

achievements during last year, he also discussed about Bose-Einstein condensation in Rb87 atoms in a double magneto optic trap setup at  $T = 1^\circ\text{K}$ ,  $n = 1013/\text{cc}$  and  $N=106$  atoms with a life time of 14 second. He further told that an LED-based diagnostic system was developed for detection of oral cavity cancer. This system is more compact, rugged and maintenance-free compared to the N2 laser based systems used earlier. Photon counting version of uranium fluorimeter was developed with detection limit 0.02 ppb and measurement range up to 50 ppb. The developed fluorimeter is under field evaluation at BARC. A gated grid S-20 optical streak camera was developed and tested in Indus-1 SRS by the electron bunch length measurement. Highlighting the upgradation of computing and communication systems, he talked about the commissioning of a high performance computing cluster (Kshitij-3, क्षितिज-3) capable of delivering peak computing power of 9 teraflops. Discussing about the human resource development, he informed that BARC Training School at RRCAT, 13thbatch had 14 Trainee Scientific Officers, while 66 Stipendiary Trainees were being trained under Stipendiary Training Programme. Number of PhD and M Tech registration under Homi Bhabha National Institute was 97 and 67 respectively.

In the chief guest address, Dr. R Chidambaram expressed his happiness over the progress made by the scientists, engineers and the supporting staff of RRCAT in the areas of lasers, accelerators and related advanced technologies. Reiterating the importance of the advanced technologies being developed at RRCAT, he added, "Inputs from advanced technologies into equipment are needed for doing what today one calls "Bigscience". Accelerators and research reactors; synchrotron radiation sources like Indus-1 & 2, optical, radio and gamma ray telescopes; neutrino observatory; and so on. These are Mega-Science projects at one end of the spectrum." He praised the round the clock operation of Indus-2 and the enthusiasm shown by the researchers from the various universities and national laboratories on utilization of Indus SRS facility. He praised that the work related to enabling technologies and focused R&D efforts taken up at RRCAT in the development of accelerator system for SNS. Sharing the vision, he said, "Research involves generation of new knowledge and innovation requires adding economic value (or societal benefit or strategic value or a mix of them) to knowledge, even knowledge not generated by you. The border between applied research (& also what I call "directed basic research") and innovation, when developing cutting-edge technologies, becomes fuzzy."

Dr. S M Oak, Head, Solid State Laser Division proposed the vote of thanks. The Foundation Day programme was conducted by Sh. S C Joshi, Head, ProtonLinac& Superconducting Cavity Division.



*Gathering at Central Complex Auditorium during 29th Foundation Day celebration*

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## **N.2: National Science Day at RRCAT**

National Science Day (NSD) is celebrated every year on the last Saturday of the month of February at Raja Ramanna Centre for Advanced Technology, Indore. This year, it was celebrated on 23rd February 2013. 1500 students and teachers of 111 schools and colleges from Indore and some from faraway places came to visit the scientific facilities in RRCAT. The staff members of RRCAT had prepared about 15 exhibits which were kept in 12 buildings to explain the scientific and technical activities of the Centre and to demonstrate a few concepts in basic sciences. In the main function at RRCAT auditorium, Shri H S Vora, Convener NSD-2013, welcomed the students and teachers. He invited Dr. P D Gupta, Director RRCAT to inaugurate NSD-2013 and address the gathering. Dr. Gupta informed that the National Science Day is celebrated to commemorate the path-breaking discovery of Raman Effect which led to the winning of Nobel Prize by Prof. C.V. Raman. Dr. Gupta brought out several inspirational aspects of Prof. Raman's personality and life-style besides his scientific contributions. Dr. Gupta also described the growth of Indian Science in the last few decades and the contribution of the Department of Atomic Energy in the enhancement of Science and Technology capabilities of our country. He also gave an overview of Laser and Accelerator activities at RRCAT and explained several applications. His simple and easy to understand explanations had a stimulating effect on the students and teachers. He also encouraged the students to take up the scientific research as career and briefly explained its relevance in national and international context. Shri Rajesh Arya, Co-Convener NSD-2013, presented vote of thanks.



*Students visiting various RRCAT labs during NSD-2013*

After his address all the students were taken to different laboratories in organized groups under the guidance of volunteers from RRCAT. Elaborated arrangements were made by Sh. Rajesh Arya, Sh. M P Kamath, Sh. N S Benerji and Dr. C P Paul to take students to different laboratories in organized groups under the guidance of enthusiastic volunteers from RRCAT. The students and teachers were greatly enthused by the interesting exhibits. Students visited Synchrotron Radiation Sources (SRS) Indus-1 and Indus-2, laser laboratories, cryogenic laboratory, workshop, magnet laboratory, fire safety, industrial accelerator lab and other interesting laboratories. Snacks and lunch were served to all the students and accompanying teachers from various schools and colleges by the team of volunteers led by Sh. P Bhatnagar. Aroused scientific queries of the students were addressed by a team of senior scientists during the lunch break. This yearly effort brought an enthusiasm among the students. They admired the scientific activities being pursued by DAE in general and RRCAT in particular.

In the afternoon, families and friends of RRCAT officials visited the laboratories and witnessed exhibits.

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### **N.3: Interaction Meet on Utilization of Synchrotron Based X-ray fluorescence and related Techniques**

A two-day interaction meet on "Utilisation of Synchrotron Based X-ray Fluorescence and Related Techniques" was organized during 19th- 20th, March 2013 at Raja Ramanna Centre for Advanced Technology, Indore. The meet was organized by the Indus Synchrotrons Utilisation Division (ISUD) with an aim to foster active interaction

between different X-ray fluorescence spectroscopy research groups of the country and to showcase a micro-focus XRF spectroscopy beamline (BL-16), which has been recently commissioned at Indus-2 synchrotron radiation facility. The BL-16 beamline provides an interactive research platform to X-ray fluorescence spectroscopy users covering atomic physics, fundamental parameters evaluation for quantitative X-ray fluorescence analysis, environmental, archaeological, geology, biomedical and material science applications involving heavy metal speciation and their localization. The BL-16 beamline works in the X-ray energy range 4-20 keV and offers a combination of different analytical probes, e.g. X-ray fluorescence mapping, X-ray microspectroscopy and total-external reflection fluorescence characterization.



*Participants of the Interaction meet on Utilisation of Synchrotron Based X-ray fluorescence and related Techniques*

The meet was inaugurated by Dr. P. D. Gupta, Director, RRCAT Indore. He briefed an overview of accelerator and laser programs at RRCAT. He also accentuated why focused interaction theme meetings are important for effective utilization of Indus synchrotron facility. The welcome address to participants of the interaction meet was presented by Dr. S. K. Deb, Head ISUD. Dr. G. S. Lodha presented a brief account on X-ray fluorescence activities of the ISUD group. The meet was attended by 30 participants from different part of the country. There were seven invited tutorial talks delivered by the experts from different Indian universities and national research laboratories.

In the forenoon session of the first day, first invited talk was delivered by Prof. Devindra Mehta, Panjab University Chandigarh. He described various fundamental aspects of the X-ray fluorescence technique including resonant X-ray Raman scattering effects in chemical speciation. Dr. K. Shiva Kumar, Mineralogy, Petrology Group, Atomic Minerals Directorate for Exploration and Research, Hyderabad, explained importance of XRF technique in the analysis of geological samples. In the afternoon session, Dr. M. Sudarshan, UGC-DAE CSR, Kolkata Centre, presented the