



From the Editor's Desk....

The editorial board is happy to bring out the second issue of the RRCAT Newsletter of the year 2012 much around its promised deadline. It presents an account of various activities that have taken place in the Centre in areas ranging from accelerators through infrastructure to lasers during the first half of the present year.

The Newsletter begins with reports on different aspects of research and developments that have taken place in the area of accelerators. With Indus-2 being routinely operated in round-the-clock mode to its full energy, there have been concerted efforts to increase its use by addressing to the experimental requirements of its users. This has been done either by developing techniques to manipulate the synchrotron beam to make it better suited for the experiments requiring it or augmenting facilities around the beamlines to be able to carry out the experiments already designed to use these. The first of the accelerator reports narrates the technique that has been developed for the reduction of horizontal emittance of the electron beam in the Indus-2 storage ring. This is followed by the report that describes the development of a high pressure XRD setup at the ADXRD beamline on Indus-2 for carrying out measurements for determining the structural properties of materials under extreme conditions. The other important achievements worth mentioning include synchrotron induced total reflection x-ray fluorescence measurements on Indus-2, design and development of digital low level RF system, development of longitudinal coupled bunch mode measurement system for Indus-2, up-gradation in the Indus-2 control software among others.

On the Laser front the noteworthy achievements include observation of Bose Einstein Condensation of ^{87}Rb atoms using a double magneto-optical trap (MOT) developed at RRCAT, development of Erbium:Ytterbium co-doped fiber laser emitting 10 Watts near $1.55\ \mu\text{m}$ in eye-safe region, development of a simple electro-optic laser pulse shaping technique, diffusion of Chlorin-p6 across a lipid bilayer probed by second harmonic generation, development of usable GaAs p-i-n photodetectors and γ -ray irradiation effect on its characteristics among others. The infrastructure section highlights reports on the accomplishments by our computer, library and civil departments. The publication section consolidates the scores of scientific achievements and the news section provides coverage on the various happenings the Centre has witnessed over the first half of the current year. This is followed by three theme articles, which focus on three important areas of research activities. The article on the microfabrication using soft and deep X-ray lithography highlights the capabilities of X-ray lithography beamline of Indus-2 to fabricate different high aspect ratio (HAR) structures that have potential use in various fields including optical, mechanical, electrical, biological and chemical. The second article elucidates the techniques to grow and characterize LiNbO_3 and $\text{Li}_2\text{B}_4\text{O}_7$ single crystals and discusses about their potential applications. The article in the young scientist forum beautifully outlines the various theoretical and technical components needed for a comprehensive understanding of optical tweezers and its use for manipulation of microscopic objects like biological cells.

It is our privilege to put together all these expositions. We would like to convey our deepest gratitude to the Director, RRCAT for his keen interest and active support at various stages of compilation of the Newsletter. We also feel glad to acknowledge the kind support and encouragement of all those, who contributed directly or indirectly to make the newsletter a success.

S K Majumder
Chief Editor