From the Director's Desk

I am happy to see that the first issue of this year's RRCAT Newsletter is ready to go to press. The issue reports on a number of significant advances the Centre has made in the last few months.

Both, Indus-1 and Indus-2 Synchrotron Radiation Sources continued to operate on round-the-clock basis, and were made available to researchers from various national institutes and university laboratories, to carry out a variety of investigations. For this purpose, a two-days interaction meeting with more than 100 prospective beamline users from research institutions all over the country was organized, to make them aware of the available facilities and to know their suggestions for additional requirements. These are being implemented. The work on setting up of new beamlines on Indus-2 has progressed well. Three beamlines are operational and five more beamlines are either close to or under commissioning trials.

Development of superconducting radio-frequency cavities and cryo-modules, and setting up of related test facilities and technical infrastructure, are crucial to the Department's long term programme of setting up high energy proton accelerator for Spallation Neutron Source / Accelerator Driven Subcritical System. In this context, it was quite encouraging that the first single cell niobium cavities developed jointly by RRCAT and IUAC, and processed at Fermilab, U.S.A., performed very well, providing a high accelerating gradient of 23 MV/m. Another important related development is that, the cryogenics team at RRCAT achieved liquefaction of helium using an indigenously developed system, for the first time in the country.

Significant advancements in laser related activities were : development of industrial model of 10 kW peak power Nd:YAG laser, and for demonstration trials with it for underwater cutting of Zircalloy and S.S. sheets; operation of pulsed XeCl laser driven by an all solid state excitor; achievement of 50 W average power from copper bromide laser in sealed-off operation, etc. Some interesting applications of lasers during the last few months include: improving drug delivery for photodynamic treatment, and fusion neutron generation. Incidently, the year 2010-2011 is being celebrated world over as the 50th year of the invention of the laser. A special session was, therefore, organized at RRCAT to commemorate the event during the DAE-BRNS National Laser Symposium (NLS-19) held from December 1-4, 2010.

Some of the above advancements and events are reflected in this issue of the Newsletter. For more details, the concerned scientists and engineers may be contacted. In the end, I wish to compliment all the members of the Editorial Board for their dedicated efforts in bringing out this issue.

With best wishes

P.D. Gupta
Director

From the Editor's Desk

We are delighted that the first issue of the RRCAT Newsletter of the year 2011 is all set to go to print. As always, the Newsletter reports on the various achievements in areas ranging from lasers through accelerators to infrastructure and features three theme articles, one each from the laser and the accelerator program, and the third from a young scientist. While the news section gives a comprehensive coverage of the various happenings the Centre has witnessed over the later half of the past year through the beginning of the current year, the publication section lists the series of research papers appeared in peer-reviewed journals or presented in national or international symposia during this period.

The reports from the accelerator program comprise the opening section of the Newsletter. The commissioning trials of the soft and deep X-Ray lithography beamline on Indus-2, integration of the beam line front ends GUI panel with BL-21 front end control and quarantine disinfestation of seeds by irradiation with electron beams from a 750 keV Dc accelerator are some of the representative examples of accomplishments in this important area of R & D of the Centre. The next section presents the various latest results in the area of lasers. For example, demonstration of fusion neutron generation in deuterated polyethylene target using 10 TW Laser, development of a 300J pulse energy long pulse Nd: YAG Laser system as well as development of a 1200V, 6kJ/sec constant current capacitor charging power supply for pulsed discharge excimer laser are to name a few from the longer list. This is followed by the three theme articles, which focus on three important areas of research activities. The first one presents India's first indigenously developed Helium liquefier, the second one details high repetition rate, narrow line-width, tunable dye laser activities at RRCAT, and the third article in the Young Scientists Forum describes the various studies on Yb-doped double-clad CW and pulsed fiber lasers. The infrastructure section highlights reports on the accomplishments by the computer section of RRCAT.

It is really heart-warming to see all these contributions. The Editorial Board appreciates the time and effort that have been devoted by the different contributors and would like to thank them all. As always, suggestions and criticisms towards improving the newsletter content are welcome. Last but not the least, we would like to express our deepest gratitude to the Director, RRCAT, for his keen interest and support.

Chief Editor
RRCAT Newsletter