From the Convener's Desk...

The Editorial Board for RRCAT Newsletter is delighted to bring out the second issue of the RRCAT Newsletter of 2017, which gives an account of various activities and major developments in the areas of accelerators, lasers and infrastructure that have taken place in RRCAT during the first six months of this year.

The Newsletter begins with reports covering different aspects of research and development in the area of accelerators. The first two reports describe the installation and commissioning of new 20 MeV injector microtron and new transport line from the microtron to booster synchrotron, respectively, in the Indus Accelerator Complex. The new systems have improved features in the design, fabrication, vacuum system, as well as enhanced diagnostic devices with necessary softwares. A tenfold improvement in the correction rate of betatron tune feedback system is discussed in the third report, which is followed by a report on magnet cycling verification system. Development of 650 MHz superconducting RF cavity and a 40 kW solid-state RF amplifier are the topics of next two reports. There are other reports about beam profile measurement system and collimator magnet power supplies for the ARPF Linac, beam energy spread measurement of the new microtron, and the use of beamlines in Indus-1 and Indus-2 for the electronic structure and crystal structure studies of PrGe.

The next section of the Newsletter covers various accomplishments in the field of laser applications such as an indigenously developed remotely operable laser cutting technique for removal of coolant channels, cutting of thick end fitting inside lead shielding flask at KAPS-1 reactor, cutting of bellow lip weld joints at KAPS-2 reactor, and enhancement of the corrosion resistance of 316L stainless steel specimens using laser shock peening. A synthesis route for spherical and triangular silver nanoparticles, and studies on resistive switching in thin film are described in the next reports. Spatially-offset fluorescence spectroscopy for non-destructive sub-surface interrogation of layered turbid samples and studies on gold nanorods coated with various polyelectrolytes are also reported.

Several works on the infrastructure development such as the houses in CISF residential area, pre-engineered building for Cryomodule Engineering Lab and enclosure for ARPF Linac have been reported, along with the landscaping works and clean & green initiatives.

Theme articles in the Newsletter discuss important developments in R & D activities of the Centre. The first article reports challenges, intricacies, and results of the indigenous design, development, installation, and commissioning of 505.8 MHz normal conducting RF cavity for Indus-2. The second article presents overview of interferometric gravitational wave detectors, the LIGO-India project and activities at RRCAT for this project. The third article tells about incorporating artificial intelligence concepts in different accelerator control system through intelligent objects and analysis of different multi-agent based control schemes for synchrotron radiation source, taking Indus-2 as a case study.

Celebration of several important events, namely, Foundation Day, National Science Day, Fire Service Week, Women's Day are covered in the Newsletter. It reports a US patent that has been granted for the development of RF substrate used in solid-state RF amplifiers. Reports on the third Orientation Course on Accelerators, Lasers and related Science and Technologies (OCAL – 2017), M. Tech. students' cultural fest: ANUGOONJ-2k17, accomplishments of our distinguished colleagues, and seminars delivered during this period are included. The Newsletter summarizes various activities carried out for the promotion and propagation of Hindi usage. The Newsletter also welcomes new members to the RRCAT family and remembers those who superannuated during this period.

We feel privileged to put together these reports in the form of RRCAT Newsletter. The Editorial Board appreciates the time and efforts put in by the contributors and would like to thank them. We are grateful for the kind support, encouragement and suggestions that we have received from many of our colleagues. We would like to express our deepest gratitude to the Director, RRCAT, for his keen interest, guidance and active support at various stages of compilation of this Newsletter. We look forward to receive suggestions from readers towards improving the Newsletter content.

With warm regards,

(Mangesh B. Borage)
Convener
RRCAT Newsletter

September 16, 2017