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IUAC: Accelerator-based national facility for interdisciplinary research

The Inter-University Accelerator Centre (IUAC) is the first Inter-University Centre (IUC) in India, providing energised ion beams that span nearly the entire periodic table, with energy ranges from a few tens of electron volts (eV) to several hundred million electron volts (MeV). It serves a diverse research community across the country. The facility offers advanced experimental capabilities that support research in basic experimental nuclear physics, accelerator mass spectrometry, ion-beam modification and analysis of materials, as well as various multidisciplinary areas.

The main accelerator facilities at IUAC include a 15UD/16MV Pelletron tandem accelerator and a superconducting booster linear accelerator (SC-LINAC). Additionally, an Accelerator Mass Spectrometry (AMS) facility has been established for radiocarbon dating of geological and prehistoric samples.

Upcoming developments at IUAC include the commissioning of a High Current Injector (HCI), which comprises a superconducting Electron Cyclotron Resonance (ECR) ion source, a Radio-Frequency Quadrupole (RFQ), and six Drift Tube LINAC (DTL) modules. The centre collaborates with various national and international organizations on research and development initiatives, contributing to projects of national importance, such as low fluence irradiation of devices intended for space applications. IUAC is also engaged in the indigenous development of an MRI machine equipped with a superconducting magnet.

Furthermore, IUAC is involved in In-Silico Methods in Physics and the Use of High-Performance Computing (HPC), where the integration of simulation and advanced experimentation is advancing research in materials, chemistry, and physics by enhancing the discovery, validation, and optimization processes.

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