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“Ravigrahan”- Student watching of Solar Eclipse

Solar eclipse is an amazing astronomical event where the light of the sun is blocked by the moon. Watching solar eclipse is much more fun than watching lunar eclipse because it is short timed so the sun can be clearly seen being uncovered. The solar eclipse that took place on 26th December, 2019, Thursday, was rather more important, because it was very rare event, called the annular solar eclipse. In this eclipse, the moon is a bit far from the Earth so it doesn't cover the whole sun and we can seecontd on P.23, inside back cover

PHYSICS NEWS

New open release from CERN streamlines interactions with theoretical physicists

What if you could test a new theory against data from the Large Hadron Collider (LHC)? Better yet, what if the expert knowledge needed to do this was captured in a convenient format? This tall order is now on its way from the ATLAS Collaboration at CERN, with the first open release of full analysis likelihoods from an LHC experiment. "In particle physics, experimentalists develop a very rich summary of measurements, which account for all relevant scattering processes and every source of uncertainty, encapsulated into what we call *likelihoods*," explains Lukas Heinrich, CERN research fellow working for the ATLAS Experiment. "Likelihoods allow you to compute the probability that the data observed in a particular experiment match a specific model or theory. Effectively, it summarizes every aspect of a particular analysis, from the detector settings, event selection, expected signal and background processes, to uncertainties and theoretical models." Extraordinarily complex and critical to every analysis, likelihoods are one of the most valuable tools produced at the LHC experiments. Their public release will now enable phenomenologists around the world to explore ATLAS data in a whole new way. The ATLAS open likelihoods are available on HEPData, an open-access repository for experimental particle physics data.

Read more at : <https://phys.org/news/2019-12-cern-interactions-theoretical-physicists.html>

Original paper: <https://cds.cern.ch/record/2684863>

Scientists correlate photon pairs of different colors generated in separate buildings

Particles can sometimes act like waves, and photons (particles of light) are no exception. Just as waves create an interference pattern, like ripples on a pond, so do photons. Physicists from the National Institute of Standards and Technology (NIST) and their colleagues have achieved a major new feat—creating a bizarre "quantum" interference between two photons of markedly different colors, originating from different buildings on the University of Maryland campus. The interference between two photons could connect distant quantum processors, enabling an internet-like quantum computer network. Using photons that originally had different colors (wavelengths) is important because it mimics the way a quantum computer would operate. In their study, a collaboration between NIST and the Army Research Laboratory, physicists and engineers in adjacent buildings at the University of Maryland created two different and separate sources of individual photons. The photons were so similar that it was not possible to tell them apart in the experimental setup. Individual photons ordinarily act independently of one another. But due to the peculiar quantum nature of light, when two indistinguishable photons interfere with each other, their paths can become correlated, or dependent upon one another. Such quantum correlation can be used as a powerful tool for computing.

Read more at: <https://phys.org/news/2019-12-scientists-photon-pairs.html>

Original paper: *Physical Review Letters* (2019). DOI: [10.1103/PhysRevLett.123.213601](https://doi.org/10.1103/PhysRevLett.123.213601)

Spin on perovskite research advances potential for quantum computing

The next generation of information technology could take advantage of spintronics—electronics that use the minuscule magnetic fields emanating from spinning electrons as well as the electric charges of the electrons themselves—for faster, smaller electronic devices that use less energy. Newly published work by scientists at the National Renewable Energy Laboratory and the University of Utah may figure into the future success of spin-based electronics. They have shown that the transport of electrons with a particular spin state through a two-dimensional hybrid organic-inorganic perovskite can be manipulated by introducing special organic molecules in the multilayer structure. These are chiral, which means they prefer one electron helicity over the other.

Read more at: <https://phys.org/news/2019-12-perovskite-advances-potential-quantum.html>

Original paper: *Science Advances* (2019). DOI: [10.1126/sciadv.aay0571](https://doi.org/10.1126/sciadv.aay0571)

Sandeep Kaur

BULLETIN OF INDIAN ASSOCIATION OF PHYSICS TEACHERS (ISSN 2277-8950)

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<http://www.indapt.org>**From the President's desk ...**

Let me begin by wishing the IAPT fraternity, one and all, a joyous and memorable new year! Greetings also to families and friends of the IAPT fraternity.

This past year we began a number of initiatives which included the tasks of revising the Constitution, the streamlining of the membership list, putting the website in order, among many others. All these tasks have begun but let us hope that with support from all we can complete them in the coming year.

We had a successful annual convention in Prayagraj. We are also in the happy situation that our finances are stable and we have requests for hosting the EC meetings and annual conventions in 2021 and beyond. The centenary of Prof. D P Khandelwal falls on Oct1, 2021 and we need to plan educational events around this. A committee to plan for this will be set up this year. May I also mention that this year 2020 marks the beginning of the centenary hailing the golden decade (1920-1930s) in Indian Physics.

On the flip side the participation in the essay, the experimental and computers in physics competitions was not up to the mark. Teacher participation was abysmal. The EC meetings held regularly twice in a year are quite fruitful, but poor attendance in the Annual General Body Meeting leaves much to be desired. Several RCs and sub RCs are moribund. There is a paucity of good articles in the Bulletin and as pointed out by Prof. Kushwaha, the editor, there is no response or comments on these articles (in the form of letters to the editor) by members at all. It perhaps means that we are not giving these articles serious consideration. This is a major concern for me and in the coming year I hope to take time off from my busy schedule to contribute a few articles for consideration.

My colleagues led by Prof. Joshipura have shown excellent team work and I thank them. Once again, best wishes for the new year.

Prof. Vijay A Singh

President IAPT

The editors wish all the readers

A
VERY HAPPY
NEW YEAR

Experimental determination of mesh size of a TEM grid by diffraction: A new low cost experiment for undergraduate labs

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Abstract

We report, for the first time (to the best of our knowledge), a systematic study of diffraction using a commercially available TEM (*Transmission Electron Microscopy*) grid and a green LASER diode. We discuss the features of the *Fraunhofer* diffraction pattern obtained by the TEM-grid and then use the pattern to calculate mesh size of the grid. The estimated mesh size is found to show a close agreement with its standard value, as specified by the manufacturer. Our experiment provides a non-destructive and simple technique to estimate the mesh size or pitch of a TEM grid, without involving any costly instrumentation such as SEM (*Scanning Electron Microscopy*) or optical microscope. This low cost experiment could be a good addition to undergraduate Physics laboratories..

1. Introduction

Diffraction is a well-known phenomenon [1]. Experiments like study of diffraction by a single slit, double slit and line grating can be found easily in any undergraduate Physics laboratory. However, the experiments with a square grating are usually not available in undergraduate laboratories. We have therefore planned to study the diffraction of light by a square grating and develop a new low cost experiment for undergraduate labs. Our choice of grating meets at research level, where square grids are generally used in TEM and are available in the market [2]. A TEM grid is typically a flat disc with a mesh or other shaped transparent holes of the size of a few micrometers, which is of the order of the wavelength of visible light. These are easily available in the market in different mesh sizes. In this paper, we report *Fraunhofer diffraction* with a TEM-grid and making use of it, we estimate the pitch/mesh size of the grid and compare it with the standard value.

2. Experimental

The experimental arrangement consisting of a collimated green LASER and a TEM grid is shown in Figure 1. The wavelength of the LASER source used is 532 nm and the PELCO makecopper *TEM grid* is of an outer diameter 3.0 mm (200 mesh, Hole-size $\sim 90\mu\text{m}$ and Pitch $\sim 127\mu\text{m}$). The TEM grid is mounted on the LASER diode face [2]. The diffraction pattern from the TEM-grid is projected on a graph paper having a least count of 1mm situated 3.6 meter apart from the TEM grid. This large distance is quite optimum to achieve a well-resolved diffraction pattern and reduce fractional errors in the measurements. The obtained diffraction pattern was then aligned/adjusted along the horizontal and vertical lines on the graph paper and a good quality camera was used to capture the pictures of the pattern. The positions of different order of maxima on both sides of the central maximum in the image of the diffraction pattern were determined by Image J and Origin software [3].

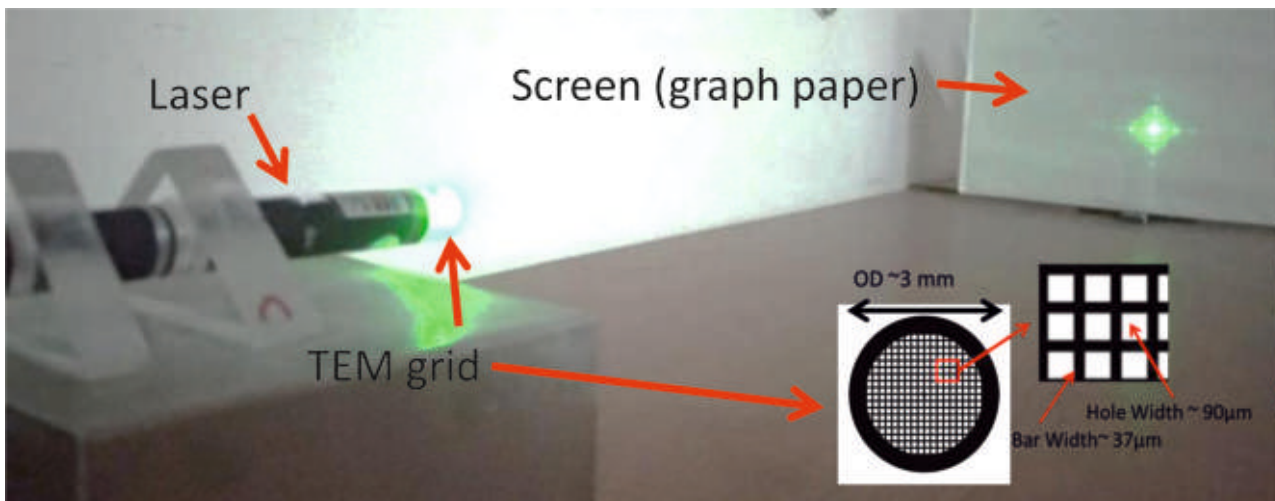


Figure 1: Experimental arrangement to study diffraction by TEM grid. Inset shows a schematic view of the TEM grid and its grid lines.

3. Results and discussion

The schematic experimental set-up along with the image of the diffraction pattern of the TEM-grid is shown in Figure 2. The symmetry of a diffraction pattern reveals useful information about the symmetry of the diffracting object [4]. The diffraction spots seen in Figure 2 thus serve to reflect the symmetry of a square grating with a square structure. The obtained diffraction spots show a symmetric pattern with a common central maxima and a series of secondary maxima and minima located symmetrically on X-axis and Y-axis. This obtained pattern can be assumed to be a pattern created by a combination of two diffraction gratings crossing each other at right angles.

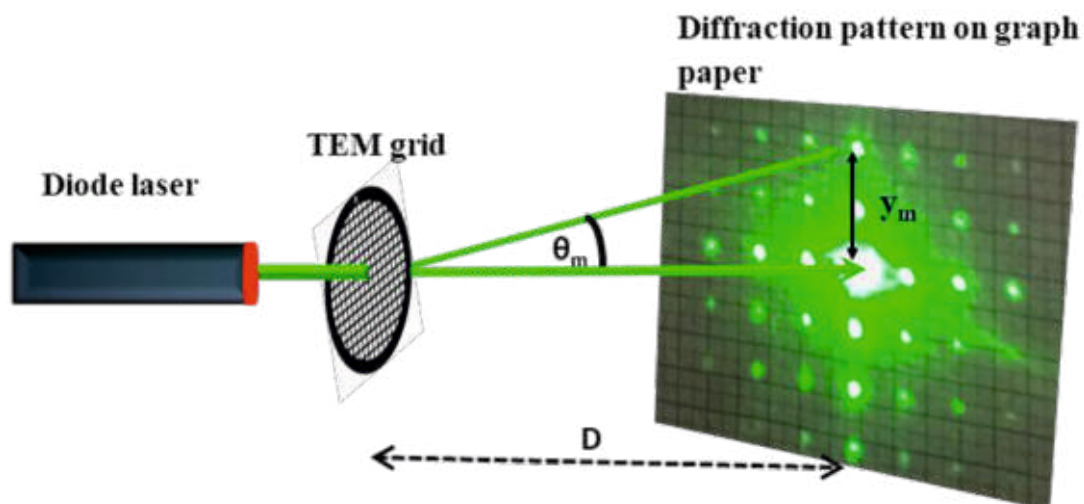


Figure 2 A schematic diagram of the experimental set-up for study of the diffraction and image of the diffraction pattern observed with TEM grid.

Figure 3 shows the spatial 3D-distribution of the intensity of the diffraction pattern observed with the TEM grid. The image of the experimentally observed diffraction pattern (Figure 2) was used to create the spatial 3D-distribution using Image J software. We can infer easily from Figure 3 that the central maxima have maximum intensity. Furthermore, as we move along the axis, the intensity of the peaks decreases continuously, as expected. Beside the peaks lying on the X and Y-axes, it is interesting to note that the off-axis secondary peaks are less intense compared to their nearby on-axis secondary maxima. Above observation of intensity distribution supports the theoretical predictions of a square grating [1,4].

For mesh size calculation, we created the intensity profile data from diffraction pattern (Figure 3). Further these data were plotted in origin software and fitted with Gaussian peaks and the positions of maxima were found precisely. The plot of position of maxima *versus* the order of maxima is shown in Figure 4. The plot shows a linear relation between the position of two secondary maxima along the X-axis and along the Y-axis have nearly the same position with respect to central maxima. This means the successive maxima are nearly equally-spaced, irrespective of the axis.

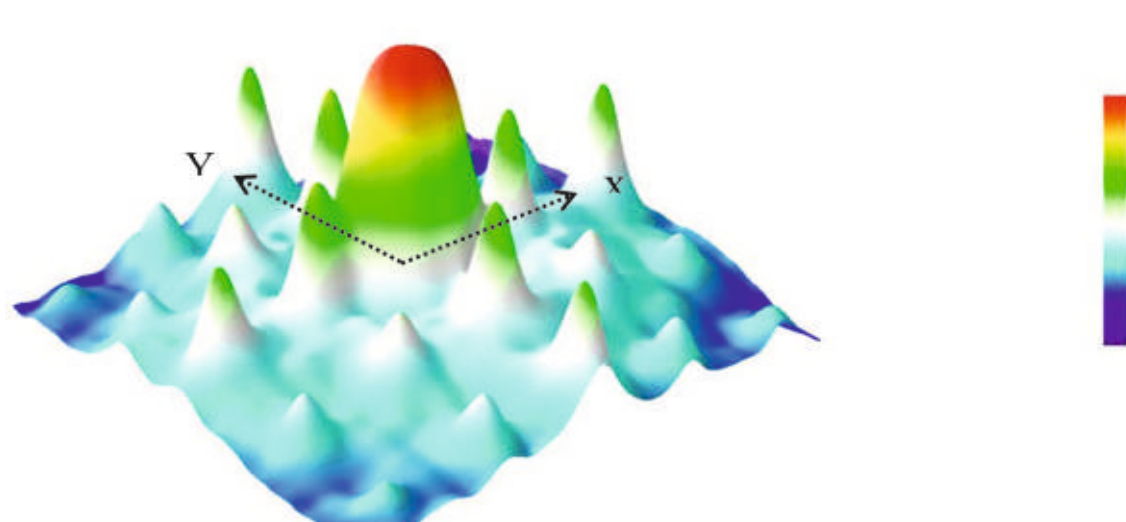


Figure 3: The spatial 3D-distribution of the intensity of the diffraction pattern of 200 mesh TEM grid. This 3D plot is created by ImageJ software from the experimentally observed diffraction pattern image (Figure 2). Intensity scale is in arbitrary units; the red colour being the maximum and the blue, the minimum.

The diffraction equation for m^{th} order principal maxima along the X-axis and Y-axis in the diffraction pattern of the TEM-grid is given by [4,5]:

$$d \sin\theta_m = m\lambda, \text{ where } m = 0, \pm 1, \pm 2, \pm 3, \dots$$

The values of θ_m can be obtained from Figure 2 with a small angle approximation: $\sin \theta_m \sim \theta_m = y_m/D$ or x_m/D . Hence, we can determine the position of principle maxima $y_m = (\lambda D/d) m$ or $x_m = (\lambda D/d) m$. For small angle diffraction, the relation between the position of the principal maximum and its order “m” is linear and the slope of such straight line is equal to $(\lambda D/d)$. The experimental value of the slopes was calculated from Figure 4 by applying linear curve fitting. The calculated value of the slope comes out to be ~ 1.57 cm. Then using the known experimental parameters i.e. $D = 380$ cm and $\lambda = 532$ nm, in the formula of the slope (i.e. slope = $\lambda D/d$), the pitch of the grid “d” was calculated, which comes out to be ~ 129 μm . This value is quite close to its standard value of “d”=127 μm [2].

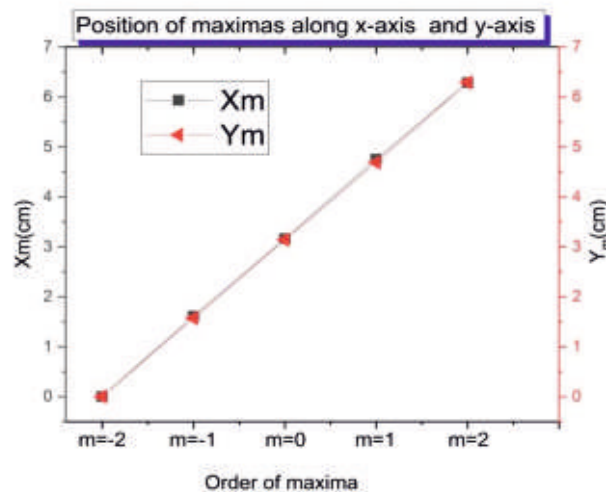


Figure 4: The positions of maxima along the X-axis (X_m) and Y-axis (Y_m) versus the diffraction order “m”.

The mesh size of any grid is defined as the number of holes per inch (i.e. 2.54 cm or 25400 μm). Therefore, in our case the mesh size would come out to be 25400/129 (~ 197 mesh), which is in good agreement with the standard value of 200 mesh [2]. This simple experiment is thus quite helpful in understanding physics of square mesh diffraction and also provides an application of diffraction pattern in measuring the mesh size of an unknown grid and also being a low cost experiment, it can be a good addition to undergraduate laboratories.

4. Conclusion

In conclusion, we have performed the Fraunhofer diffraction experiment to analyze the properties of two-dimensional square symmetry gratings or TEM grid comprised of square holes. With this study we have shown that how one can find out an unknown TEM grid mesh size or pitch, with standard equipment available in most undergraduate Physics laboratories.

5. Acknowledgements

The authors would like to express their appreciation to Dr. Narendra Jakhar, Mr. Arvind Kumar and Mr. M. K. Gora, Dr. Subhash Chandra for useful discussions and Mr. Mor Singh Rawat, Mr. Ram Prakash Sharma, Mr. Pawan Gupta, Mr. B.L. Choudhary and Mr. Om Prakash for their continuous technical support.

6. References

- [1]. M. Born and E. Wolf, “*Principles of optics*” 7th ed. Cambridge University press, 1999.
- [2]. https://www.tedpella.com/grids_html/Pelco-TEM-Grids.htm.
- [3]. <https://imagej.nih.gov/ij/download.html>.
- [4]. E. Hecht, “*Optics*”, 4th ed., Addison Wesley, 2002.
- [5]. F.A. Jenkins and H.E. White, “*Fundamentals of Optics*”, 4th ed., McGraw-Hill, 1976.

Abstracts of presentations by participants of NSSP 2019

Q-16: HEAVY ION COLLISIONS AT LOW ENERGIES

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Abstract: This is an exciting time for nuclear research, especially in heavy ion collision. I'll be providing a brief intro of the fundamental atomic models, and going from up there explain about Liquid drop model, Shell model, Collective model and Nilsson model. I'll be discussing the role of angular momentum, entrance channels, deformations and orientations and fusion hindrance. I'll be discussing about dynamical cluster-decay model (DCM) and its advantage over other statistical models. Also, I'll provide with the experimental and theoretical developments of heavy ions reactions and the need to study heavy ions collision (investigation of Nuclear structure, its Stability, Fusion reactions, Elastic and inelastic collisions, etc.)

Q-17: CHARACTERIZATION OF AEROSOL RADIATIVE FORCING OVER URBAN ENVIRONMENT OF WESTERN INDIA

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Abstract: An analysis of Radiative Forcing (RF) has been attempted over Ahmedabad region using the Aerosol Optical Depth(AOD) data measured during Winter and Summer 2017 campaigns. In-situ and satellite AOD data collected over Ahmedabad

city is used as an input in the SBDART Radiative Transfer Model. The radiative forcing is calculated using the fluxes available from the model output and the results show that the satellite-derived RF and ground-derived RF shows nearly a perfect correlation of 0.92 and 0.82 for Top Of the Atmosphere(TOA) RF and Aerosol Atmospheric RF(Atm) for Winter 2017, respectively; whereas, it shows a very good correlation of 0.79, 0.89, 0.84 for Surface, TOA and Atm radiative forcing for Summer 2017, respectively. These values of correlations demonstrate the validity of our present work. This study is our first attempt to generate satellite radiative transfer products which will be useful in future.

Q-18: STUDY OF ELLIPTICALLY POLARISED LIGHT BY TOTAL INTERNAL REFLECTION

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Abstract: A plane polarised light has been converted into an elliptically polarised light by total internal reflection in a glass prism. This has been studied with a spectrometer and two polaroids. The phase difference introduced between the perpendicular and horizontal components of light introduced by total internal reflection has been measured and eccentricity of the ellipse is determined.

O-19: BOSE-EINSTEIN CORRELATION FUNCTIONS FOR KAONS

Divya Jyoti and Nagy Marton

DJ (M.S.) and NM (Professor)

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Abstract: Correlation functions give statistically correlated results present among spatially or temporally separated random variables. Bose-Einstein correlation function (CF) measurement enables the study of properties of emerging particles and helps to better understand the hydrodynamics of the collision centers in high energy particle collisions. Data analysis results of kaons produced in $\sqrt{s_{NN}} = 200$ GeV Au+Au collisions during 2010 run period at RHIC, Brookhaven National Laboratory, New York, are presented in this paper. We have plotted CF for kaons detected at PHENIX detector subsystem for a given range of average transverse momentum (P_T) of the particle pair. The obtained plots resemble Levy-type density distribution functions. By making use of Levy-source analysis method, fit parameters were obtained and particle source function is interpreted.

ABSTRACTS OF ORAL PRESENTATIONS

P-1: "LIGHT" - THE MYSTERY

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Abstract: Humans have always been interested to know what light is. In the early days, a light beam was thought to consist of particles. Later, the phenomena of interference and diffraction were demonstrated which could be explained only by assuming a wave model of light. Much later, it was

shown that phenomena such as the photoelectric effect and the Compton Effect could be explained only if we assume a particle model of light. Now, as we know, the values of the mass and charge of electrons, protons, alpha particles, etc., are known to a tremendous degree of accuracy approximately one part in a billion! Their velocities can also be changed by the application of electric and magnetic fields. Thus, we usually tend to visualize them as tiny particles. However, they also exhibit diffraction and other effects which can be explained only if we assume them to be waves. Thus, the answers to the questions such as "What is an electron" or "What is light?" are very difficult. Indeed electrons, protons, neutrons, photons, alpha particles, etc., are neither particles nor waves. The modern quantum theory describes them in a very abstract way which cannot be connected with everyday experience.

P-2: A STUDY ON THE EFFECT OF SERIES RESISTANCE AND ABSORBER LAYER THICKNESS ON THE SOLAR CELL STRUCTURE BY USING SCAPS SIMULATION

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Abstract: Quaternary semiconductor, $\text{Cu}_2\text{ZnSnS}_4$, with a kesterite mineral structure namely the CZTS is a material for meeting the requirements for low cost and eco-friendly thin film solar cells, as none of the elements are scarce in the earth crust and the constituents are non-toxic. The SCAPS simulation program has been utilized to explore the output performance of the traditional Al:ZnO/CdS/CZTS/Mo solar cell. The variation in the overall series resistance of the cell and its effect on the cell performance has been studied. Series resistance plays an important role in the cell performance and on the fill factor of the cell. Further the absorber layer thickness of the CZTS material has been varied in order to study the effect on the

cell performance. With respect to the cell performance of the cells, other parameters are also been studied.

P-3: AN INTRODUCTION TO EPR-PARADOX AND BELL'S INEQUALITY

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Abstract: I present a work which i did in IISER-Mohali on Quantum Foundation with Prof. Arvind. The poster will start with Einstein–Podolsky–Rosen paradox where we will show that the basic idea was about the nature of reality and incompleteness of quantum theory. And which can be completed by introducing Hidden variables. But the interpretation of Einstein was strongly opposed by another great quantum physicist, Niels Bohr, because of the violation of his complementarity principle. Finally we deduced Bell's Inequality with a simple example and proved that hidden variable violate these inequalities, forcing us to renounce the Einstein's local realistic world vision.

P-4: BLACK BODY FRICTION FORCES: MEANING AND THEIR IMPLICATIONS

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Abstract: In our universe, number of different forces are in action, ranging from the microscopic world to macroscopic world. One among these forces are the little known black body friction forces. The accurate measurement of these forces acting on atoms due to their interaction with black body radiations is significantly important in atom interferometry, nanomechanics, etc. These affect

the working of high precision atom interferometers employed to perform some tests of fundamental physics such as those of the equivalence principle, planned searches for dark matter and dark energy, gravity gradiometry, inertial navigation and even the Casimir force measurements and gravitational wave detection. Moreover, a precise estimation of these forces is also required in order to calculate the exact speed, trajectories, etc. of different spacecrafts and satellites. Right now, I'm working on a project which aims to analyse the effect of these forces on Rubidium atoms. So, in my poster, I aim to explain what exactly these forces are, how these forces can be measured experimentally and theoretically along with focussing on their practical implications.

P-5: CALIBRATION OF METAL FOIL BOLOMETER

Sunita Tarei and Devila Kumawat

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Abstract: Tokamak is the most developed magnetic confinement system and is the basis for the design of future nuclear fusion reactors in order to generate clean and abundant energy. It is an electromagnetic device with different magnetic coils to initiate, confine and control the stability of the plasma. Bolometer is one such diagnostics that is used for the measurement of the radiation energy loss from a tokamak and also determines the purity of the plasma. A metal foil bolometer of 1-cm square and 7- μm -thick of platinum foil has a very high operating reliability. The calibration experiments have been performed and cooling time (τ), heat resistance (Z), heat capacity (C), response (r) are calculated of the bolometer. Also, output powers for 5-100 mW observed.

P-6: CARBON BASED NANOMATERIALS: SYNTHESIS, CHARACTERISATION AND APPLICATION IN WATER PURIFICATION

Inderpreet Kaur, Kiran Jeet

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Abstract: The presented study focuses on preparation of carbon based nano hybrid which act as an adsorbent for removal of heavy metals from aqueous solution. Four different adsorbent are prepared viz graphene oxide, functionalised multiwalled carbon nano tubes, graphene oxide carbon nano tube hybrid and magnetic graphene oxide. Synthesis of graphene oxide was carried out by modified Hummer's method. Functionalisation of multiwalled carbon nanotubes was carried out with the help of refluxing. Magnetic graphene oxide nanoparticles were formed with coprecipitation of iron nanoparticles on the surface of graphene. Graphene oxide multiwalled carbon nano tube hybrid (GO- MWCNT) was prepared by providing mechanical shear to functionalised carbon nanotube and graphene oxide powder in acid solution. The structural characterisation of the synthesised nanomaterial was carried using Transmission Electron Microscopy. The TEM images of graphene oxide revealed a rough surface and irregular shape. GO has folded layers due to presence of hydroxyl group. Particles of amorphous carbon embedded in sheets are spherical in shape which also offers surface area for adsorption. TEM micrographs represent the well ordered locally aligned tubes. Formation of functional groups on the surface of nano tubes generates repulsive force which leads to debundling of tubes and thus increases in their surface areas. This can be exploited for process of adsorption. TEM micrographs of GO-MWCNT provide us evidence of the formation of GO-MWCNT hybrid. The micrographs reveal the Vander wall forces of interaction between CNTS and GO sheets. This

results in formation of hybrid. TEM images of MGO showed that Fe_3O_4 nanoparticles were fully coated on the surface of GO.

P-7: COUPLED NONLINEAR ORDINARY DIFFERENTIAL EQUATIONS WITH TOPOLOGICAL MANEUVERING

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Abstract: Complex networks are important to study behaviour of many natural systems like "social" media (for example Facebook, WhatsApp), epidemic propagation and political movements; to name a few. A mathematical tool to analyse such a complex system is *Graph theory*. Using this mathematical model, networks are broadly classified into three categories namely, Random, Scale-free and "Small-world" networks. In this project I have studied properties of these networks in a quantitative manner using rigorous mathematical techniques and then reproduced the some of the networks in computer simulation by writing a few programs. Further, using those computer programs, robustness of solution a set of coupled nonlinear ordinary differential equations, popularly known as GCCGLE, has been verified, when the underlying network structure changes from one to another (topological maneuvering).

P-8: DEPOSITION OF COPPER DOPED TIN OXIDE THIN FILMS FOR GAS SENSING APPLICATIONS

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Abstract: In this research investigation, copper doped tin oxide thin films were grown on glass

substrates by the thermal evaporation method using a vacuum coating system. The optical and structural characteristics of the thin films were determined. Also, the gas sensing properties of the thin films were investigated for their application as gas sensors. The thickness of the samples was determined with the help of an in-built quartz crystal monitor and was kept at 300 nm. Subsequently, the films were annealed at a temperature of 400 °C for 4 hours in the presence of atmospheric air. The gas sensing studies were carried out, using a two probe set up, for the detection of toxic gases such as H₂S and C₂H₅OH. It has been observed that the sensor signal was very high for H₂S gas but little sensor signal towards ethanol.

P-9: DETERMINATION OF WATER CONTENT OF SAL WOOD USING GAMMA RADIATION

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Abstract: Moisture content of wood is a function of atmospheric conditions. Moisture content varies with temperature and humidity of surrounding air. The variation of moisture content is different for different wood. It affects physical as well as mechanical properties of wood. The present study deals with determination of water content of sal wood from the determination of mass attenuation coefficient using gamma ray transmission using NaI (TI) scintillation detector and radioactive source ¹³⁷Cs of energy 0.662MeV. The obtained mass attenuation coefficient for wet state and completely dry state of the wood were used to determine the water content of the selected wood sample. The absolute water content in selected wood sample is

59.3 ± 8.2 %. Further, it was shown that attenuation coefficient increases with decrease in moisture content.

P-10: EFFECT OF TEMPERATURE ON ULTRASONIC VELOCITY IN ADULTERATED MUSTARD OIL

Parhanpreet Kaur and P.S.Tarsikka

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Abstract: In these days the adulteration in food products is the main problem and needs immediate attention. The adulterants are generally low quality/cost liquids mixed with pure samples. It will be a threat to living beings. There are several methods to detect the adulteration in liquids. Most of the methods are destructive methods. Ultrasonic have been regarded as rapid and non-destructive tool, which has been used to analyse the mustard oil with adulteration of palm oil having different concentrations (100%, 90% and 80%) of mustard oil. The present study deals with the measurements of ultrasonic velocity, viscosity and density at different temperatures in the range (30°-70°C). Ultrasonic velocity and viscosity decreases linearly with temperature. The ultrasonic velocity and viscosity also decreases with the addition of palm oil as impurity. The ultrasonic velocity of 100% mustard oil is 1446m/s and 90% is 1419m/s and for 80% 1404m/s at 300C. The viscosity of 100% mustard oil is 52.87mpascal sec and 90% is 42.70 mpascal sec and for 80% 35.42 mpascal sec at 300C. The density of mustard oil increases with the addition of different concentrations of palm oil. From the measurements of these properties the quantification of concentration of impurity can be calculated.

(RC-12)
Ammani Anveshika

Venue: Vallalar Women's College, Erode

Date: 9 Dec 2019

Teachers: 7 **Students:** 60

Topic: Verification to Investigation !

Resource Person: Sarmistha Sahu

5 different experiments were given to the students to work in groups with just a sketchy theory and the required apparatus. The students were given room to brain storm and uncover the mystery in small steps till they came to the conclusion. The teachers around helped them to progress with nudges here and there and of course, all the moral support they required.



Figure 1. Student feedback, very satisfying. Explanation of the experiment and what skills they picked up was noteworthy.

Each group did 1 experiment in the morning and another after lunch. And a report from group leaders was communicated to all the other participants to familiarize everyone about all the experiments. The excitement of doing such experiments was evident from their voices and expression. The benefit to the participants was enormous. They learnt very many topics and some skills of experimentation and were very happy. The staff team work and the enthusiasm of students to learn was admirable.



Figure 2. Bubbling with joy

Sarmistha Sahu

Coordinator

To our readers

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Mumbai Sub-Regional Council Workshop on Problem-Designing for Physics Teachers

Date: 28th and 29th November 2019

Venue: Ramnivas Ruia Junior College, Matunga, Mumbai

Number of participants: 11 (teachers from other colleges) + 4 (teachers from local college)

A two-day workshop on problem-designing in physics for teachers at +2 level was organised on 28th and 29th November 2019 in collaboration with Ramnivas Ruia Junior College. Ms. Aarti Sovani, Vice Principal, coordinated the workshop. 15 teachers from various colleges of Mumbai, Thane and Navi Mumbai participated in the workshop. The inaugural lecture was by the Mumbai Sub RC President Dr. Atul Mody. He talked about need for problem - based learning in the present context with the help of ideas involved in Bloom's taxonomy levels of learning, constructivism model and how it is important to change the students' belief system. IAPT President Prof. Vijay Singh spoke on designing of tests. He first explored different types of tests for various purposes, like test for elimination, speed test to check the knowledge based on entire syllabus, misconception test to check the conceptual understanding, remedial test to test knowledge gained in earlier course for incremental subjects. He gave ample examples from various competitive examinations about how to set good questions that allows critical thinking and also badly designed questions from some prestigious competitive examinations. He mentioned about rules that paper a setter must follow.



Mr. Mahesh Shetti, from Wilson College, Mumbai conducted a session on designing "Order of magnitude problems" and how it can be used to improve students' perspectives and to deepen students' level of understanding

Participants solved problems that helped them to estimate many physical quantities in various situations and could see use of physics principles at +2 level for this purpose. He also discussed about designing problems based on Sci-fi (Science-fiction) situations with various examples from Sci-fi by Clarke and Asimov.



Mr. Vinayak Katdare, retired teacher from D G Ruparel College conducted session on how to design problems from situations around us in classroom and at home. He gave live demonstration of designing extempore problems in the classroom and how to involve students to collect data for such problems. He also talked about precautions that paper setters for MCQ type questions must observe. Mr. Sumedh Sawant, assistant professor from the same college conducted a session on problems on space science.

Participants presented various situations and how physics problems could be designed using them. Dr. Atul Mody, Mr. Mahesh Shetti, Ms. Rekha Ghorpade contributed in the discussion and provided valuable inputs. Participants, through their feedback highly appreciated the workshop.

The certificates were given at the hands of Coordinator Ms. Aarti Sovani and Dr. Atul Mody. Ms. Rekha Ghorpade, Treasurer, proposed the vote of thanks.

Mahesh Shetti
Secretary
Mumbai Sub-Regional Council

(RC-06)
Anveshika Science workshop

Date: 11 December, 2019

Venue: Auditorium Jai Shree Periwal High School, Jaipur, Rajasthan

Target Audience: 300 plus student of X and XI standard and faculty members.

Invited speaker: G.S. Menaria, Regional coordinator ANVESHKA

The objective of the workshop was to experimentally demonstrate the concept of physics in a joyful way beyond the classroom teaching. Principal Mrs Madhu Maini welcomed the resource person. In her address, she emphasized and underlined the importance of learning by doing. After the welcome address, demonstration on reaction time, measurement of height of distant object, law of conservation of linear momentum, undamped oscillation, laws of reflection, total internal reflection, equilibrium of body, black body radiation, thermal expansion, faradays & lenz's law and magnetic field line was given by Dr. Menaria in an engagement interactive way. With each demonstration, mathematical explanation was



discussed as per query.

For concept understanding of physics, it was a very meaningful & enriching workshop enjoyed by the students. In his address, Dr. Menaria underlined the importance of 'seeing is believing' & motivated students to feel physics in every walk of life and implement knowledge gained by them in research area.

The workshop ended with a vote of thanks by HOD Science, JSP high school.



Mrs Madhu Maini
Principal

(RC-09)

National Workshop on Innovative Experiments in Physics

Date: 7th and 8th December 2019

Venue: Govt. Girls' P. G. College Ujjain, Centre for Excellence

No. of participants: 15 Teachers , 78 students from 7 colleges

Resource Persons:

Dr. Y K Vijay, Director, Center for Innovation in Science Teaching IIS University Jaipur

Sri Mor Singh, Scientific Officer

Dr. P. K. Dubey EC member

The Workshop was organized by Physics Department and Internal Quality Assurance Cell (IQAC) of Govt. Girls' P G College, Ujjain and sponsored by RC-9 and College Janbhagidari Samiti.

The workshop was inaugurated by the chief guest, Dr. V. Ganesan, Ex-Director of UGC-DAE-Consortium for Scientific Research Indore. Convener of the workshop Dr. Vinod Kumar Gupta welcomed the guests and presented the theme of the workshop. Chairperson of the program, Dr. Ulka Yadav, principal of the college, told that it was a rare opportunity for the participants to learn what is innovation and what is innovative experiments.

In his inaugural speech, Dr. Ganesan explained that the aim of innovative experiments is to understand fundamentals of the subject.

Dr Vijay told during his presentation in the first session that to learn something, a small effort is needed in right direction. Innovative ideas can be put to experiments that make theory understandable. After describing through ppt and demonstration he provided 10 innovative experiments using 3-4 parallel sets to be performed by the participants. He explained the basics in detail to the participants. These experiments included, (1) Study of resistance of different bulbs and estimate their temperature. (2) Study of R-L, R-C and L-C-R circuits using A. C. power supply. (3) Study of magnetic interaction using ring magnets. (4) Study of thermal conductivity using soldering iron. (5) Optical diffraction using diode lasers (6) Self adjustments of molecules (7) Rutherford scattering (8) Barrier penetration (9) Crystal defects (10) Pendulum with time period more than 2 seconds In the after lunch session students exchanged the experiments.

Special guest of the program, Dr. Nishchal Yadav, lecturer in School of Studies in Physics and sports director of Vikram University Ujjain told during second session that innovation acts as a nucleus around which inventions take place.

On day two, in the third session of the workshop, students first put their queries and had discussions with Dr Vijay about basic principles



learnt through these experiments and difficulties faced by them. After that they performed the remaining experiments.

In the fourth session another resource person Dr. P K Dubey EC member joined the workshop. He demonstrated and provided 5 innovative experiments to the participants. These experiments included (1) Centre of gravity (2) Anti gravity and Boyls' Law (3) Lorentz Force (4) Balancing stick (5) Study of ring magnets.

In the valedictory session chief guest, Dr. B D. Shrivastava, Ex-Prof. of Physics, School of Studies in Physics Vikram University Ujjain told that the principles learnt through experiments always remain in memory. Theory evolves through experiment and experiments in turn through theory. Experiments must be qualitative and quantitative both and this is evident in this innovative workshop. Dr. Vinod Gupta proposed the vote of thanks.

Vinod Kumar Gupta
Co-ordinator

REPORT

(RC-22)
One day programme
on
Synthesis, characterization and applications on nanomaterials

Date: 12/12/2019

Target Audience: B.Sc & M.Sc Physics Students

On 12-12-19, Department of Physics, St.Pious X Degree and PG College for Women, Hyderabad and RC-22 organised One Day Lecture Series on the topic ' Synthesis, Characterisation and Applications of Nano Materials.' Prof.D Ravinder, Chairman of Bodies, Department of Physics, Osmania University, delivered a talk on the main topic and motivated students to pursue Ph.D. after post-graduation. He made the audience aware of the scope of research on Nano materials and their applications. Mrs. K.Vani, Research Scholar, Physics Department, Osmania University delivered a talk on the research developments in the field of Nanomaterials. The students of UG and PG also presented papers on 'The Novel Applications of



Nano Materials in Science & Technology' and a collection of abstracts was released on the same topic.

V. Rajeshwar Rao

**Prof. Babulal Saraf Memorial One week All India Laboratory
Workshop on
Experimental Physics For P.G.Teachers And P.G. Students**

**Sponsored by
Indian Association of Physics Teachers
16th March to 21st March 2020**

at

**Department of Physics
Institute of Science & Laboratory Education
IPS Academy, AB Road, Rajendra Nagar, Indore (M.P) – 452012.**

A Laboratory Workshop in Physics for College/University teachers and PG Students will be held at the Department of Physics, IPS Academy, Indore, Madhya Pradesh during 16th to 21st March 2020. It will cover Laboratory Experiments in Nuclear Physics and other areas of Advanced Physics.

Teachers and Students of Postgraduate department from Colleges / Universities who wish to participate may write to course Director on the following address giving brief bio data: date of birth, IAPT membership number (not mandatory), teaching experience, courses being taught, e-mail address and mobile number. Application should be duly forwarded by the Head of the Institution. Those who have already attended this work shop need not apply.

Selected Participants will be provided local hospitality for the duration 16th to 21st March 2020.

Registration Fee: Rs. 600/-

Application will be considered until the seats are full.

Dr. Jitendra Tripathi
Convener and HOD, Physics.
(O) 07314014584 (M)09425860675
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Dr. Jaiveer Singh
Organizing Secretary
(M) 09009846762

IAPT National Competition on Essay Writing in Physics (NCEWP - 2020)

Writing makes one perfect, essay writing more so.....

NCEWP is one of the three national competitions being held by IAPT every year. The competition is open to participants in two categories viz., students & teachers (including Science Communicators).

Category A- *students* of Higher secondary /Jr. College, UG and PG levels; Students will send their entries duly forwarded through respective school/college/institute to the appropriate Regional Council(RC).

There will be a preliminary competition in each of the Regional Councils RC1 to RC – 22, on the same topic. The top **2** entries each in Higher Secondary, UG and PG levels from each RC will be sent by respective RCs for the National Competition.

CategoryB- *teachers* of Higher Secondary/Jr.College, UG and PG institutions, also Science Communicators working in recognized institutions.

Participants in category B will send their entries, duly forwarded through respective college/institute, directly to the Coordinator/Member.

Topic of Essay for both the categories is:

“POLLUTION IN OUR COMMUNITY: MEASUREMENTS AND PHYSICAL INSIGHTS”

The idea is to explore the Physics of pollution and ferret out interesting science themes. By community we mean all that which affects our existence or we affect its existence positively or negatively. As a keen scientist you need to share your observations, exploration and investigation. Your essay may be written considering the following points:

- (i) Define the scope and scale of your study
Different types of pollution {you may choose any **two** from the following}
 - a. air
 - b. sound
 - c. water and
 - d. industrial etc. and their main causes
- (ii) Change in the level of pollution in different seasons (summer/rainy season/winter), what is the science behind such changes?

You may analyze:

(a) Traffic data e.g., no. of two and four wheelers details how many using petrol/diesel/CNG variation of traffic with time (morning/noon/evening hours)

(b) Sound pollution. It is easy to download an app and measure decibel levels at various crossroads in the morning and in the evening and afternoon for a few days to see the pattern etc. Then you will have a "noisemap".

- (iii) The measures taken by various Governments/Agencies to control pollution and outcome of these efforts. How many industries/organizations have followed the norms prescribed by Government?

It may contain other routine items e.g. a brief description and highlights of your study area. You can of course look at all of the above with a scientist's (physicist's) eye. For example, if you are mentioning pollution of air then mention AQI; you may also mention vehicle density (an idea similar to surface charge density). Further you may have a graph showing how the number of vehicles has grown over the decades. You may also optionally provide a maximum of 5 figures/pictures.

General Instructions:

The essay will be limited to 08 pages including figures/tables etc., type-written in the Times New Roman 11- point fonts, with 1.15 spacing. A format is given below:

IAPT National Competition on Essay Writing in Physics: 2020 (NCEWP – 2020)

Topic: - "POLLUTION IN OUR COMMUNITY: MEASUREMENTS AND PHYSICAL INSIGHTS"

Tick Category: A B

Author's Details (with Affiliation & Signature):-

Total No. of Words:-

Key Words (Maximum Five)

All entries will be subject to the online plagiarism test. Hand written and/or scanned submission will be rejected. Only two entries per institution may be submitted in a category.

All the RCs are requested to motivate participation from students and teachers in this national contest.

For students (category A) the RCs will arrange a preliminary regional essay competition on the above topic, between January - July 2020, to select the top two participants from their region in Higher Secondary/UG/PG for the final NCEWP - 2020. Final entries must be submitted in PDF format by e-mail to any one of the following:

Prof. S. K. JOSHI, Coordinator, NCEWP, Mail id: joshisantoshk@yahoo.com

Dr. HIMANSHU PANDEY, Member, NCEWP, Mail id: himanshukrpandey@gmail.com

Dr. SHIVANAND MASTI, Member, NCEWP, Mail id: shivanandmasti@yahoo.co.in

The entry must be forwarded through the Head / Principal of the institution, mentioning the category A or B, along with all contact details clearly.

Exception: Retired teachers can self-attest their entry. All entries (in English only) will be scrutinized in all respects, and will be assessed by three evaluators.

Deadline for submission to NCEWP is JULY 30, 2020

Attractive cash prizes plus books/CD will be awarded to the winners separately in categories A and B. Details of the prizes will be decided in consultation with the judges of the competition.

Results of the competition NCEWP 2020 will be declared in the IAPT Bulletin, and will also be mailed to contestants. The prize distribution will take place as a part of the IAPT annual convention to be held at Indore (MP) during October 31-03 November, 2020

Prof. S. K. JOSHI
Coordinator, NCEWP 2020



UGC- DAE CONSORTIUM FOR SCIENTIFIC RESEARCH

(An Autonomous Institution of University Grants Commission, New Delhi)

Registered Office & Head Office: University Campus, Khandwa Road, Indore 452 017, India

The UGC-DAE Consortium for Scientific Research is an Inter–University Centre (www.csr.res.in) established by the University Grants Commission and provides access to various research facilities of DAE. The Consortium has set-up a number of state-of-art research facilities in the area of Material Science at Indore, Mumbai and Kolkata, primarily meant for researchers from universities and other educational institutions.

UGC-DAE CSR, KALPAKKAM NODE

A UGC-DAE CSR Node has been established at Kalpakkam, Tamil Nadu (about 70 Kms from Chennai) with comprehensive characterization facilities such as **FE-SEM, FIB-SEM, HRTEM, XPS, GIXRD, 15T Magneto-resistance setup, Ball indentation, Small punch creep, NMR, 7T SQUID Magnetometer, Raman spectrometer, AFM**. Materials synthesis facilities in terms of **Infrared float zone single crystal furnace, High Energy Ball Milling, electron beam evaporation system, RF Sputter deposition system are available**. Advanced computational facilities are also available. A **200 kV heavy ion accelerator** has also been installed at the Node. Apart from these, access to advanced physical, chemical and engineering facilities at IGCAR (www.igcar.gov.in) can also be provided through the Node and may be used for collaborative research.

Ways to avail the facilities

- **Single shot mode** – where Faculty/Student wish to use a specific instrument for a particular study – they write to us with the brief study to be made, we allot the time, they come and use the facility through UGC Scientists with proper acknowledgement (basic travel and local hospitality is paid by UGC-DAE CSR)
- **Long term collaborations** – where they submit research proposals based on which UGC-DAE CSR grants funds for 3 (+ 1) yrs to support a Ph.D student, consumables, etc. Basically the student will work part-time at University and part-time here under our(collaborator's) guidance using UGC-DAE CSR facilities on an area of mutual interest.

During the last few years, about 50 Collaborative Research Scheme (CRS) proposals had been sanctioned to various universities to carry out collaborative work under the aegis of UGC-DAE CSR. Every year, research proposals are invited from Universities/academic institutions in the following areas: **Materials Science** – Single crystal Synthesis, Thin films, Nano-materials, Soft condensed matter, Superconductivity & Magnetism, Defects & Ion beam modification;

Metallurgy - Advanced structural materials, Structure–Property Correlations, Corrosion and Coatings, Non-Destructive Evaluation, Mechanical properties, Welding.

Materials Chemistry - Thermochemical properties of alloys and ceramics, Synthesis and characterization of materials for chemical sensors, Novel extractants and resins, Phase diagram studies, Synthesis and characterization of glasses containing rare earths

For further queries, please contact:

Dr. N. V. Chandra Shekar

Scientist In-Charge, UGC-DAE CSR, Kalpakkam Node,

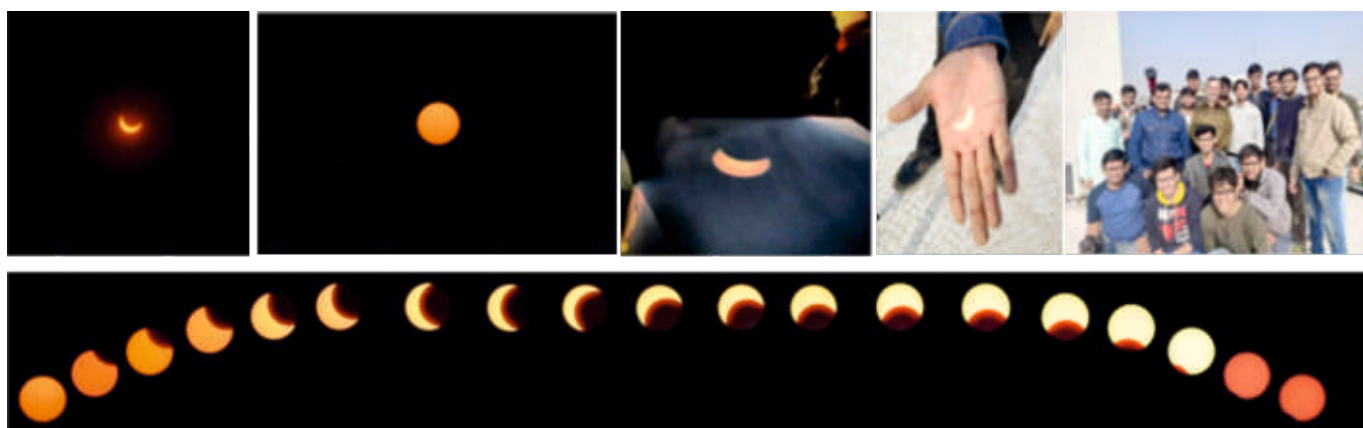
Via Kokilamedu Gate, KOKILAMEDU-603 104, T.N

Tel: 044-2748 0500 Ext. 21918 or 21919(off) URL: www.csr.res.in Email: nvcshekar@csr.res.in

Ravigrahan (.....contd from front page)

the sun as annulus or a bright ring. In the partial solar eclipse observed from the Ahmedabad by "Amateur Astronomy Club" of Physics and Electronics department of St. Xavier's College, Ahmedabad, 67 % of the Sun was covered by the moon at the peak stage. In Partial Solar Eclipse, Sun, Moon and Earth don't align perfectly in a single line, due to which sun does not get fully covered, but is partially covered by the moon. There are three stages of Partial Solar Eclipse. Probability of Partial Solar Eclipse (35%) is much more compared to Total Solar Eclipse and Annular Solar Eclipse.

Amateur Astronomy Club of Physics and Electronics department of St. Xavier's College, Ahmedabad organized an event named, "Ravigrahan"- Student watching of Solar Eclipse, for observing the Solar Eclipse on 26th December, 2019 at 7:30 a.m. in collaboration with Universe Science Forum. Partial Solar Eclipse was visible from Ahmedabad. Amateur Astronomy Club had total three telescopes for observing the phenomena. For ease to observe the phenomena, they projected the sun on a white screen using one telescope so everybody can watch it together. For the people who were unable to remain present at the venue, they did live streaming on YouTube. The other two telescopes were installed along with sun filters so that the visitors could also observe the phenomena using those telescopes. Also, an arrangement of DSLR camera (a digital still image camera that uses a single lens reflex (SLR) mechanism) with sun filter was also made for capturing the whole event of Partial Solar Eclipse. Phases of the solar eclipse recorded by our team are shown in the following picture.



This program was held under the guidance of Dr. Tushar C. Pandya. There were two teams of volunteers who conducted this program:

1. The Coordinating Team:

Mr. Suresh Parekh, Mr. Vaibhav Trivedi, Mr. Jahaan Thakkar, Mr. Kishan Malaviya, Ms Bhavya Thacker

2. The Photography Team:

Mr. Jaydeep Kholvadiya Mr. Vedant Agrawal

The Coordinators team was responsible for hosting the program and managing the crowd as well as YouTube live streaming. The photos that we are seeing are all due to the photography team who kept clicking photos of eclipse at different phases. Near about 500+ people witnessed this event (300 on YouTube and 200+ at the venue).

Dr. Tushar C Pandya

BULLETIN OF INDIAN ASSOCIATION OF PHYSICS TEACHERS

FOUNDED BY (LATE) DR. D.P. KHANDELWAL

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