Director's Report

Several new projects have been undertaken in the year 2003-04 and good progress was achieved in the existing projects. Emphasis is now being put by the Accelerator user committee on novel ideas for experiments. We are grateful to the University Grants Commission for providing the necessary support in manpower and funds. The Pcllclron accelerator operated at the level of 94.5% uptime with an utilisation of -60% for experiments. However, the maximum terminal voltage in this year was limited to 13.5 MV due to problems with the charging chain system at higher terminal potentials. This will be fixed in the scheduled maintenance period beginning May.

The implementation of reversal mechanism of the cathodes in MC-SNICS brought down the cathode changing time and 64 experiments could be completed. An ion source test bench has been set up with the old SNICS for development of new ion beams. The chopper, TWD has been integrated with the multi-harmonic buncher and beam has been delivered with this new combination. The AMS beam line has been completed with a Q-pole doublet and a Wien filter assembly and a C sample obtained from IOP, Bhubaneswar was used for calibration.

Preliminary beam test was conducted through the first linac cryostat with 2 resonators on, to check alignment and acceleration. The switching magnet and four beamlines have been installed in beam hall II where the beam is expected soon. The first indigenous resonator has been fabricated and tested successfully. The helium purifier was automated and the liquid nitrogen transfer line has been extended to the rebuncher position.

The world's first high temperature superconductor based ECR source was fabricated and tested in collaboration with M/s Pantechnik and ISN, Grenoble, France. Its performance matched the design values for highly charged ions.

On the instrumentation front, several power supplies for magnets have been designed and developed, notable among them is a high current power supply suitable for large quadrupoles needed for a spectrometer. A prototype air cooled 1 kW power supply has been designed for the high current injector. Modular VH.F power amplifier and a new slow-tuner control electronics has been developed for the linac. A general purpose control box with an embedded computer has been developed which is being used to replace the CAM AC computer systems in the accelerator. A List Processing Crate Controller and a sliding scale 14 Bit ADC have been developed for high-speed Data Acquisition System. A Patent application has been filed for the electronics module developed for handling the Clover Detectors of ING A.

The detector, target, vacuum, electronics laboratories, workshop and the utilities system provided excellent support to the user community and upgraded their facilities to provide smooth and uninterrupted performance of the accelerator system.

A totally new area of work for the Centre began with the launching of the project for development of innovative experiments for post graduate teaching laboratories. A low cost radiation detection and pulse processing system has been developed for post-graduate teaching laboratories and several of these have been handed over to the university departments after an intensive workshop at NSC.

Design of the Indian National Gamma Array (INGA) and the Hybrid Recoil Analyser (HYRA) have been completed and the order for major components of HYRA has been placed. The RIB facility has been used to study the elastic scattering and transfer reactions of ^{7}Be + ^{9}Be and ^{7}Be + $^{2/}$Al near barrier energies. A preliminary measurement of fission fragment - neutron correlation was carried out using the General Purpose Scattering Chamber. The energy dependence of the efficiency of the neutron detectors has been measured using *n-j* time of flight technique using a ^{252}Cf fission source. Quasi-flssion and incomplete fusion experiments have been investigated by several user groups.

A new beam line for materials science in beam hall II with one high vacuum chamber has been set up and the in-situ XRD system has been ordered. An Atomic Force Microscope has been procured and installed at the Centre for studies on SHI induced changes in materials. A quadrupole mass analyser has been procured and is being integrated with the materials science chamber in beam hall I. Among the large number of experiments conducted this year, important results were obtained for SHI induced mixing, formation of alloys in Au/Ge interfaces and Luminescence studies of the Si nano particles formed by keV and MeV ion beams. The increase in the magnetization on SHI irradiation effects on various type of ferrite films is shown to be due to the texturing of the films, evident by the XRD.

New materials for radiation dosimetry have been explored which show good promise as thermoluminescence detectors. Beam-single-foil and beam-two-foil experiments for measurement of lifetimes of metastable high charged ions are being earned out in collaboration with universities in Atomic Physics. The experiments conducted in the field of Radiation Biology, involved cell inactivation and chromosome aberration due to charged particle interaction with V79 and M5 cells and studies of the germination and biochemical properties on ion beam irradiated mustard seeds.

We look forward to and solicit novel and daring ideas from the user community in all the programmes of the Centre in the coming year.

Amit Roy

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