



Some of the above noteworthy advancements are briefly described as news items in the present issue. The newsletter also carries theme articles presenting a comprehensive description of some R&D activities which have acquired a significant level of maturity with resultant applications. The three theme articles included in this issue are on development of non-destructive type fast current transformers which are used as diagnostic instruments in accelerators, optical coherence tomography for non-invasive depth-resolved three-dimensional imaging of biological tissues with micrometer scale resolution, and a newly identified family of resonant converters which have myriads of potential applications in power supplies for accelerators as well as lasers.

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

With best wishes

March 14, 2012

( P D Gupta )  
Director

### From the Editor's Desk....

We feel happy to bring out the first issue of the RRCAT Newsletter of the year 2012 well in time. It presents a large number of reports on the various research and development activities, that have taken place in the Centre during the later half of the past year, in areas covering lasers, accelerators, and related advanced technologies.

Since the launch of the last issue, the Centre has marched ahead with several new developments. Most notable of these is surely the successful operation of Indus-2 at 2.5 GeV beam energy and at 100mA beam current, which by itself is a significant milestone in the country's accelerator programme. The first of the reports in the Newsletter documents this important achievement. Following this is a series of reports which narrate the different key components that were developed and incorporated for making Indus-2 operate at 2.5 GeV energy and also depicts the different studies that were carried out using various facilities created around Indus-2. The other important developments which are worth mentioning include development of 1.3 GHz single cell SCRF cavities with improved performance, hydrogen ion beam extraction from ECR ion source and beam characterization, bremsstrahlung source term measurement for 450 MeV electrons, buffered chemical polishing of niobium half cells. Reports of other significant research and developments include studies of spin wave instabilities in ferrite and garnets for CW ferrite circulators, studies on scattered radiation dose at SR beam line hutches of Indus-2, electron beam irradiation using accelerators among others.

The Laser part of the Newsletter contains a range of reports spanning the different aspects of research and developments in the area of lasers. These include demonstration of soft X-ray lasing achieved in capillary discharge plasmas, development of optical twisters-driven multilayered micromotors, development of narrow line-width tunable radiation source based on second harmonic of CVL pumped dye laser, laser rapid manufacturing of porous structures for engineering applications, development of PHWR nuclear fuel pellets inspection system for NFC fuel fabrication facility and measurement of absolute diffraction efficiency of a variable line spaced grating using Indus-1 reflectivity beamline among others. The infrastructure section highlights reports on the accomplishments by our computer, library and civil wings. The publication section consolidates the scientific achievements and the news section provides coverage on the various happenings the Centre has witnessed over the last few months. This is followed by three theme articles, which focus on three important areas of research activities viz. development of non-destructive type fast current transformers (FCTs) and monitors for accelerators at RRCAT, optical coherence tomography for tissue diagnosis and the third on resonant impedance converters and their applications in power supplies for accelerator and laser subsystems under the Young Scientist Forum.

It is our privilege to put together all these expositions. We wish to express our deepest gratitude to the Director, RRCAT for his encouragement and active support at various stages in bringing out the present issue.

March 14, 2012

S K Majumder  
Chief Editor