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UGC-DAE CONSORTIUM *for* SCIENTIFIC RESEARCH
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Annual Day 2009

The 19th anniversary of UGC-DAE Consortium for Scientific Research (CSR) was celebrated on December 23, 2009, with a keynote lecture by Prof. Milan K Sanyal, an eminent Scientist and Director, Saha Institute of Nuclear Physics, Kolkata. The Chief Guest commended the growth of the institute as a unique scientific institution providing state of the art facilities to the university community. He said that providing such facilities to the university community is essential to raise the standard of basic research in India to the international level. He spoke on “Novel Physical Properties of Nano-structured Materials”, highlighting the research facilities and activities of his group in the field of nano-materials. The lecture featured issues such as the formation of nanoparticles of gold at liquid-liquid interface, realization of 1D Wigner crystal in polymer nanowires, and its electrical switching behavior. The lecture was followed by a lively scientific interaction with the audience.



The function started with Dr. P. Chaddah, Director, UGC-DAE CSR, welcoming the guests. He highlighted the activities of the three centres of the Consortium and the node at the IGCAR, Kalpakkam, during the last one year, including the utilization and development of various facilities of the institute. He pointed out that the experimental research from the Consortium is now receiving detailed citations establishing its impact on the thinking of the established scientists elsewhere, and announced the starting of the annual CSR award for scientific excellence to a faculty member. He introduced the Chief Guest to the gathering, highlighting his scientific achievements, recognitions and awards. Prof. Ajay Gupta, Centre-Director, UGC DAE CSR, Indore centre, proposed the vote of thanks. The keynote lecture of Prof. Sanyal was followed by a poster session

highlighting the research activities / facilities of the three Centres (Indore, Kolkata, Mumbai) and initiation of Kalpakkar node).

In the afternoon session prestigious Prof. R. Srinivasan award was given to an eminent low temperature physicist, Prof. A. K Majumdar of S.N. Bose Centre, Kolkata. Prof. Majumdar has produced a large number of students who are active in low temperature physics in India. CSR award for Scientific Excellence was also given on the occasion to Dr. Alok Banerjee of the consortium. The awardees delivered seminars highlighting their research activities. The day ended with a cultural programme of Nikhil Barodia (sitar recital) and Trupti Ambardekar (vocal recital).



Dr. Alok Banerjee receiving the CSR Award for Scientific Excellence for the year 2009.



Prof. A. K. Majumdar receiving the Prof. R. Srinivasan award for the year 2009.

Workshop on “SOLID STATE PHYSICS TO MATERIALS SCIENCE–SSP2MS”

A three day Workshop on “SOLID STATE PHYSICS TO MATERIALS SCIENCE –SSP2MS” was organized by Indore Centre jointly with IGCAR, Kalpakam, Institute of Mathematical Sciences (IMSc), Chennai and Pondicherry University (PU) during August 19 - 21, 2009 at the Department of Physics, Pondicherry University. The workshop was conceived by Prof. G. Bhaskaran (IMSc.), to address young Ph. D. students doing experimental research in Solid State Physics/Material Science. The aim of the workshop was to share with research scholars some excitements in modern materials science from the perspective of basic solid state physics and let them know about experimental research facilities available at the Centre of UGC-DAE Consortium for Scientific Research.

Dr. C. S. Sundar, Director, Materials Science Group, IGCAR, in his inaugural talk reviewed historical developments that took place in India on the Materials Science front and highlighted the need to solve problems in materials science with help of concepts that are rich in solid state physics. Dr. V. Ganesan (CSR, Indore) gave an overview of CSR activities in general and LTHM capabilities available at Indore in particular. Dr. R. Shankar (IMSc) delivered a talk on “You can’t ignore Quantum Mechanics” and Dr. B.M. Jaffar Ali, Anna University, on “Measurements and manipulation of life at Nanoscale”. A theoretical talk on “Physics with Biological Materials” was given by Dr. S.V.M. Satyanarayana (PU). Participants of the workshop highlighted their research activities in a poster session in the afternoon.

The second day’s lectures of the workshop were organized at Materials Science Group (MSG) of IGCAR, Kalpakam. The programme started with a brief overview by Dr. G. Amarendra on “Upcoming Facilities and Programmes at UGC-DAE CSI Node at Kalpakam”. Following this, Dr. A. Bharathi gave a talk on “Low temperature facilities and experiments on superconducting materials” and Dr. S. Dhara on “Nanomaterials research at Kalpakam”. The participants also visited the laboratories of MSG. The third day’s programme was started with a talk by Prof. Ajay Gupta (CSR, Indore) on “X-ray characterization of thin films and multilayers” followed by Dr. Valsa Kumar (IGCAR) on “Computational materials science”, Dr. V. Ganesan on “Measuring physical properties” and Dr. H.K. Sahu (IGCAR) on “Data Analysis”. The concluding lecture of the workshop was delivered by Prof. G. Bhaskaran (IMSc) on “You can’t ignore Kittel”.

In all about 100 participants including forty four outstation students, benefitted from the workshop. The local organizers from Pondicherry University were Prof. K. Porsezian, Dr. S. Sivaprakasam and Dr. S.V.M. Satyanarayana. As a gesture from IMSc., each student participant was given two books.

School on Neutrons as Probes of Condensed Matter at Mumbai (NPCM)-XIV

A six day School on “Neutrons as Probes of Condensed Matter (NPCM)” was jointly organized, by UGC-DAE Consortium for Scientific Research (CSR), Mumbai Centre and Bhabha Atomic Research Centre (BARC), from 5 to 10th October, 2009 at BARC Mumbai. This school, which included hands-on experiments at Dhruva Reactor, was fourteenth in the series of schools/workshops on neutron as probes of condensed matter and preceded the Conference on Neutron Scattering and Mesoscopic Systems that was held at Goa University during October 12-14, 2009. Dr. P. D. Babu (CSR, Mumbai Centre) and Dr. Amitabh Das (SSPD, BARC) were the coordinators for this School.

The school evoked overwhelming response. There were more than 150 applications and there were applicants who wanted to attend the school at their own expenses. Out of these, 55 participants (45 Ph.D. students and 10 faculty) representing all the regions of the country were selected. This school was unique in that there were six foreign speakers from different neutron centres, out of which four of them were present from beginning to end of the school and interacted with the participants. For the experiments, all the participants were taken inside BARC to Dhruva Reactor.



The School had formal inauguration function where Dr. S. Banerjee, Director, BARC was the Chief Guest. Dr. J.V. Yakhmi, Associate Director, Physics Group, BARC, welcomed the gathering and Dr. S.L. Chaplot, Head, SSPD, BARC gave the general remarks and background of the schools and workshops on use of neutrons. Dr. P. Chaddah, Director, UGC-DAE CSR, gave the introductory remarks. He thanked Reactor Group, BARC for smooth operation of the reactor, which is essential for utilization of neutron beam for research. He also thanked SSPD for their cooperation and extending the neutron scattering facilities for university users. Dr. S. Banerjee in his inaugural address dwelt on the importance using neutrons in understanding material properties and also other complementary tools such as transmission electron microscopy, etc. Dr. R. Mukhopadhyay, SSPD, BARC conducted the inaugural session and Dr. A.V. Pimpale, Centre Director, UGC-DAE CSR, Mumbai Centre proposed the vote of thanks.

The school consisted of 21 theory lectures plus 3 discussion cum tutorial sessions and two days of experimental sessions at Dhruva Reactor. Out of these 9 lectures were delivered by the foreign experts and there were lectures on complementary techniques such as Synchrotron Radiation and Electron Microscopy. Following the inauguration, school started with the overview of National Facility for Neutron Beam Research (NFNBR) by Dr. Mukhopadhyay, who gave a bird's eye view of neutron scattering facilities at BARC. Dr. Chaddah gave a lecture describing the CSR neutron diffractometer which provides the unique sample environment of high magnetic fields at low temperatures. He dwelt on various physics issues that could be addressed using these facilities. Dr. A.V. Pimpale delivered a lecture on basics of neutron scattering and its theoretical formalism. Dr. J Rodriguez Carvajal (ILL, France), who developed the FullProf Rietveld refinement program, delivered his first lecture on the Rietveld Method and second lecture on crystal structure refinement using FullProf. On popular demand, he gave a third lecture cum tutorial on refinement of simple and complex magnetic structures using FullProf software. Dr. Javier Campo (Univ. of Zaragoza, Spain) delivered two lectures, one on the concepts of magnetic crystallography and another on refinement of magnetic structure by FullProf. There were lectures on neutron reflectometry by Dr. Saibal Basu (BARC), small angle neutron scattering (SANS) from soft matter and biological systems by Dr. V.K. Aswal (BARC), SANS and its

applications to porous materials by Dr. D. Sen (BARC), structure of liquids and amorphous systems by Dr. P.S.R. Krishna (BARC), inelastic neutron scattering: experiments and some results by Dr. Mala N Rao (BARC), inelastic neutron scattering –time of flight spectrometry by Dr. Stephane Rols (ILL, France), stochastic dynamics-quasi-elastic neutron scattering by Dr. Subhankur Mitra (BARC), local order viewed by neutron scattering by Isabelle Mirebeau (LLB, France), single crystal neutron diffraction experiment and structure determination by Dr. R. Chitra (BARC), SANS in in Soft matter by Dr. M Imai, (Ochanomizu University, Japan) and molecular diffusion by Dr. Fanni Jurayni (PSI, Switzerland). In addition, there were two talks on complementary techniques one by Dr. G.K Dey (BARC) on Electron Microscopy for Material Research and the other by Dr. S. K. Deb (RRCAT) on Synchrotron Facility in India.

For the experimental part, participants were divided into 10 groups with 5 to 6 persons per group and 10 different instruments were made available. Each group worked on 4 different instruments in 4 sessions for two days of the school. The instruments offered were four diffractometers (two powder, one high Q and one single crystal), two small angle neutron spectrometers, polarized neutron spectrometer, triple axis neutron spectrometer, quasi elastic spectrometer and neutron reflectometer.

An amateur group from Anushaktinagar presented an evening of classical music for the participants on the first day of the school and a special dinner was also hosted by the Director, BARC. The school ended with a concluding session where participants gave their feedback and certificates of participation were distributed. Participants in general felt that the school was very useful and thanked the organizers for organizing the school. Some participants felt that experimental sessions were most enjoyable, highly educative and wanted longer duration for experiments as well as tutorials.

Awareness Workshop on “The Facilities of UGC-DAE Consortium for Scientific Research”

An awareness workshop on “The facilities of UGC-DAE Consortium for Scientific Research (UGC -DAE CSR)” was held at the Centre for High Pressure Research (CHPR), Department of Physics, Bharathidasan University (BU), Tiruchirappalli during September 16-17, 2009. The work shop started with a brief inaugural function. Prof. K. Ramamurthi, HOD, School of Physics, BU welcomed the participants and speakers. Dr. M. Ponnaivaiko, Vice Chancellor, BU inaugurated the workshop and presided over the inaugural function of the workshop. Dr. A.V. Pimpale, Centre Director, CSR Mumbai delivered his address highlighting the motive of the workshop and invited researchers from universities and colleges to actively participate in the research programs of CSR that will be a mutually beneficial one. Dr. V. Ganesan, CSR, Indore explained the scope of the workshop. Prof. M. Lakshmanan, Prof of Eminence & DST Ramanna Fellow, Dr. G. Amarendra of IGCAR Kalpakkam, Dr. S.K. Deb of RRCAT, Indore and the faculty of BU were present during the inaugural function. About 40 participants attended the workshop from all the major universities of region close to Tiruchirappalli, apart from the local participants. Prof. S. Arumugam, CHPR, BU, local convener of the workshop proposed vote of thanks.

Overviews of the facilities available at various centers of CSR were given by Drs. A.V. Pimpale, V. Ganesan and A. Saha. Dr. S.K. Deb elaborated on the synchrotron radiation facility of RRCAT, Indore and Dr. G. Amerandra gave an overview of the facilities available at MSD IGCAR Kalpakkam and those are planned at Kalpakkam Node of CSR. Drs. V Ganesan, A. Banerjee, N.P. Lalla and V.R Reddy discussed some of the facilities available at the Indore Centre in detail. Prof. A. Armugham gave talk on the facilities available at the centre for High Pressure Research, School of Physics, BU and Dr. K. Jeganathan, BU, made a presentation on Structural characterization of Nitride Semiconductors. The participants raised questions about various current scientific issues that were answered by the speakers and senior scientists in the gathering.



YRAST'09 - School cum Workshop on Nuclear Yrast and Near Yrast Spectroscopy

The atomic nucleus is often studied by imparting external stimulus and observing its response. The response of the nucleus to a rotational stimulus is very effectively studied by the cascade of electromagnetic emissions (gamma rays). Such in-beam gamma ray spectroscopy investigations demand advanced instrumentation involving accelerators, large detector systems and advanced pulse processing and analysis techniques. In the Indian context, the successful operation of the Indian National Gamma Array (INGA) facility, a national collaboration between the Universities and Research Institutes and funded in part by DST has caused a national renaissance in the field of nuclear structure.

Catering to the need of the growing research community in the field of nuclear gamma ray spectroscopy, a School cum Workshop on Nuclear Yrast and Near Yrast Spectroscopy, was organized by the Kolkata Centre of the Consortium in collaboration with IIT Roorkee at IIT Roorkee from October 26-30, 2009.

In the school, about 14 lectures were delivered by experts in the field. The first talk in the School was an umbrella talk by Dr. S. K. Basu on the experimental techniques for yrast and near yrast spectroscopy. This was followed by talk on Modern Gamma Detection Systems, and Channel Selection by S. Muralithar & N. Madhavan. Dr. Janssens concisely summarized various techniques being employed for the study of neutron-rich nuclei. The lectures by Dr. A. K. Sinha & Dr. P. K. Joshi introduced to the students the techniques for lifetime measurements. Dr. R. Palit discussed about the extraction of various parameters such as transition probabilities and mixing ratios from the experimental observable. Prof. P. Regan and Prof. Ph Walker during their presentations brought out the intriguing phenomena observed when one investigates the decay of isomers. Dr. S. Mandal discussed about the possibilities of gamma-ray investigations using fast exotic nuclei. Dr. S. P. presented the students with a need for nuclear model and an overview of the underlying physics of the various models being routinely used. Prof. K. Kar & Prof. V. K. B. Kota in their lectures outlined the Spherical Shell Model in its various facets. Prof. A. K. Jain in his presentations elucidated the various geometrical symmetries associated with yrast and near yrast structures.

Various open-access software/codes available for nuclear structure interpretations were introduced to the students by Dr. Arumugam during his talk. There were 3 pre-dinner talks: Prof. S. C. Pancholi on the interesting observations with Strongly deformed triaxial nuclei; Dr. A. O. Macchiavelli on aspects of pairing correlations and Dr. A. Roy on devising an experiment. There were dedicated sessions devoted to actual hands-on-experience with the data-analysis procedure, conducted by Dr. Ambar Chatterjee as well as introduction to extracting level-lifetimes using the Doppler Shift Attenuation Method by Dr. I. K. Joshi. These sessions were quite enthusiastically attended by the research scholars and were conducted in the computer lab of the IIT-R continuing till late evenings upto 11 pm.



After the school, workshop continued on October 29th – 30th 2009. In his inaugural talk Dr. R. K. Bhowmik, gave a very comprehensive overview of the Physics problems that have been addressed successfully using the INGA campaign conducted so far. Presentations were made by various users of the INGA facility (Dr. R. Palit, Dr. S. Bhattacharya, Prof. M. Govil) summarizing their results. Of these a few presentations were made by senior research scholars (Ms. Ritwik

Chakraborti, Mr. Anukul Dhal, Ms. Deepika Choudhury and Mr. Dinesh Negi) who have completed their thesis using this national facility. Dr R V. F. Janssens & Dr A. O. Macchiavelli during their presentations described the recent developments in detector development and the associated advanced instrumentation along with the proposed Accelerator facility and future plans in investigating dizzy nuclei. Prof. P. Regan, Prof. P. Walker and Prof. U. Garg presented some of their interesting results obtained recently using either a large gamma array or a combination of arrays to enhance the sensitivity and selectivity of the measurements. Dr. S. Tandel and Dr. S. Chamoli presented some of their recent results using facilities abroad. A sessions was devoted to the possible physics problems that could be addressed using the next generation INGA facility, wherein the speakers (Dr. R. Palit, Dr. D. C. Biswas, Dr. S. S. Ghugre, Dr. G. Mukherjee, Dr. S. Kumar, Mr. R. P. Singh and Prof. S. C. Pancholi) described the physics problem that they would like to pursue, and also outlined the instrumentation required to pursue such investigations. It is expected that this exercise would finally culminate in the write up of the project proposal for the next INGA facility. From the discussions it was apparent that ancillary detectors would form an integral part of the facility. This session was chaired by Prof. G. K. Mehta. There were about more than 70 participants in the school & workshop from various parts of the country.

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विकिरण वेक्षक (डिटेक्टर)

संदीप घुगरे

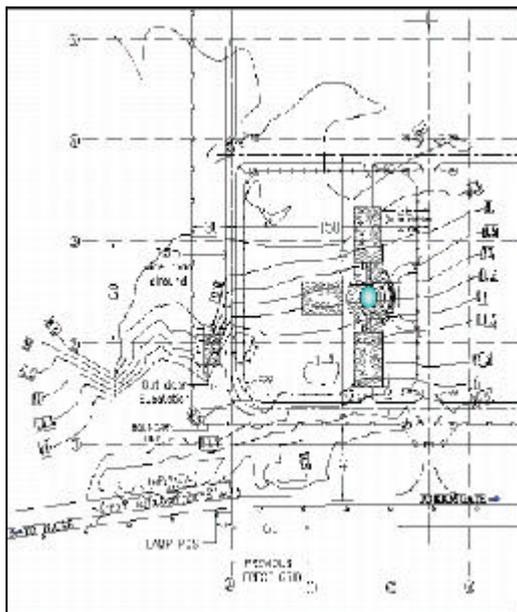
विश्वविद्यालय अनुदान आयोग परमाणु ऊर्जा विभाग वैज्ञानिक अनुसंधान संकुल कोलकाता केंद्र

विकिरण हमारे दैनिक जीवन का एक हिस्सा है. बहरहाल, हम इससे अनजान हैं, क्योंकि यह हमारी संवेदी अंगों से महसूस नहीं हो सकता. विकिरण केवल एक विकिरण डिटेक्टर से पकड़ा जा सकता है. वेक्षक विकिरण का पता लगाता है और इसे एक औसत दर्जे के इलेक्ट्रॉनिक संकेत में परिवर्तित करती है. विकिरण डिटेक्टर का आधारभूत सिद्धांत यह है कि, विकिरण का डिटेक्टर के साथ संपर्क होते ही वह अपनी ऊर्जा का हस्तांतरण डिटेक्टर को कर देते हैं. यह संपर्क के कारण डिटेक्टर के भीतर "जानकारी के वाहकों का" निर्माण होता है. जानकारी के वाहकों की संख्या विकिरण के ऊर्जा के आनुपातिक है. हम जानकारी के वाहकों की संख्या को मापते हैं, और विकिरण के बारे में जानकारी प्राप्त करते हैं. इस प्रस्तुति के दौरान, विकिरण का पता लगाने के कुछ प्रकारों का वर्णन किया जाएगा. ऐसे डिटेक्टरों के उपयोग पर भी चर्चा की जाएगी.



Kalpakkam Node:

Dr. G. Amarendra, Scientist-in-charge Kalpakkam node, is working overtime to ensure that the laboratory buildings are ready to accept instruments and university users.



Site location and layout

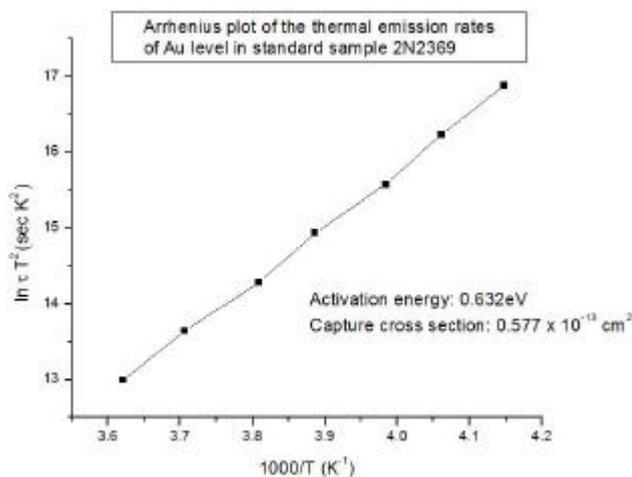


Roof laying for the Physics wing of UGC-DAE CSR, Kalpakkam Node as on Oct 21, 2009

New Instruments/Additions

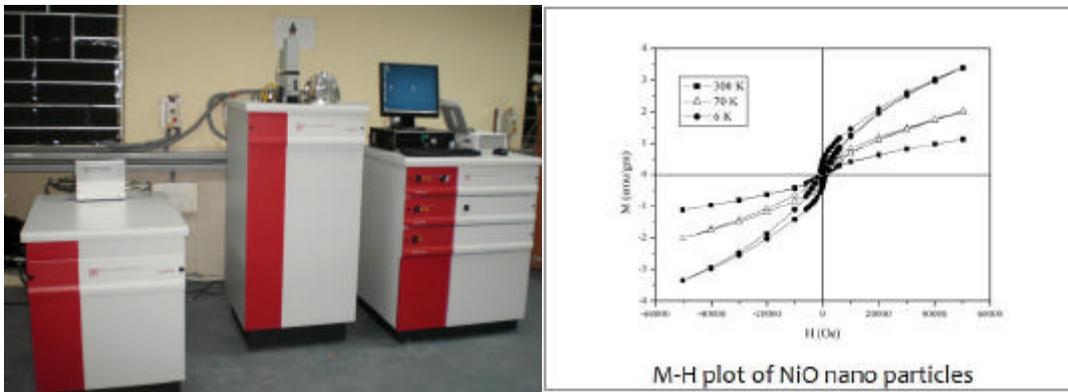
Deep Level Transient Spectroscopy DLTS

A DLTS (Deep level transient spectroscopy) system has been installed in the detector laboratory of the Kolkata centre to characterize and examine deep non-radiative defects in semiconductors. It is basically a measurement of transient capacitance of Schottky and p-n junction. This is based upon the principle that emission rates of electrons or holes from trap in semiconductor junction held in reverse bias are temperature dependent. This temperature dependency allows determination of the activation energies of the traps, their capture cross-section and concentration. The facility shown in the photograph below is accessible to the university users and Dr. D. Das (ddas@alpha.iuc.res.in) may be contacted for the purpose. The plot in the figure below shows the data taken from the setup.



7-Tesla Squid

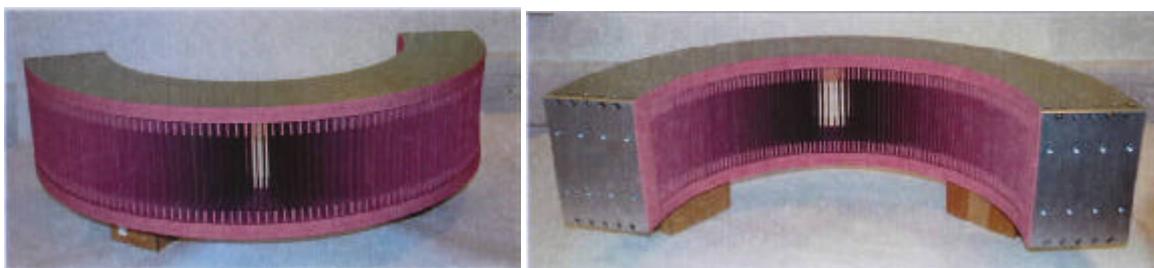
A 7 Tesla SQUID magnetometer with an ever-cool dewar has been recently installed at the Kolkata centre as a part of the high magnetic field facility being created under the aegis of DST, Govt. of India. The SQUID facility provides dc magnetization and ac susceptibility measurements up to 7 Tesla field in the temperature range 2K-330K. The facility is accessible to the users from universities. Dr. D. Das (ddas@alpha.iuc.res.in) may be contacted for using this facility.



Oscillating Radial Collimator for Neutron Powder Diffraction

Our powder neutron diffractometer employs a number of overlapping linear position sensitive detectors (PSDs), covering a scattering angle of 140° , and has a large opening in the detector shield. Consequently, neutrons scattered neutrons enter the detectors and contribute to the background. Further, when sample environmental facilities such as cryostats, cryo-magnets, furnaces, etc., are used on the diffractometer, the shrouds, radiation shields and other elements, which are mostly made of Aluminium, scatter neutrons strongly into the detectors giving rise to a large background. This large unwanted background can be eliminated by employing a radial collimator which allows only the neutrons scattered from the sample to enter the detectors.

A radial collimator (RC) is a soller collimator in circular (or semi circular) shape. It has vertical blades coated with neutron absorbing material. Spacing of the blades decides the area in horizontal plane at the sample position over which scattered neutrons are allowed to enter the detector. The blades of the radial collimator cast shadows on the detectors leading to dips in the diffraction patterning corresponding to each blade. In order to avoid this, the radial collimator is made to oscillate (hence the name Oscillating radial collimator) at predefined speed and amplitude so as to distribute the shadows uniformly over all scattering angles. This arrangement eliminates the unwanted background/contamination from sample environmental facilities and other sources and improves S/N ratio.



Radial Collimator view from Convex and concave sides – internal surfaces (pink) are coated with Gd_2O_3 paint.

In order to achieve similar objective for the powder neutron diffractometer installed by the Consortium at Dhruva Reactor, Mumbai, a radial collimator was procured from Switzerland. Its design parameters were optimized by calculating the visibility function. The collimator is made up of blades of very thin Mylar foils which are coated with gadolinium oxide paint (high absorber of thermal neutrons, pink color in above images). These Mylar blades are held under tension by suitable mechanism and spaced about 1.8° with respect to each other. This will cut down completely scattering from anything outside a diameter of 29 mm at the sample position. This means, the scattering from even the innermost wall of the cryomagnet used on this diffractometer whose diameter is 33mm will be eliminated. The mechanical assembly and motor controller, to oscillate continuously this radial collimator within specified limits, is being designed and fabricated.

Seminars at CSR:

1. Strongly Correlated Superconductivity in $\text{Rh}_{17}\text{S}_{15}$, Prof. S. Ramakrishnan, Tata Institute of Fundamental Research, 30 July 2009.
2. Quantum Size Effects in Thin Metal Films grown on Quasicrystalline Surfaces, Dr. A.K. Shukla, Institut Jean Lamour, CNRS, Département Chimie et Physique des Solides et des Surfaces, Nancy, France, 7 Aug 2009.
3. Epitaxial Surface- Phases and Nanostructures, Prof. S. M. Shivaprasad, JNCASR, Bangalore, 22 Sep 2009.
4. The European Synchrotron Radiation Source - Today and Tomorrow, Dr. Rudolf Rueffer, European Synch. Radiation Facility, 28 Oct 2009.
5. Nano-structured materials in the light of Nuclear Resonance Techniques, Dr. Rudolf Rueffer, European Synch. Radiation Facility, 30 Oct 2009.
6. Nano-Assembly Using Electrochemical Materials Science, Prof. R.K. Pandey, Barkatullah University Institute of Technology, Bhopal, 3 Nov 2009.
7. Graphene - electronic structure of a 2D model solid, Prof. Karsten Horn, Fritz Haber Institut of the Max Planck Society, Berlin, Germany, 9 Nov 2009.

Details of Lectures given by CSR faculty / students:

1. Spectroscopic studies of nuclei between the valley of stability and the island of inversion in A~30 region, Dr. S.S.Ghugre, International Conference on Nuclear Structure and Related Topics, at Joint Institute for Nuclear Research, Dubna (June 30 - July 5, 2009).
2. Ferromagnetic shape memory alloys studied by density functional theory, S. R. Barman, at 2nd International Conference on Ferromagnetic shape memory alloys, Bilbao, Spain, July 1-3, 2009.
3. Electronic properties of ferromagnetic shape memory alloys, S. R. Barman, at Max-Planck Institut for Microstructure Physik, Halle, July 13, 2009.
4. Study of diffusion mechanism in nm range thin films using neutron reflectivity, Mukul Gupta, Jülich Centre for Neutron Science at FRM II, Graching, Munich, Germany, July 31, 2009.
5. Glass-like metastabilities across magnetic transitions – our results and some new concepts, P Chaddah, at TIFR Mumbai, August 5, 2009.
6. Depth resolved structural studies in magnetic materials using x-ray standing waves, Ajay Gupta, at Department of Physics, University of California at San Diego, August 4 - 10, 2009.
7. A perspective on nanocrystalline nickel, G. S. Okram at Department of Physics, Manipur University, Imphal, August 21, 2009.
8. Inaugural and Keynote address, V. Ganesan at the AI CTE Seminar on Nanotechnology in Engineering and Medicine – A New Mile Stone”, at Institute of Road Transport, Erode, August 22, 2009.
9. Instrumentation in Nano-Sciences - AFM and its relevance, V. Ganesan, at Mother Theresa Women's University, September 19, 2009.
10. Science With Neutrons and Ions in the workshop “Neutron Generator and Applications”, A.K. Sinha, Department of Physics, Banaras Hindu University, Varanasi, September 19-20, 2009
11. Self-diffusion studies using neutron reflectivity, Mukul Gupta, Conference on Neutron Scattering and Mesoscopic Systems, Goa International Centre, Goa, October 12-14, 2009.
12. Studies on nanostructured materials, T. Shripathi at Department of Physics, Banaras Hindu University, Varanasi, October. 22, 2009.
13. Scanning Probe Microscopy as a characterization tool, V. Ganesan, at Workshop “On Nanostructured Materials (Wnm-09)”, Dept. of Physics, MLS University, Udayapur, October. 23-24, 2009.
14. Transmission electron microscopy of Nano-materials, N.P. Lalla, at Workshop “On Nanostructured Materials (Wnm-09)”, Dept. of Physics, MLS University, Udayapur, October. 24, 2009.

15. Ce-Doped BiFeO₃ Nanoparticles: Sol-Gel Synthesis and Investigation of Its Optical, Thermal, Magnetic and Dielectric Properties, Ms Bhavya Bhushan, Material Science and Technology, 2009, David L. Lawrence Convention Center, Pittsburgh, Pennsylvania, USA, October 25-29, 2009
16. Scanning Probe Microscopy as a tool to characterize the nano structures, V. Ganesan, at the BRNS meeting on "Theme meeting on Quantum Structures", BARC Mumbai, November 2, 2009.
17. In-situ study of magnetic thin films using Magneto Optical Kerr Effect, Ajay Gupta, at the BRNS meeting on "Theme meeting on Quantum Structures", BARC Mumbai, November 2, 2009.
18. Surface Functionalized Quantum Dots: Synthesis, Growth Kinetics and Biological Interfacing, Dr. A. Saha, National Symposium on Photonics and Quantum Structures, Tezpur University on November 4-6, 2009.
19. In-situ study of growth of magnetic thin films, Ajay Gupta, at National Institute of Materials Physics, Bucharest, Nov. 8 – 13, 2009.
20. Photoelectron spectroscopy using Synchrtron Radiation, D.M.Phase at National Conference on Radiation Physics held at Department of Physics, M.L.S University, Udaipur in Nov. 19-21, 2009.
21. Electron spectroscopy study of rare gas nano-bubbles in aluminum formed by ion irradiation, S.R. Barman, at National Conference on Radiation Physics held at Department of Physics, M.L.S University, Udaipur in Nov. 19 - 21 2009.
22. Electron spectroscopy study of rare gas nano-bubbles in aluminium, S.R. Barman, at India Italy Workshop on Synchrotron Application in Indian Institute of Science, Bangalore, November 23-25, 2009.
23. Application of Raman Spectroscopy in analysis of nano particles, Vasant Sathe, at Department of Physics, Banaras Hindu University, Varanasi, December. 1, 2009.
24. Recent trends in thin films of spintronics materials, R. J. Choudhary, at National Symposium on Pulsed laser deposition (PLD-2009) held at IIT, Chennai in December 2-4, 2009.
25. Photoelectron spectroscopy of pulsed laser deposited thin films, D.M.Phase at National Symposium on Pulsed laser deposition (PLD-2009) held at IIT, Chennai in December 2-4, 2009.
26. Experimental study of nuclei in the vicinity of island of inversion through the fusion reaction, Dr. S.S.Ghugre, International Symposium on Nuclear Physics, Bhabha Atomic Research Centre, Mumbai, December 8-12, 2009.
27. Interactive talk on UGC-DAE CSR facilities, T. Shripathi at Department of Physics, Manipal University, Manipal, December. 9, 2009.
28. Glass-like metastabilities across magnetic transitions – our results and some new concepts, P Chaddah, at JNU New Delhi, December 10, 2009.
29. Keynote Address, V. Ganesan, at the Department of Chemistry and Biochemistry, St. Aloysius`College Jabalpur during a National Seminar on " Nanotechnology: A Futuristic Application in all Disciplines of Science", December 12-13, 2009.
30. Anomalous physical properties of nanocrystalline nickel, G. S. Okram at Bhabha Atomic Research Centre, Mumbai, December 24, 2009.

Ms. Komal Bapna (CSR, Indore) got one of the best poster awards at DAE Solid State Symposium 2009, Badoda for her presentation titled "Resonant Photoemission of Anatase TiO₂ Thin Film Prepared by Pulsed Laser Deposition."

Foreign Visit by Staff / Students:

Sl. No	Name	Place visited	Date	Purpose
1.	Dr. V. Siruguri	Helmholtz Zentrum Berlin, Germany	June 28 to July 5, 2009	neutron diffraction studies
2.	Dr. S. Rayaprol	Helmholtz Zentrum Berlin, Germany	June 28 to July 5, 2009	neutron diffraction studies
3.	Dr. S.S. Ghugre	Dubna, Russia	June 30 – July 4, 2009.	International Conference on Nuclear Structure and Related Topics
3.	Dr. S. R. Barman	Bilbao, Spain	June 30 to July 4, 2009	Spain 2 nd International Conference on Ferromagnetic shape memory alloys
4.	Dr. S. R. Barman	Berlin, Germany	July 4 to 31, 2009	Experiments under the D.S.T.-Max Planck Partner Group project.
5.	Dr. Mukul Gupta	(i) PSI, Switzerland (ii) FRM II, Munich, Germany (iii) Gustav-Stresemann-Institut Bonn, Germany	July 12- August 8 2009	(i) Neutron reflectivity experiments under Indo-Swiss joint project (ii) Seminar at FRM II (iii) International conference on Polarized Neutrons and Synchrotron X-rays for Magnetism (PNSXM 2009)
6.	Mr. S. M. Amir	PSI, Switzerland	July 15 – 27 2009	Neutron reflectivity experiments
7.	Ms. Ranjeeta Gupta	PSI, Switzerland	July 20-30 2009	Neutron reflectivity experiments
8.	Prof. Ajay Gupta	Stanford Synchrotron Radiation Laboratory, USA	August 4 - 10, 2009	Experiments on polymer thin films
9.	Ms. Deepti Kothari	Groningen, The Netherlands	Sept. 5-10 2009	European School on Multiferroics
10.	Mr Sadhan Ch. Das	University Of Greifswald, Germany.	Oct. 1-31, 2009	Visit for academic and engineering activities (on invitation).
11.	Ms. Bhavya Bhushan	National High Magnetic field Lab., Tallahassee, Florida and Dept of Chemistry, Florida State University, Tallahassee, Florida	Oct. 6-24, 2009	To carry out collaborative works on multi ferroics using EPR and electrical measurements
12.	Ms. Bhavya Bhushan	David Lawrence Conv. Center, Pittsburgh, Pennsylvania, USA	Oct. 25-29	Material Science and Technology, 2009
13.	Dr. Mukul Gupta	(i) PSI Switzerland (ii) ILL, Grenoble, France	Oct. 25-November 10, 2009	Neutron reflectivity experiments
14.	Mr. S. M. Amir	(i) PSI Switzerland (ii) ILL, Grenoble, France	Oct. 25-Nov.10, 2009	Neutron reflectivity experiments
15.	Prof. Ajay Gupta	ILL, Grenoble, France	Nov. 4 – 8, 2009	Experiments on neutron reflectivity
16.	Prof. Ajay Gupta	National Institute of Mat. Physics, Bucharest	Nov. 8 – 13, 2009	Under Indo-Romania joint research project
17.	Dr. P.D. Babu	Paul Scherrer Institute, Switzerland	December 6 – 16, 2009	Neutron scattering experiments at spallation neutron source, SINQ

Student Placements:

1. Ms. Sharmistha Bagchi joined as Scientist at Institute of Minerals and Materials Technology, RRL (CSIR), Bhubaneswar.
2. Dr. Ajay Soni joined as Post Doctoral Fellow at Nanyang Technological University, Singapore.
3. Dr. Ashim Kumar Pramanik joined as Post Doctoral Fellow at Leibniz Institute for Solid State and Materials Research (IFW) Dresden, Germany.
4. Dr. L. S. Sharath Chandra joined as KSKRA fellow at RRCAT, Indore.
5. Dr. Krishichayan joined as Post Doctoral Fellow at the Cyclotron Institute at Texas A & M
6. Dr. Anagha Chakarborty joined as faculty at Krishnanagar College, West Bengal and is now Post Doctoral Fellow at University of Kentucky.
7. Dr. Sudatta Ray joined as Post Doctoral Fellow at SINP, Kolkata
8. Dr. Somsunder Mukopadhyay joined as Post Doctoral Fellow at Mississippi State University
9. Dr. Anindita Chatterjee, joined as Post Doctoral Fellow, National Dong Hwa University, Taiwan.
10. Dr. Amiya Priyam, joined as Post Doctoral Fellow, Florida State University, USA
11. Dr. Jyoti Prakash Maity joined as Post Doctoral Fellow, National Cheng king University, Taiwan
12. Dr. R. K. Dutta is a Faculty in the Deptt of Chemistry, IIT Roorkee
13. Dr. Samrat Mukherjee is a faculty in the Physics Department BITS, Mesra, Ranchi

Following students of the Consortium obtained their PhD during July-December 2009:

Student	Thesis Title	University	Supervisor
L. S. Sharath Chandra	A study on Ground State Properties of Correlated Electron Systems	DAVV, Indore	Dr. V. Ganesan
Rajendra Singh Dhaka	Electron spectroscopic investigation of metallic systems	DAVV, Indore	Dr. S.R. Barman
Ajay Soni	Study of physical properties of nanomaterials	DAVV, Indore	Dr. G. S. Okram
J. B. M. Krishna	Some Studies on Conducting Polymers and their possible applications	Jadavpur University	Dr. B. G. Ghosh
Aparna Datta	Synthesis of CdS nanoparticles in Aqueous and Organic Phase by Chemical and Radiolytic Techniques and its Possible Interactions with Molecules of Biological Relevance	Jadavpur University	Dr. A. Saha Co-Supervisor: Dr. K. K. Mukherjea
Somsundar Mukhopadhyay	Spectroscopic studies of exotic nuclear phenomena at high angular momentum	University of Calcutta	Dr. S. S. Ghugre Prof. S. N. Ray

CSR news:

- About 665 users availed the access to various in-house research facilities of the three centres of the consortium during 2008-09.
- 106 ongoing collaborative research schemes with various university groups at the three centres of the consortium during the year 2008-09.
- During the same period, there were about 220 publications in refereed journals and 95 presentations in conferences / symposia.

For more details see http://www.csr.ernet.in/csr/annual/annualreport_2009.pdf