



## *From the Director's Desk....*

I am very happy to see the second issue of this year's RRCAT newsletter ready for publication. This issue includes news items about the latest accomplishments of the Centre in research and development activities, human resource development and infrastructure developments during the first half of 2015.

The Indus synchrotron radiation facility has been operating round-the-clock as a national facility. There is a continuous effort to upgrade the performance of the accelerators, Indus-1 and Indus-2, as well as the user facilities. A transverse bunch-by-bunch feedback system has been deployed in Indus-2 which has significantly reduced the instabilities and made the injection rate twice as fast. A new soft x-ray reflectivity beamline has been commissioned on Indus-2. Thus the number of operational beam lines on Indus-2 has increased to thirteen. Several beamlines have been upgraded by adding different functionalities and sample environments to allow a wider range of experiments. The performance enhancement of Indus facilities has resulted in doubling of the number of users in the past two years. X-ray diffraction studies of amorphous solids using the Angle Dispersive X-ray Diffraction beamline have produced interesting results and the structure of several proteins has been determined using the protein crystallography beamline. Fresnel zone plates have been fabricated by e-beam lithography for focusing x-rays to a spot size of a few microns. Some of the recent research results from the Indus Synchrotron Users facility are described in this issue.

Continuing the pursuit of developing the technology for design, development and testing of superconducting radio-frequency (SCRF) cavities, the first 1.3 GHz nine-cell SCRF cavity has been fabricated and is undergoing surface preparation for its performance test. A 30 kW solid state RF amplifier at 650 MHz has been designed and developed for the superconducting proton linac programme. The liquefaction capacity of the indigenously developed helium liquefier has been increased to 35 litres/ hour with the help of newly-designed aluminium plate fin heat-exchangers and higher capacity expansion engines.

In laser R&D also, there have been several remarkable achievements. Some of these like the water-jet assisted underwater laser cutting of spent fuel tubes stored in the water pool of Dhruva reactor at BARC and laser additive manufacturing of nuclear reactor components are described in this issue. An engineered model of portable high power diode pumped solid state green laser system has been developed for pumping of high power dye lasers. Fiber Bragg grating based temperature sensors have been developed for temperature monitoring up to 900 °C. The technology of a portable uranium analyzer developed at the Centre has been transferred to ECIL for production.


Advanced technical facilities require a correspondingly developed infrastructure and full attention is paid at our Centre to provide a convenient, safe, and clean work environment. Keeping in mind the increasing number of researchers and students coming to use the R&D facilities of the Centre, a new guest-house was built in record time. To mark the Diamond Jubilee of the Department a commemorative structure symbolizing the key R&D activities of the Centre was installed in the newly constructed Diamond Jubilee Park on an island in the Sukhniwas lake. Both of these were inaugurated by Dr. R. K. Sinha, Chairman, AEC & Secretary, DAE during his visit to the Centre on July 26, 2015.

Another new venture this year was the two-month Advanced Orientation Course on Accelerators and Lasers (OCAL - 2015) for M.Sc. and M.Tech. students. This course gives an exposure to both theoretical and practical aspects and is expected to provide a good foundation for an R&D career in these areas of great technological importance. Forty students from across the country successfully completed the first edition of the course.

In the end, I compliment the Editorial Board for their commendable efforts in presenting a wide spectrum of the activities and accomplishments of the Centre and in bringing out the Newsletter in time.

With best wishes,

September 19, 2015

  
( P D Gupta )  
Director