

DEPARTMENT OF PHYSICS

BASIC SCIENTIFIC RESEARCH - UGC

➤ UTILIZATION PATTERN OF THE THREE INSTALLMENTS OF BSR-INFRASTRUCTURE GRANT

➤ FURTHER INSTALLMENT JUSTIFICATION

1. OUTPUT OF THE UTILIZATION OF THE THREE INSTALLMENTS OF BSR-INFRASTRUCTURE GRANT

- I. Upgradation of the laboratory infrastructures to perform new experiments.
- II. Laboratory equipments for new courses.
- III. To perform students projects
- IV. Financial support for best student projects
- V. Enhancement of teaching methodology

i. UPGRADATION OF THE LABORATORY INFRASTRUCTURES TO PERFORM NEW EXPERIMENTS

New experiments were introduced for the post graduate students using Faraday Effect Kit, Solar water heating system and CCD based spectrometer and Laser kit.

ii. LABORATORY EQUIPMENTS FOR NEW COURSES

The laptop and digital camera and the accessories are instrumental for introducing the Extra Disciplinary Course “**Digital photography**” offered by the Department of Physics to the other major PG students.

The ECG machine, body fat analyzer, respiration monitor electro-myograph trainer, electro encephalograph trainer, pulse rate meter trainer and single channel ECG telemetry trainer are the tools used in for the elective course “**Medical Physics**” and “**Biomedical instrumentation**”.

iii. LIST OF STUDENTS’ PROJECTS

Most of the student’s projects are done in the department itself. Some of the projects done were the equipments purchased under the BSR funds are listed here.

- Determination of velocity of ultrasonic waves through amino acids Dielectric studies on binary mixtures.
- “Spectroscopic analysis of organic liquids using Raman spectrometer”.

- Voting Machines.
- Applications Solar thermal Appliances.
- Synthesis and characterization of Zinc oxide Nano materials.
- Study on the efficiency of solar water heater.
- Synthesis and characterization of nano particles used as cathode materials for cells.
- Growth and characterization of single crystals by slow evaporation.
- Growth and characterization of PMMA Thin films.
- Synthesis and characterization of proton conducting polymer electrolytes.
- Water Level Indicators.
- Touch motor Control.
- Burglar alarms.
- Refrigerator door Open alarm.
- Determination of sugar content in various cool drinks by measuring the velocity of ultrasonic waves through them.
- Water analysis.
- Measurement of Dust deposition in the college campus.
- Determination of Brewster's angle.
- Measurement of noise level in and near the college campus.
- Documentary on various festivals celebrated in the college.

iv. FINANCIAL SUPPORT FOR BEST STUDENT PROJECTS

The Department conducts the display of UG students' projects and PowerPoint presentation of PG projects. The best projects were supported financially and the list is enclosed in the self appraisal.

v. ENHANCEMENT OF TEACHING METHODOLOGY

The LCD projector is very essential for a modern day classroom. With the help of BSR funds the department was able to acquire this facility. The LCD projector serves as a modern tool that enhances teaching and enables learning easy. Students also use it for their seminar presentations.

Faculty Profile

The department of physics has a full fledged strength of 12 faculty members. It has 2 faculty members with Ph.D. One more has submitted her thesis and awaiting Viva-voce., and 4 more faculty members have registered for Ph.D. Two of the staff have passed NET and SLET.

Student profile

Student enrollment normally ranges from 45-57 for UG course and 34-26 for PG course. Mostly students are from state of Tamil Nadu. More than 80 per cent of the admitted students are from rural area, Tamil medium, and first generation learners. They are given proper attention and remedial coaching is provided after class hours to improve their levels.

Research Projects Completed

S. No.	Title of Project	Principal Investigator	Sponsored By	Year	Sanctioned Amount (₹)
1.	Ultrasonic Studies of Biomolecules	Dr. S. Lalitha	UGC	2005 - 2007	68,000/-
2.	Investigations on Superconductivity mechanisms & new results using existing model	Dr. A. Therese Pushpam	UGC	2005 - 2007	75,000/-
3.	Enhancement of Pyroelectric coefficient by aminoacid doping in TGS crystals for IR applications	Mrs. S. Arulmozhi Packia Seeli	UGC	2006 - 2008	80000/-
4.	Synthesis of Nano structured Cathode materials For Li-ion batteries	Dr. S. Lalitha Mrs. A. Sheela Vimala Rani & Ms. L. Caroline Sugirtham	DST	2007 - 2010	10,75,000/-

Research Project sanctioned

Name of the Investigator	Funding agency	Duration	Title of the project	Amount (₹)
Dr. G. Dheva Shanthakumari.	UGC	2011 - 13	Fabrication of homogeneous and Heterogeneous Human tissue equivalent phantoms of thorax, Head and Neck for invivo dosimetry in cancer treatment	Yet to be released

PUBLICATIONS/PRESENTATIONS OF RESEARCH PAPERS BY THE FACULTY

2008 - 2009

- ❖ *Dr. Mrs. S. Lalitha & Mrs. Mathavi Manisekar*, Department of Physics, has published an article titled **Mathematical & Experimental Physics** in a International Conference on **A Study of Physical properties of amino acids through Marked and Weighted graphs** organized by PSGR Krishnammal College, Coimbatore from 19.12.2008 to 20.12.2008.
- ❖ *Mrs. L. Caroline Sugirtham*, Department of Physics, has published an article titled **Magnetic Studies of Metal - Insulator Transition in a Quantum Well System** in **World Scientific International Journal of Nano Science** Vol. 1-7, Page No. 4 & 5 (2008).
- ❖ *Mrs. L. Caroline Sugirtham*, Department of Physics has published an article titled **Spatial Dependent Effective Mass for Donor Binding Energies in a Quantum Well in the Influence of an Electric Field** in **Journal of Computational and Theoretical Nano Science** Vol. 6, 1-5, 2008.

2009 - 2010

- ❖ *S. Lalitha, A. Sheela Vimala Rani*, has published an article on "Synthesis of Al doped LiMnO₂ Nano cathode materials for Lithium batteries" proceedings of the National Seminar on Nano Science and Crystal growth organized by the Dept. of Physics, Adithanar college, Thiruchendur, 2009.
- ❖ *S. Lalitha, A. Sheela Vimala Rani*, has published an article on "Synthesis and charecteristics of Sb doped LiMnO₂ Nano Cathode materials for Lithium batteries" in the proceedings of the National Seminar on Recent Advances in Nano sciences sponsored by TNSCST, Chennai at PSGR Krishnammal College for Women, Coimbatore December, 2009.
- ❖ *S. Lalitha, Mathavi Manisekar*, has published an article on "**A study of Amino acids through Weighted and marked graphs**" **Mathematical and Experimental Physics**" Narosa Publishing House, New Delhi. ISBN: 978-81-8487-057-2.

2010 - 2011

- ❖ *Mrs. A. Sheela Vimala Rani*, attended and presented a paper in the National conference on "recent trends in Physics" by the Dept. of Physics, SFR College, Sivakasi on 29.10.2010 & 30. 10. 2010.
- ❖ *Mrs. A. Sheela Vimala Rani* attended and presented a paper titled "Synthesis and characterization of spinel nanocomposite for electrode of Li-ion fuel cell" in the International conference on Advanced Materials and its applications organized by Dept of Materials science , Kalasalingam University, Krishnankoil.

- ❖ *Dr. G.Dheva Shantha Kumari* Attended and presented a paper on Photo Cytocidal activity of alternative Photosensitisers in MCF 7 cell lines in the International Conference of Medical Physicists, hosted by Sanjay Gandhi postgraduate institute of Medical sciences at Lucknow, India, on 19. 11.2010
- ❖ *Dr. S. Lalitha, and A. Sheela VimalaRani* attended and presented a research paper on Synthesis and characteristics of Sb doped LiMnO₂ Nano cathode materials for Lithium batteries in the International conference on Nano science & Technology at K. S. Rengasamy College of Technology, at Thiruchengode.on 13th to 16th December 2010.
- ❖ *Mrs. Mathavi manisekar* attended and presented paper on Exploration of Chemical properties through energies of Chemical Graphs in an international seminar on New Trends in Applications of Mathematics organized by Bharatha mata College, Thrikkanara, Kochi on 31.1.2011 and 1.2.'11.

2011 - 2012

1. **Mrs. A. Sheela Vimala Rani** , Associate Professor of Physics, presented a paper on the title **“Synthesis and characterization of Nano cathode materials for Lithium batteries”** in the International Conference on Nanoscience and Nanotechnology 2011(ICNN2011) organized by Coimbatore Institute of Technology, Coimbatore jointly with Centre for Research and advanced studies of IPN-Mexico during 6-8 July 2011.
2. **Dr. G. Dheva Shantha Kumari**, Associate Professor of Physics, presented the following papers
 - (i) **“Measurement of delivered dose in tissue in homogeneity using an ion chamber for indigenously developed slab phantom”** &
 - (ii) **“A dose delivery verification method for conventional radiation therapy using thorax phantom”** in the International conference on Medical Physics, organized by Christian Medical College, Vellore, Tamil Nadu, during 16-19 November 2011.
3. **Mrs. T. Indira**, Assistant Professor of Physics, presented a paper titled **“Dielectric studies on Binary Polar-Polar liquid Mixtures by Kirkwood Correlation Factor”** in the International Conference on Advanced Materials(ICAM-2011) organized by PSG College of Technology, Coimbatore, Organized by University of Oslo Norway, Simon Fraser University, IGCAR India, Institute for Energy Technology Norway, Uppsala University Sweden, during 12-16 December 2011.
4. **S. Arulmozhi Packiaseeli**, Head and Associate Professor of Physics, presented a paper titled **“SUBSTRATE ANALYSIS SURVEY ON MIXED (GALLIUM OXIDE WITH SELENIUM) FILM IN LOW COST TECHNIQUE”** in the International Conference on Advanced Materials (ICAM-2011)

organized by PSG College of Technology, Coimbatore, Organized by University of Oslo Norway, Simon Fraser University, IGCAR India, Institute for Energy Technology Norway, Uppsala University Sweden, during 12-16 December 2011.

2. JUSTIFICATION

S. No.	Item	Approximate cost (₹)
1.	Centrifuge	6,000
2.	Vaccum oven (with oil pump)	1,25,000
3.	Ultrasonicator	30,000
4.	Magnetic stirrer with hot plate and digital display	20,000
5.	Materials science lab establishment	6,75,000
Total		8,56,000

The department has identified “**Materials science**” as the thrust area. Synthesis and characterization of materials have been instrumental in the development of Science and Technology worldwide. Applications of novel materials with enhanced properties encompass a wider range. Hence, with the help of the BSR fund, we intend to equip the Physics laboratory with the basic facilities listed below.

- ◆ **Centrifuge:** It is an equipment, driven by a motor that puts an object in rotation around a fixed axis and the centripetal acceleration causes more dense substances to separate out. This is very useful in specimen preparation of materials by solgel method
- ◆ **Vaccum oven:** The grown crystals, thin films, nano materials need to be annealed at high temperature and low pressure. This is done with the help of vacuum oven.
- ◆ **Ultrasonicator:** Miniaturization of devices leads to less power consumption and hence thin films and nano materials are the need of this era. Particle size reduction is facilitated using ultra sound vibrations. Hence we would like to purchase this equipment.
- ◆ **Impedance meter and accessories:** The synthesized materials need to be characterized in various ways. The electrical characterization such as impedance and dielectric constant measurements can be made using this equipment. This will be used for any sample using various sample holders.
- ◆ **Magnetic stirrer with hot plate and digital display:** This device is useful to get a homogeneous solution at any desired temperature, by continuously stirring saturated solution using Teflon coated magnetic pellets.