



## *From the Convener's Desk...*

The Editorial Board is happy to bring out the first issue of RRCAT Newsletter of the year 2018. It contains a number of reports on various research and development activities in the areas of accelerators, lasers and related technologies that have taken place in the Centre during the second half of the previous year.

The section of accelerator programme starts with a report describing installation of one 10 MeV linac (Linac-B1) at Agricultural Radiation Processing Facility site and the results of endurance testing of the other one (Linac-B2) at RRCAT. The next two reports describe the reference generation module for the pulse selector magnet power supply in linac and an electronic system for de-gaussing of microtron dipole magnet in Indus. Cold testing of X-link tuner with an RF cavity is described in the next report. Development of 100 kV modulators based on solid-state Marx modular and converter modulator schemes are described in the next two reports. Experimental NEG coating of aluminium alloy vacuum chamber and initial results of titanium film coating on the surface of the alumina substrate are reported next. The last few reports exemplify the utilization of beamlines of Indus-2 synchrotron radiation source, for instance, the testing of Fresnel zone plate and multilayer mirrors using BL-16 beamline, high pressure studies on FeGa<sub>3</sub> using BL-11 beamline, and testing of reflectivity performance of refurbished x-ray mirror at BL-3 beamline.

Various developments in the field of laser are covered in the next section. Development of 260 W Nd:YAG green laser at 532 nm is described in the first report. Laser cutting of pipeline for replacement of double check valve at KKNPP-1 reactor is covered next. The growth of undoped and doped  $\beta$ -Ga<sub>2</sub>O<sub>3</sub> single crystals, and the development and application of a magneto-SPV and magneto-PL setup are the topics of the next two reports. Experimental setups and measurements for betatron resonance electron acceleration using 200 fs Ti:Sapphire laser pulses, and the trapping of cold <sup>87</sup>Rb atoms are described in the subsequent reports. The effect of gamma radiation accumulated dose on fiber Bragg grating has been reported next. The role of self-catalyst and substrate surface in various growth mechanisms and crystalline structure of InAs on Ge, studies on charge transport in polymer nanocomposite thin films for photo-voltaic applications, demonstration of a colorimetric sensing technique using gold nanoparticles for detection of heavy metal ions in water, and studies on laser shock peening on 9260 spring steel to reduce the harmful effects of the surface defects are described in the last few reports.

The architecture and features of the newly released email system, developed with the latest tools and techniques, have been reported. Similarly, features and facilities in the system deployed for authenticated access to online scientific information resources over internet are described in the next report in the Infrastructure section.

The first theme article describes the details of studies carried out on thin films of silicon based compound materials using reflectivity beamlines in Indus Accelerator Complex. The second article presents overview of mode-locked fiber laser with their basic elements, mathematical models and experimental results. The third article tells about the study of rapidly evolving hot dense plasma, created by focusing high intensity laser pulses onto solid target surface, carried out as a part of author's Ph. D. thesis.

Several important events such as Graduation Function of BARC Training School at RRCAT, distribution of Training, Qualification and Licensing certificates for operation of Indus facility, SCRFWS-2017 workshop, HBNI Scholars' Day etc. are covered in the Newsletter. Further, the reports on accomplishments of our distinguished colleagues and various activities carried out for the promotion and propagation of Hindi usage are included. The Newsletter also welcomes new members to the RRCAT family and wishes a happy and healthy post-retirement life to those who superannuated during this period.

The Editorial Board would like to thank all the contributors. We feel privileged to put together these reports in the form of RRCAT Newsletter. We would like to express our deepest gratitude to Director, RRCAT, for his keen interest, guidance, and active support.

With warm regards,

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**( Mangesh B. Borage )**  
Convener  
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