



From the Editor's Desk...

We are happy to announce the publication of the first issue of the RRCAT Newsletter for the year 2023, which reports various R&D activities and events organized at RRCAT between **July - December 2022**.

The first section contains nine reports on various R&D activities associated with the Accelerator programme. First two reports highlight the status of Indus accelerators and activities at Indus beamlines. One of the important reports is connected with the utilization of e-beam irradiation facility for sterilization of around one million units of intravenous cannula. Other reports include development of 1000 A/ 10 V power converter for testing of superconducting magnets, SCADA system for remote control and monitoring of vacuum furnace, Sc/Mg multilayer for soft x-ray emission spectroscopy applications, impedance simulation of storage ring vacuum components, design and simulation analysis of superconducting wavelength shifter vacuum chamber for Indus-2, and prototype upgraded titanium sublimation pump controller.

The second section devoted to the R&D activities of Laser programme contains a total of seven reports covering various achievements like the development of two-beam high-gain, Joule class laser pre-amplifier system for seeding kJ class Nd:glass laser, fabrication of thermal turn around point long period fiber grating by thermal annealing method for greater thermal stability of the temperature sensors, and fabrication of ultra-narrow GaN based photodetector for UV radiation detection. Additionally, achievements falling in the areas of application of lasers, like laser directed energy deposition based additive manufacturing of copper-stainless steel functionally graded material, improvement in ratcheting fatigue life of high strength low alloy steel by laser shock peening, role of JxB force on the laser driven electron acceleration, and synthesis of highly luminescent cesium lead halide based perovskite with tunability are also reported.

The third section reports the infrastructural achievements made by the Centre, which includes development of technology for producing sound austenitic weld metals having its relative magnetic permeability very close to that of the parent metal by adding 1.5% to 2% nitrogen in the shield gas (argon) during tungsten inert gas (TIG) welding and manufacturing of beam dump for 3 MeV proton beam.

This edition of Newsletter contains three *Theme Articles* reviewing three R&D activities carried at the Centre including one originated from the Ph. D. thesis of an HBNI scholar. The first two articles are devoted to the development of accelerator based facilities like the Hydrogen ion sources for proton accelerators and an infra-red free electron laser (IR-FEL) facility for IR-THz spectroscopy of materials. The third one falls in the realm of semiconductor based devices describing the development of GaN photodetectors for detection of UV radiation.

The last section *Events and Happenings* comprises reports on the events and functions held at RRCAT. In this section, activities of Incubation Centre-RRCAT, Public Outreach, Clean and Green Campus, TASAR programme, Industrial and Fire Safety, AECS, Indore, and RRCAT Staff Club are included. This section also includes reports on two important functions related with the Trainee Scientific Officers and Ph. D. scholars of HBNI at RRCAT, which are the Graduation Function for the 22nd batch of BARC Training School at RRCAT and the celebration of Bhartiya Bhasha Utsav. Report on public outreach activity highlights inauguration of "Light Exploratorium" in Sukhniwas Palace, a commemorative event jointly organized with Vigyan Bharati, remembering the contribution of Dr. Homi Jehangir Bhabha in nation building, and celebration of the DAE iconic week under Azadi ka Amrit Mahotsav.

Like earlier issues, this issue also contains a list of colleagues and Ph. D. scholars who have won awards and accolades for their accomplishments. We have also included a list of new members who have joined RRCAT and welcome them to the RRCAT family and we remember all those colleagues, who have superannuated from their services during this period and we wish them a happy and healthy post retirement life.

The Editorial Board would like to thank all the contributors for their cooperation. We take this opportunity to express our deepest gratitude to Director, RRCAT, for his keen interest, guidance, and active support in publication of RRCAT Newsletter. We look forward to receiving constructive comments and suggestions from readers for improving the content of RRCAT Newsletter.

With warm regards,
July 21, 2023

Arup Banerjee
Chairman, Editorial Board
(on behalf of RRCAT Newsletter Editorial Board)