The School was inaugurated by Dr P D Gupta, Director, RRCAT on Nov 28, 2012. Dr D D Bhawalkar, former Director, RRCAT distributed the award certificates in the concluding session on Dec 8, 2012. Prof W Chou, Fermilab served as Chairman, Curriculum Committee and Shri S C Joshi, RRCAT as convener, Local Organizing Committee. Based on the overall performance, two of the Indian students Ms Rinky Dhingra and Shri Rahul Gaur were among the top 8 performers of the School.

Reported by:
S C Joshi (scjoshi@rrcat.gov.in)

N4: Fourth SERC School on Laser produced Plasmas: Physics and Applications

The "Fourth SERC School on laser produced plasmas: Physics and applications" was held at Raja Ramanna Centre for Advanced Technology, Indore, from July 9-21, 2012. This school was fully sponsored by the "Science and Education Research Board" of the Department of Science & Technology. 45 students were selected for the School from among the 120 applications which were received from Ph.D. students and university / college teachers, with some background in laser produced plasma. Dr. P A Naik was the Director of the school with Dr. J A Chakera and Shri H SVora as the Co-directors of the school.

Dr. P D Gupta, Director RRCAT addressing the participants during the inaugural session of Fourth SERC School on laser produced plasmas : Physics and applications

The school was inaugurated on July 9, 2012 by Dr. P.D. Gupta, Director, RRCAT. Dr. A.K. Das, Head, Laser and Plasma Technology Division of Bhabha Atomic Research Centre (BARC) was the Guest of Honour. The format of school was a combination of class room lectures, evening lectures by eminent personalities, and hands-on experiment related to the subject to give the students exposure to higher level experiments, equipment. During registration, the participants were provided with books on Plasma and Laser, worth about Rs.1,800 each, along with printouts of the lecture notes of all the lectures, a CD containing lecture notes and other relevant reference material, printed handouts on the detailed instructions and guidelines related to the hands-on experiments, and the laser safety information sheets. There were total 42 lectures, including six tutorial lectures and one on laser safety, most of which were of black-board type. These lectures were be given by 22 faculty members from RRCAT and outside. There were nine evening lectures by eminent persons related to the field of plasma or laser-produced plasma. These lectures were delivered by 1) Prof. P K Kaw, Institute of Plasma Research (IPR); 2) Dr. A K Das, BARC; 3) Dr. P D Gupta, RRCAT, 4) Dr. Anurag Shyam, BARC-Visakhapatnam; 5) Prof. G R Kumar, Tata Institute of Fundamental Research (TIFR); 6) Dr. L J Dhareshwar, BARC; 7) Dr. Amita Das, IPR; 8) Prof. M Krishnamoorti, TIFR; and 9) Dr. L M Kukreja, RRCAT. There were eight hands-on experiments, two laser related and six laser-plasma related. Students were divided in four batches. Each experiment was run for four days, with the four batches rotating to carry out the four experiments in each round, covering all the eight experiments in two rounds.

Another important feature of this school was hands-on training in simulations. Dr. S Sengupta of IPR gave two classroom lectures on plasma simulations, followed by hands-on training in Computer Centre, where each participant sat on a computer terminal and received practical training in simulation techniques. When one batch was undergoing training in simulation for one and half hours, the other batch was exposed to use of various indigenously developed data acquisition, image grabbing and image processing softwares by Shri H S Vora and Shri Rajiv Jain, who have written these software packages themselves at RRCAT.

Two cultural evenings were arranged for the students and the faculty members to showcase their cultural talent. The students and faculty members actively participated in these events. There was a one day excursion to Mandu. An

SERC dinner was also organized for the students and faculty members. Free Wi-Fi connection was provided to the students at Guest House, which was highly appreciated and used by the students. There was a lab visit also organized on one day. In this visit, students visited Indus-1 and Indus-2 synchrotron sources, the 150 TW Ti:sapphire laser system, different types of Solid state lasers, Dye lasers, and Copper vapour lasers.

On the second-last day, there was a multiple choice type quiz given to the participants to gauge how much they had grasped during the School. This was followed by a feed-back session to get detailed feedback from the students. The feedback showed that overall the students were quite happy with all the aspects related to the school. On the last day, there was concluding session wherein prizes were distributed to the 5 winners of the quiz and participation certificates were distributed to all the participants by Dr. P D Gupta, Director, RRCAT.

Reported by:
J A Chakera (chakera@rrcat.gov.in)

N.5: Fifth SERC School on micro-fabrication and micromachining

The fifth SERC School in the series of micro-fabrication and micromachining was organized at Raja Ramanna Centre for Advanced Technology (RRCAT), Indore during October 29-November 03, 2012. The theme of the school was "New developments in micro-fabrication with focus on synchrotron radiation-based Deep X-ray Lithography". The total 57 participants from all over the country participated in the School. They were selected from 160 applicants, based on their academic records, research interests and relevance.

The school was inaugurated on October 29, 2012 by Dr. P K Gupta, then Officiating Director, RRCAT. Prof. P K Kalra, Director, IIT Jodhpur was the Guest of Honour. Dr. G S Lodha, gave an introduction on X-ray lithography and theme of the school. The school was a combination of class room lectures and hands-on experiments on X-ray lithography. The participants were given a very famous reference book, Fundamentals of Micro-fabrication and Nanotechnology (vol. 1, 2 and 3) by Marc J Madou.

The participants and faculty of Fifth SERC School on Micro-fabrication and Micromachining posing for a group photograph

Total 30 lectures were given by 25 faculty members and researchers from RRCAT and outside. The lectures were arranged to cover all the dimensions of multidisciplinary area of X-ray lithography. Three teachers from abroad were also invited to deliver the Lectures. Dr Lucia Alianelli from Diamond Light Source, UK discussed the various fabrication processes for design and development of X-ray lenses. The advanced course on X-ray lithography including the device fabrication and testing was taken by Prof Y Utsumi from Hyogo University, Japan. Dr R Bhatia from SpotOptics, Italy explained the process involved in metrology of micro devices. Dr V K Suri from BARC, Mumbai shared his valuable experience in the field of micro-nano engineering for realization of innovative micro-nano devices for societal applications during the evening talk.

Beside lectures and tutorials, project proposal and presentation was organized each day where each participant presented a brief research plan. Around 28 projects were presented by the participants which included application in the field of mechanical, electrical, biological and physical science. The 3 hands-on experiments related to X-ray lithography were performed with 2 batches. While one batch was busy with the hands-on experiments the other batch was involved in visiting the laser micro-fabrication facilities. The participants also visited Inuds-1 and Indus-2 synchrotron sources. In addition, two cultural evenings were organized for the participants and faculties. The feedback was collected from the participants that showed happiness with the arrangements and overall usefulness of the school.

Dr T Ramasami, Secretary, Department of Science and Technology presided the concluding session of the SERC School. DrRamasami in his key note address talked