



From the Editor's Desk....

A warm welcome to you all!

We are delighted that the first issue of the RRCAT Newsletter of the year 2014 is all set to go to print. Like always, it presents an account of various activities that have taken place in the Centre in areas ranging from accelerators through lasers to infrastructure during the later half of the past year.

Since the launch of the last issue, the Centre has marched ahead with several new developments. With Indus-2 being routinely operated at 2.5 GeV beam energy with ~ 125 mA beam current in round the clock mode, there have been concerted efforts to increase the target of stored beam current to 175 mA at 2.5 GeV so that it can provide more intense synchrotron radiation to its users. This was achieved by increasing the RF power capacity of indigenously developed solid state RF amplifiers which in turn led to a total Indus-2 RF power of 250 kW. The Newsletter begins with a report on this most important achievement. This is followed by another important report that describes the characterization of performance of the 650 MHz Superconducting Radio Frequency (SCRF) cavity developed earlier and intended to be used in the high energy superconducting linac based Spallation Neutron Source to be developed at RRCAT. Following this is a series of reports which narrate the different key components that were developed around Indus-1 and Indus-2 for improving their performance. The notable of these include enhancement of Indus-1 RF control system, development of control system for remote operation of diagnostics beamlines of Indus-2, development of distributed ambient temperature monitoring system for Indus-2 tunnel, indigenous development of solid state pulse modulators and related pulsed technologies for 3 MeV H- RFQ at RRCAT and development of 5T pulse magnetizer for magnetization of Nd-Fe-B magnets among others.

On the laser front the noteworthy achievements include generation of high-quality stable electron beams from laser wake-field acceleration in high density plasma, development of 215 W of all-fiber single transverse mode Yb-doped CW fiber laser, power amplification of mode-locked Yb-doped fiber laser, designing of a single tiled grating laser pulse compressor, development of fiber-tethered sensors for use in radiation environments, development of photon counting version of uranium analyser for trace measurement of uranium in potable water to name a few from the longer list. The infrastructure section highlights reports on the accomplishments by our computer, library and civil departments. The publication section consolidates the scores of scientific achievements and the news section provides coverage on the various happenings the Centre has witnessed over the later half of the past year. This is followed by three theme articles, which focus on three important areas of R & D activities. The first article describes the indigenous development of a novel technique for SCRF cavity fabrication with the help of laser welding with an Nd:YAG laser developed at RRCAT. The second article elucidates the essence of feature based design and manufacturing technology employing the method of laser rapid manufacturing for fabrication of engineering/prosthetic components directly from a solid model. The article in the young scientist forum beautifully outlines the various theoretical and technical components needed for a comprehensive understanding of magnetostructural transition and multi-functional properties in ferromagnetic shape memory alloys.

It is our privilege to put together all these expositions. We would like to convey our deepest gratitude to the Director, RRCAT for his keen interest and active support at various stages of compilation of the Newsletter. We also feel glad to acknowledge the kind support and encouragement of all those who contributed directly or indirectly to make the newsletter a success.

S K Majumder
Chief Editor
RRCAT Newsletter