From the Editor's Desk...

The *Editorial Board* is pleased to announce the publication of the first issue of the RRCAT Newsletter for year 2022. This edition of the Newsletter comprises reports of various R&D activities and events organized at RRCAT during the period **July to December 2021**. This issue has been brought out under the supervision of both the outgoing Editorial Board and the newly constituted one.

The first part of the Newsletter is devoted to the reports on various R&D activities of the *Accelerator programme*. It starts with a status report on the operation of Indus-1 and Indus-2 synchrotron radiation sources. It is followed by a report on the utilization of the Indus beamlines by users from all over the country. The extensive use of Indus beamlines has resulted in over a hundred publications in peer-reviewed journals. The third report discusses the development and commissioning of pinger magnet system in the Indus-2 as a beam diagnostic tool. The next report describes the installation of the control system for power supplies used for energizing orbit correction coils in microtron. The fifth report is pertaining to the development and commissioning of a three mirror-based higher-order suppressor system in the soft x-ray reflectivity beamline BL-03 of Indus-2 to improve the spectral purity of the beam. Reports on development of multilayer optics using a combination of W/B_4C films for the purpose of soft gamma-ray spectroscopy and measurement of the band gap and bowing parameter of β-$(Al_xGa_{1-x})_2O_3$ alloys through an optical reflectivity experiment are also included.

The second section of this issue contains reports on the accomplishments in the field of lasers and their applications. The first report on laser activities describes the development of a 1 kW single transverse mode all-fiber Yb-doped CW fiber laser. Development of laser-induced breakdown spectroscopy setup using a Q-switched Nd:YAG laser is discussed in the next report. The third report discusses the achievement of magnetic trapping of cold ^{87}Rb atoms on an atom-chip. The development of a triboelectric nanogenerator based on ZnO nanowires for vibrational energy harvesting and polymer-based laser energy meter using poly (vinylidene fluoride–trifluoroethylene) films are presented in the fourth and the fifth reports, respectively. The sixth report describes the synthesis of uniform, densely packed monolayer films of gold nanoparticles of various shapes for use as the surface-enhanced Raman scattering substrates.

The next two reports describe the accomplishments related to the development of infrastructure at RRCAT. One of these is pertaining to the synthesis of nickel hydroxide from spent electroless nickel bath as a potential electrode material for supercapacitor and another is on construction of an ISO Class-4 cleanroom of size ~ 35 m^2 for the processing of niobium superconducting radiofrequency cavities.

This edition of RRCAT Newsletter contains four *Theme Articles* focusing on some of the important R&D activities undertaken at RRCAT. The first *Theme Article* describes in detail the various aspects of the development of pinger magnet system, which has been deployed in Indus-2 for carrying out linear and nonlinear studies of the lattice parameters of Indus-2. The second *Theme Article* gives an overview of the development of different types of power supplies and controllers for the lamp-pumped Nd:YAG and diode-pumped fiber lasers for various nuclear field applications. The third *Theme Article* provides an overview of the R&D activities carried out on the transition metal Ti-Zr-V based non-evaporable getter thin film compatible for accelerator UHV applications. The last Theme Article is based on the Ph. D. thesis of the author, which reviews the experimental and theoretical studies of electromagnetically induced transparency in different schemes prepared in D_2 line transition of ^{87}Rb atoms at room temperature as well as in trapped cold atom cloud.

The last section reports on "Events and Happenings" at RRCAT. It starts with report on organization of an online workshop titled "Creating Lab-to-Land Ecosystem: Challenges & Opportunities" and extending utilization of FBG inscription facility to Indian industries. A report on the development of 650 MHz, 40 kW solid state RF amplifier and its shipment to Fermilab, USA is also included. This section also contains reports on the regular activities such as TASAR programme, Industrial safety, Fire safety, Clean and green campus activity, and activities of RRCAT Staff Club, celebration of Vigilance Awareness Week and accomplishments of AECS, Indore. Report on public outreach activity has been introduced for the first time. Further, we have enlisted all the colleagues 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 also 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 last report is devoted to activities for promotion of Hindi language among the staff members of RRCAT.

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

With warm regards

June 27, 2022

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