



From the Convener's Desk...

We are happy to bring out the first issue of RRCAT Newsletter of the year 2019, giving an account of various activities that have taken place in the second half of the previous year.

The first section begins with some of the recent technological developments in accelerator sub-systems. The first report describes features of new, standardized, 20 kW switch-mode power converters for quadrupole magnets in Indus-2, which are being developed and installed to upgrade the older ones. The second report describes development of mass spectrometer analyser dipole magnets for BARC. A 4 T pulse demagnetizer system, which is used to demagnetize rare-earth permanent magnets, is the topic of the third report. Design and development of power and pick-up couplers for qualification testing of $\beta=0.92$, 5-cell, SCRF cavity is described next. The results of the performance testing of CW klystron under pulsed operation are subsequently reported. The next article reports the NEG thin film deposition using the different sputtering gases and their characterization. Studies of structural properties of solid solutions using BL-11 beam line of Indus-2 and the data reduction procedure in the analysis of specular x-ray reflectivity of small samples are the described in the last two reports.

Similarly, there are eight reports in the laser section. The laser based sag measurement for reactor tubes (LASMART), a non-contact sag measurement technique which can be used effectively in high radiation environment, is described in the first report. A metallic mirror based periscopic optical imaging system with online CCD camera for end-shield leak detection at MAPS-1 reactor is reported next. Improvement in the oxidation resistance of P91 steel by creating nano grains near surface using laser shock peening is described in the third report. Studies to demonstrate radioisotope generation using laser accelerated proton and deuteron beams is the topic of the next report. A technique for estimation of groove density of gratings and inter-grating groove errors, and, fabrication and characterizations of transparent ceramics along with their characterization are the topics of the next two reports. The section ends with two reports describing an etching process for nanostructuring of silicon wafers and its characterization, and, use of Raman and atomic force microscopy for various studies pertaining to formation of nanocomposites and nano/hetero structures.

The workflow of various operations in the universal serial bus device blocking software for regulating use of such data storage devices is reported in the first article in the infrastructure section. There are reports describing the processes involved in the copper deposition of buncher cavity and RF power coupler, and, upgradation of effluent treatment plant for zero discharge of rinse water thereby allowing reuse of the waste water. The last report of this section describes installation and commissioning of advanced laboratory furnace, which is being used to optimize parameters in the processes for development of UHV components.

The first *Theme Article* describes the transverse coupled bunch instabilities measurement scheme and transverse multi-bunch feedback system of Indus-2, highlighting the resulting performance improvements. The optical techniques developed for online and *in situ* optical imaging of the crystal growth process along with the various techniques developed for investigating the optical properties and defects structure of the crystals are explained in the second article. The last *Theme Article* describes the development of a double magneto-optical trap setup for generation of ultra-cold ^{87}Rb atoms and various investigations carried out as a part of author's Ph. D. thesis.

The news section begins with a report about Trade Apprenticeship Scheme implemented at RRCAT under the National Apprenticeship Promotion Scheme. There are reports about two technology transfers and two US patents. Several important events such as UFS-2018, LAMAT-2k18, NLS-27, 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. As usual, we also welcome new members to the RRCAT family and bid farewell to those who superannuated during this period.

The Editorial Board would like to thank all contributors. We would like to express our deepest gratitude to the Director, RRCAT, for his keen interest, guidance and active support. We look forward to receive constructive suggestions from readers towards improving the Newsletter content.

With warm regards,

January 28, 2019

(**Mangesh B. Borage**)
Convener
RRCAT Newsletter