |
| Year | 2008 |
| Abstract | This study was performed by using the epoxy resin type thortex as matriex composite material with the phenol _formaldehyde type Novolac and with glass powder and the alum powder were used as reinforced material of volume fraction amounting to 40% as four types of these composite were preperd 1-The epoxy as alone to identify its characteristics2-epoxy with novolac 3-epoxy reinforced by glass and Al powder 4-epoxy with novolac and reinforced with glass and Al powder the resear in various tempreture in orderch project included study of agroup of mechanical experiments which covered testing of impact ,hardness,bending,creep, and friction coefficient in order to identify the effect of tempreture on these characteristics physical experiment were performed as well which includnitric acid ed absorption test in favour of diffusion factors of all the types that in after immersing the sample in ordinary and distilled water of restrectied period and the solution which included (HNO3),sodium hydroxide ,(NaOH) in equal concentraction of 0trengthL.P .5N the results showed that the reinforce Epoxy by (Ep+AL.P+G.P)has shown higher impact strength (16.4_24.1)MPa and hardness strength of (79.7-87.3) Pa and modulus factors of (230-425.9) Sas to creep strength the hybried composite possessed (EP+N ov+AL.P+G.P) higher creeping strength As to the friction coefficient (the set static and the kinetic) the static friction of the setting about of (EP-plas tic) possess higher value (1.28) but the highest value of the kinetic friction coefficient was for (EP-polystyrene) (1) as to the physical experiment it possessed (EP+Nov) of higher diffusion in the acid solution (HNO3)(0.31)cm2lsec and higher diffusion in basic solution (NaoH)which the hybrid composite possessed (EP+Nov+AL.P+G.P)(0.2)cm2lsec and higher diffusion to the ordinary water the hybrid composite was (EP+Nov+AL.P+G.P)(4.40)cm2lsec too the distilled water was (EP+Nov) (3.22)cm2lsec As to the adhesion the strength of adh esiveness of the epoxy composite which does not cotain the Novolac reduce with the increase of temperature yet the composite containingthe Novolac its power of adhesively increase with the rise o f tempereature However the highest heat connection and the dielectric cotent is possessed by the hybried composite (EP+Nov+AL.P+G.P)(0.673)W/m.C for heat and (136.271)for dielectric constant. |

University of Baghdad

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|---|---|
| College Name | **College of Education Ibn Al-Haithem** |
| Department | **physics** |
| Full Name as written in Passport | **Taghreed Abdul Jabbar Younis Al-Rubaii** |
| e-mail | |
| Career | ◌ Assistant Lecturer ● Lecturer ◌ Assistant Professor ◌ Professor |
| | ● Master ◌ PhD |
| Thesis Title | **Multipole Mixing Ratios of ¥-Rays from $^{56}Fe(n,n'¥)^{56}Fe$ , $^{70}_{32}Ge(p,n¥)^{70}_{33}As$ $^{142J150}_{60}Nd(n,n'¥)^{142J150}_{60}Nd$ Reactions** |
| Year | **2005** |

Abstract

The δ-mixing ratios of γ-transitions from levels of $^{56}_{26}Fe$ and $^{70}_{33}As$ and from the $2^+$ states of $^{142,144,146,148,150}_{60}Nd$ isotopes populated in the following reactions are calculated in the present work using the $a_2$-ratio and constant statistical tensor (CST) methods.

$$^{56}_{26}Fe(n,n'\gamma)\ ^{56}_{26}Fe$$

$$^{70}_{32}Ge(p,n\gamma)\ ^{70}_{33}As$$

$$^{142-150}_{60}Nd(n,n'\gamma)\ ^{142-150}_{60}Nd$$

The results obtained are, in general, in good agreement or consistent, within associated errors, with those reported previously. The discrepancies that occur are due to inaccuracies existing in the experimental data of the previous works. The present work results confirm the validities of the $a_2$-ratio and CST methods in calculating the δ-mixing ratios and their capabilities in predicting any inaccuracy in the experimental data such as γ-transitions from the levels 234.79 and 328.64 KeV of $^{70}As$, 2845.5 KeV of $^{142}Nd$ and 2526.7 KeV of $^{144}Nd$. The weighted averages of the δ-values calculated for mixed δ-transitions from levels of $^{56}Fe$ and $^{70}As$ and for $2^+$-$2^+$ γ-transitions in $^{142\text{-}150}Nd$ isotopes are presented as adopted δ-values.

# University of Baghdad

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|---|---|
| College Name | **Ibn Al-Haitham Education** |
| Department | **Physics** |
| Full Name as written in Passport | **TAGHREED ABDULHAMEED NAJI AL-TAEI** |
| e-mail | **taghreedaltaie@yahoo.com** |
| Career | ◌ Assistant Lecturer ● Lecturer ◌ Assistant Professor ◌ Professor |
| | ◌ Master ● PhD |
| Thesis Title | **Vegetation Conditions and discrimination Using Remote Sensing Data** |
| Year | **May-2009** |


Abstract

Remote sensing techniques play an important role for monitoring vegetation growth and health, as well as others Land cover and Land use. Image classification and segmentation techniques are the most important tools, usually used to differentiate between the Earth's surface features.

The supervised and unsupervised classification methods are the implemented algorithms for these purposes. These classification and identification algorithms have been used in our present project to splitting land's covers from each other. Unfortunately, both these common used methods proved unsatisfactory in identifying the variety of vegetation areas (i.e. dry and wet vegetation, or partial and full vegetated areas). Generally, the supervised and unsupervised classification techniques are purely statistical dependent methods, which in turns depend on the experience of the user in selecting the correct region of interest "ROI", also the threshold adopted to split classes from each other.

Two techniques for image classification have been introduced in this thesis; i.e. manually and automatic, both based on partitioning the scatterplot between the Red *"R"* and Near-Infrared *"NIR"* remotely sensed bands. A number of Thematic-Mapper *"TM"* and Enhanced-Thematic-Mapper plus *"ETM+"* available scenes have been used to cover the studied areas. They have been acquired by Landsat-5 and Landsat-7 sensors, with spatial resolution of (*28.5m*), and several spectral bands. Both scatterplot classification methods divided the reflectance diagram in six regions; these were *dry-soil, wet-soil, dry-vegetation, wet-vegetation, ripe vegetation cover, and water regions*. The introduced methods proved superiority in their classification results when compared with the digital image classification techniques.

A variety of indices formulas have also been used to globalize the vegetation patches, six of these vegetation indices have been adopted (i.e. *RVI, NDVI, IPVI, DVI,*

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| | *PVI, and WDVI*). The “NDVI” has higher recognized vegetated areas than other adopted indices of the amount of vegetation (ripe vegetation). Image binarization method being followed the implementation of the indices to isolating the vegetation areas from the image background. The isolated vegetated areas and their percentages are presented in tables to show the agriculture regions in two successive years (*2001* and *2002*). The changes at these agriculture areas have also been computed and presented visually on the form of images, and numerically by listing them in tables (in $km^2$). The counted areas resulted from the automatic scatterplot method and the isolated vegetated areas resulted from the implementation of the vegetation indices are also presented. The isolated agriculture regions from the implementation of the Difference-Vegetation-Index “DVI” has proved better than other used indices. Because it showed better coincident with scatterplot automatic classification technique, in the ripe vegetation region approximately. |

# University of Baghdad

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|---|---|
| College Name | **College of Education(Ibn El-Hitham** |
| Department | **Physics** |
| Full Name as written in Passport | **Tagreed Muslim Marush AL-Saadi** |
| e-mail | Tagreedmm64@yahoo.com |
| Career | ◌ Assistant Lecturer ● Lecturer ◌ Assistant Professor ◌ Professor |
| | ◌ Master ● PhD |
| Thesis Title | **CRYSTAL STRUCTURE REFINEMENT OF SOME METALLIC OXIDE POWDERS USING RIETVELD ANALYSIS** |
| Year | 2005 |


Abstract

Crystallography of a number of metal oxides having different crystal systems have been studied by powder diffraction technique using Rietveld refinement analysis . The metal oxides are $\alpha$-$Al_2O_3$ , $CeO_2$ , and $TiO_2$ in Anatase and Rutile phases as well as for mixed phases . Dicvol program is used to determine the indexing , Miller indices , crystal system and the parameters of each unit cell , by using the peak position in each scan for each sample .

Rietveld analysis are applied to obtain best fit between the observed and calculated pattern for powder diffraction of each sample . It is performed by using a part of main results from the indexing in conjunction with the intensity of each point and applied the Fullprof program . The profile reliability factors $R_p$ arrived after refinement was 23.3% for $\alpha$-$Al_2O_3$ , 26.2% for $CeO_2$ , 24.4% for $TiO_2$ Anatase phase , 25.8% for Rutile phase and 32.2% for the mixture of Anatase and Rutile phases . Part of the obtained data is used with WinPLOTR program to sketch the observed and calculated diffraction pattern after refinement . While other part of the data is used in PowderCell program to sketch atomic arrangement in the unit cell for each sample .

An attempt is performed to explain the rise in the $R_p$ values the for the experimental data utilizing data from international references for the same samples . It is found the reasons due to the experimental setup the type of the diffractometer , the sample purity while the background resulted from using the filter instead of the monochromator and to the range of scan angle .

Finally the Rietveld analysis is used in the quantitative analysis for a mixture of Anatase and Rutile phases . The results obtained reveal high precision for this method as well as it does not need to use a pure phases of the analyzed material in comparison with the direct method .

| University of Baghdad | | | | |
|---|---|---|---|---|
| College Name | Collage Of Education / Ibn Al-Haitham | | | |
| Department | Department Of Physics | | | |
| Full Name as written in Passport | Tahir Hamad Mahmoud | | | |
| e-mail | | | | |
| Career | (●) Assistant Lecturer | ( ) Lecturer | ( ) Assistant | ( ) |
| | (●) Master | ( ) PhD | | |
| Thesis Title | Study Of Structural and Optical Properties Of Cadmium Oxide Thin Films Doped With Sn Metal By Thermal Evaporation Under Vacuum Method | | | |
| Year | 2010-2011 | | | |

# University of Baghdad

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|---|---|
| College Name | Ibn al-hathaim |
| Department | Physics |
| Full Name as written in Passport | Tariq abdul-ridha alwan al-dhahir |
| e-mail | Tariqaa52@yahoo.com |
| Career | Assistant Professor |
| | PhD |
| Thesis Title | **Optical investigations of alkali matal periodates and perchlorates** |
| Year | 1990 |

Abstract


**TARIQ A AL-DHAHIR/ PhD THESIS PREFACE**

This thesis is concerned with investigations related to phase transitions in certain crystals through their optical behavior and Laser Raman spectroscopy. The crystals studied are the periodates and prechlorates of K; Rb and Cs.Special attenation is paid to CsIO4 .

Various experimental techniques used for the investigations presented in this thesis and the fabrications of several experimental instruments are described in chapter 2.

Chapter 3 deals with gel growth of single crystals periodates and prechlorates of K; Rb and Cs under different growth conditions and their Characterization

Chapter 4 is concerned with optical investigation of high temperature structural Phase transition for single crystals of CsIO4.The birefringence and light transmissions, show an abrupt falls to zero at Tc. The microscopic observations under stress leads to ferroelastics phase.

Chapter 5 presented the detailed polarized Raman spectroscopic studies of cesium ,potassium and rubidium periodates for high and low temperature whch lead to

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| | incommensurate phase at 286K.<br>High pressure Raman data reveal the presence of pressure<br>Induced phase transition for KIO4 crystal.<br>Chapter 6 the optical investigation of orthorhombic-cubic transitions for alkali |

# University of Baghdad

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|---|---|
| College Name | College **of Education Ibn Al-Haitham** |
| Department | **Physics** |
| Full Name as written in Passport | **Thair Abdulkareem Khalil Al-Aish** |
| e-mail | dr.thairalaish@yahoo.com |
| Career | ◌ Assistant Lecturer ● Lecturer ◌ Assistant Professor ◌ Professor |
| | ◌ Master ● PhD |
| Thesis Title | Design & Analysis of Dual Modulator Using Fractal Function |
| Year | 2011 |


**Abstract**

The optical modulator (reticle) represents the main part in the electro-optical tracking systems. The task of reticle varies according to its location, where its work as modulator with active mode if located in the transmission unit, while its work as demodulator with passive mode if located in the receiver unit.

Design proposed in this work, is to create an optical modulator with active mode, consisting of three parts (normal, outer fractal and inner fractal), each of the three parts completes a specific task according to its position, where its uses to detect, recognize and identify the target.

The results obtained by establishment a special program named "Disk optical modulator" using the language visual basic 6. The choice of values radius R, No of sectors q and angular velocity of reticle depend on the compatibility between the response speed of the optical detector for chopping frequency (fc) and the response speed for control system of the target.

The proposed range of electro-optical tracking systems is about 5 km therefore has been chosen one solid-state lasers, which is Nd-Yag laser, for various reasons, including high energy and wavelength ($\lambda = 1.06$ □m ), which is located within the infrared region. The wavelength is located within the limits of the optical response detector made of silicon with distinctive characteristics and cheap price.

The results of power reaching and current $i_s$ are much higher than minimum limits of detect ability NEP. Also the results of S/N (dB) are much higher than the threshold; this means the possibility of using the fractal reticle with range reaches to 5 Km.

# University of Baghdad

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|---|---|---|---|---|
| College Name | The college of education / IBN AL- HAITHEM | | | |
| Department | Physics | | | |
| Full Name as written in Passport | Widad Hamdi Jassim | | | |
| e-mail | | | | |
| Career | ◌ Assistant Lecturer | ◌ Lecturer | ● Assistant Professor | ◌ Professor |
| | ◌ Master | | ● PhD | |
| Thesis Title | Study of some of the effective factors on mechanical properties , stress whitening and degradation kinetics of HDPE in irrigation pipes | | | |
| Year | 2004 | | | |
| Abstract | Investigation in to the mechanical properties , stress whitening phenomenon and degradation kinetics have been conducted for some grades of high density Polyethylen used for molding pipes in irrigation system ,by employing tensile tests , ptical microscopy and differential thermal analysis respectively.<br>Concerning the degradation Kinetice , the thermogravimetric curves that have been carried out at different heating rates were consulted in estimating the Activation energy at certain conversion levels.<br>By employing the degradation time data . It is able to predict the lifetime of The polymer by extrapotion of the yelationship between the time and Temperature. | | | |

# University of Baghdad

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|---|---|---|---|---|
| College Name | **College Of Education Ibn Al-Haitham** | | | |
| Department | physics | | | |
| Full Name as written in Passport | Zainab naji abdullah | | | |
| e-mail | | | | |
| Career | ⊘ Assistant Lecturer | ◌ Lecturer | ◌ Assistant Professor | ◌ Professor |
| | ⊘ Master | ◌ PhD | | |
| Thesis Title | **An investigation about the differential cross section of Nuclear Fusion Reaction for Hydrogen Isotopes Type Deuterium-Deuterium.** | | | |
| Year | 2010 | | | |
| Abstract | **ntrolled nuclear fusion reactions play an important role and become one modern technologies, since it represented as energy source and also a particles sources such as protons. The huge energy for hydrogen es which approximated (3-4 MeV) for (Deuterium-Deuterium) reaction 7 MeV) for (Deuterium-Tritium) reaction can be used to operate the nt electrical powers station and have many advantage applications in nt scientific research and medical thereby.**<br>**resent project we focus on the D-D nuclear fusion reaction after arriving a sion that there exists an agreement between experimental and tical studies and we chose the differential cross section for the D-D n because it represents an important parameter in calculating the n or proton yield and this calculation need to study the changes of the ntial cross section with the deuteron energy and reaction angle .We noted e differential cross section are strongly effected with a range of reaction between [0-100] degree , and it seems that it has a maximum value when ction angle equal to zero because of the present of the parameter cos θ in calculated equation .From the figures explained pictorially we see that a agreement between our calculated results and the internationally ned experimentally results and this lead to the ability for using this in the future for different calculations and the ability for modifying its to uction a like formulas for another fusion reactions by depending on their al characteristics .** | | | |