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A new 3 MV Tandetron™ accelerator at iThemba Laboratory for Accelerator Based Sciences (iThemba LABS)

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iThemba LABS hosts a number of research accelerators. The latest acquisition is a 3 MV Tandetron™ accelerator that replaced the 51-year-old 6 MV CN Van de Graaff accelerator. The majority of the application area is dealing with materials research. The machine was installed and commissioned in 2017 by High Voltage Engineering Europa B.V. (HVEE) at the Tandetron Laboratory. The system is capable of accelerating charged particles to MeV energies from three ion sources; the Cs sputter source for heavy ions, and two Multicusp ion sources for helium ions and protons. The main purpose of the Tandetron™ machine is to conduct research in ion beam analysis (IBA) and low-energy astrophysics research projects. It is connected to the experimental section via 90° analyzing and switching magnets, directing the beam of charged particles into the target chambers. There are currently two active beamlines dedicated to (1) solid-state physics techniques, such as RBS and ERDA, and (2) nuclear microprobe-based techniques, such as PIXE and proton beam writing. Another beamline, currently being commissioned, is for astrophysics-related projects. The available ion sources are capable of delivering high-intensity beams of 200 μA and 25 μA for protons and helium light ions, respectively, while delivering 150 μA for heavy ions, at a maximum terminal voltage (3 MV). This demonstrates a huge potential in materials research areas such as ion implantation, radiation hardness testing, and shielding studies. Important features of the accelerator and energy calibration are discussed.

Apply to be considered for a student ; award (Yes / No)?

no

Level for award;(Hons, MSc, PhD, N/A)?

N/A

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