National Centre for Accelerator Based Research
(Joint Ion Beam Centre of GGV and IUAC New Delhi)
Department of Pure & Applied Physics
Guru Ghasidas Vishwavidyalaya, Bilaspur (C.G.)
(Supported by University Grants Commission (New Delhi) & DAE-BRNS)

- **Bringing Ion Beam Technology on Academic Campuses**
- **Promoting Interdisciplinary Research in Niche Areas**
- **Providing Innovative Cluster based Translational Research**
- **Offering Indigenous Technological Solutions to Industries**
- **Flagship Program of the University**

Objectives

Energetic ion beams have come up as a versatile tool in almost all areas of science & technology ranging from fundamental researches in nuclear and particle physics, probing solidion interactions in material science, developing radioisotopes and special medicine for oncology, controlling the material properties, PIXE based environmental research, trace element analysis, agriculture sciences, in-house security at ports, medical and bio-medical treatments, detecting the fake artefacts, paintings etc. In India barring inter-university accelerator Centre (IUAC) at New Delhi, small PIXE based facility at Chandigarh, focused ion beam facility at IIT Kanpur, all major accelerator facilities are under DST. Consequently, the interdisciplinary research based on energetic ion beams and its application in industry has not picked up momentum in the country. Further the current reactor technology for useful energy usage of nuclear energy requires paradigm shift as the nuclear fuel available in the country (Thorium) is not suitable for the existing reactor technology. Therefore, Accelerator Driven System (ADS) are the top priority for Atma Nirbhar Bharat as stated by the Minister of Science & Technology in the parliament.

Guru Ghasidas Vishwavidyalaya, therefore, has taken up a bold step for establishing a 3.0 MV Pelletron Accelerator in 2009, which was named as "**National Centre for Accelerator**

Based Research" under the MoU between university and DAE while awarding the mega project under DAE-BRNS scheme. The basic objective of the centre has been to boost the Research & Development in interdisciplinary areas of Science & Technology and to bring the ion beam technology on the university campus to provide internationally competitive environment for research in the niche areas of science.

Consequently, establishment of 3.0 MV Pelletron accelerator facilities has been initiated in March 2010 and in November 2014 the facility was commissioned as National Centre for Accelerator Based Research. UGC provided its approval for financial support to the machine and building to be adjusted in 11th plan or in the first grant of 12th plan. GGV also signed MoU with IUAC, New Delhi while establishing this facility and the collaboration with IUAC was very involved and active from the inception of the facility. Also in 2015, UGC sanctioned the 08 technical positions for its operation and a position of Professor earmarked for the centre. All radiation safety requirements as per the guidelines of Atomic Energy Regulatory Board (AERB), have been followed and due permissions for various stages has been obtained. In June 2013, Department of Atomic Energy (DAE) Government of India under Board of Research for Nuclear Science (BRNS) approved the program for financial assistance in phased manner and sanctioned 8.5 Crores releasing 4.5 Crores for the first phase. The DAE-BRNS project (first phase) was extended up-to March 2021.

GGV accelerator facility was a flagship program started by any university under plan grant. It was later on supported by UGC in terms of building, skilled manpower and faculty. Moreover, it was the only full-fledged accelerator facility in University set up. During the XIth - XIIth plan DST funded several mega proposals for establishment of accelerator/ion sources in project mode. The DST realised that the life of such facilities was reasonably long and the long term sustenance of such facilities beyond the project durations needed some special support. Accordingly the then DST secretary requested UGC chairperson to consider the matter. UGC chairperson constituted a high level committee under the chairmanship of Prof. S. K. Joshi. The committee deliberated with the centre-in-charges of the host institutions and resolved to sign the MoU with IUAC and UGC to provide necessary funding and management board, to these ion beam centre (IBC). Guru Ghasidas Vishwavidyalaya signed MoU and submitted the same to the Convenor of the Committee.

After the commissioning of the facility to the nation by the Secretary, DST in 2014, the centre started using the ion beams and developed a network of users nationwide. National users of this facility include ITER Ahmedabad, IUAC New Delhi, Mysore University, Chennai University, University of Allahabad, Amity University, Noida, Technos Pvt. Ltd., Jaipur and other several internal faculties. The centre organised several workshops for sensitising interdisciplinary users towards energetic ion beams and their usage in research. We have also introduced “Accelerator Physics” as a core paper in PG programs. In addition, several students

completed their PhD and PG project work. The facility has produced excellent outcome including international publications, technical reports, invited talks, and presentations in international & national conferences.

The facility is also of utmost importance as the energy range covers the synergistic region with very high current (highest current accelerator in its category in the country). Moreover, it becomes the centre of excellence for collaborative, cluster based multidisciplinary, translational research. The facility is also very useful for the industries especially for automobiles, oil exploration, steel manufacturing, agritech, internal security and PIXE based artefacts identification.

This accelerator facility is unique in the country as the high current (50 micro-amp @ 6 MeV) and may be extended for neutron generation facility. The present accelerator can produce high neutron flux (4.5 × 109 neutrons/cm2/sec) as it has high proton beam current of ~50 µAmp. This provides the unique opportunity in future for neutron-activation cross sections measurements especially in low energy region nuclear physics community for extensive studies in the areas related to nuclear astrophysics, neutron-induced reactions, measurements of neutron scattering cross sections, sub-barrier fusion reactions.

Geo-tag Photographs of the facility: 

Supporting Documents: