

THE iTHEMBA LABS RADIOACTIVE-ION BEAMS PROJECT

R.A. Bark¹

¹iThemba LABS, P.O. Box 722, Somerset West, 7129, South Africa

The iThemba Laboratory for Accelerator Based Sciences is based around a K=200 Separated Sector Cyclotron (SSC), which is used for nuclear physics research, radionuclide production, and hadron therapy. It plans in future to build an ISOL radioactive-ion beam facility. Protons will be used for the direct fission of Uranium, to produce fission fragment beams.

A high-current, 70 MeV cyclotron will be acquired to take radionuclide production off the SSC. A freed up SSC will then be available for an increased tempo of nuclear physics research.

The project has begun with a RIB “test facility”, now under construction. In a collaboration with INFN Legnaro, the target/ion-source “front-end” will be a copy of the front-end developed for the SPES project. A variety of targets may be inserted into the SPES front-end; a uranium-carbide target has been designed to produce up to 2×10^{13} fission/s using a 70 MeV proton beam of 150 μ A intensity, but the test facility will use a primary beam of up to 50 μ A of 66 MeV protons from the SSC. It is expected that intense fission fragment beams will become available for low-energy nuclear physics experiments after 2018.

The next phase will see the beams post-accelerated. At this stage, a number of options are being considered which will be presented.