



## From the Director's Desk...

I am happy to see that the second issue of this year's RRCAT Newsletter is ready to be launched. The issue gives an account of some of the accomplishments of the Centre during the first half of this year.

A major development during this period has been starting of round-the-clock operation of Indus facility following successful completion of training and licensing of operators. This has significantly increased the reliability of operation and the beam availability. Indus-1 and Indus-2 are now operated continuously for three weeks followed by one-week break for carrying out maintenance and upgradation work. Other accelerator programme related significant accomplishments include development of 1.3 GHz single cell SCRF cavities; generation of terahertz spontaneous emission in the Compact Ultrafast Terahertz Free Electron Laser (CUTE-FEL), development of 2K cryostat and commissioning of the indigenously designed and developed prototype solid state bouncer modulator at CERN. Important R&D developments in laser related areas spanned from basic research on generation of high energy electron beam from laser produced plasma to development of a 2.5J, 7ns oscillator and amplifier system.

This issue provides a brief sketch of some of these developments and this is followed by three theme articles which are longer and illustrate the high quality of research and development that is being pursued in the Centre. The first article describes design, development and commissioning of a high resolution angle dispersive x-ray diffraction beamline on Indus-2 and its role in carrying out structural characterization of different types of materials. The article on calculation of electronic structure and optical properties of nanomaterials from first principles outlines various theoretical and technical aspects of this important field of research. The Young Scientist Forum focuses on research on laser cooling and trapping of Rb atoms, which has myriads of potential applications in diverse areas such as quantum optical devices and high resolution spectroscopy.

I am sure the issue will provide the readers a glimpse of some of our recent activities. For more details the concerned scientists and engineers may be contacted. In the end, I wish to compliment the members of the Editorial Board for their sustained efforts.

With best wishes

P. D. Gupta  
Director

## From the Editor's Desk...

A warm welcome to the second issue of the Newsletter of 2010! The editorial board is delighted to bring it out well around its scheduled appearance. It covers, as usual, scores of activities the Centre has witnessed over the earlier half of the current year.

The Newsletter starts with a range of reports spanning the different aspects of research and developments in the area of accelerators. The most significant of these is surely round the clock operation of Indus-2 at 2 GeV and 100 mA beam current, which by itself is a pronounced achievement in the country's accelerator programme. Following these is an account of various accomplishments in the field of lasers and its applications. These comprise reports varying from generation of high energy electron beam from sub-mm size laser-plasma accelerator to development of a low cost, sensitive and high dynamic range CW laser power meter. The Infrastructure section of the issue depicts various important developments related to scientific computing, software and the different computer networking and communication systems for smooth flow of information. This is followed by the three theme articles, which focus on three important areas of research activities. The first one describes commissioning of an angle dispersive x-ray diffraction beamline on Indus-2, the second one details properties of nanomaterials from first principles study, and the third article in the Young Scientists Forum provides a lucid presentation on laser cooling and trapping of Rb atoms.

It is really heart warming to put together all these expositions. We feel glad to acknowledge the kind support and encouragement of all those who contributed directly or indirectly to bring out the Newsletter on time. Last but not the least, the Editorial Board would like to express its deepest gratitude to the Director, RRCAT, for his keen interest and support.

Chief Editor  
RRCAT Newsletter