Contribution ID: **27** Type: **Oral**

Acceleratore Centre for Exotic Isotopes

The iThemba Laboratory for Accelerator Based Sciences is based around a K=200 Separated Sector Cyclotron (SSC) which is used for radionuclide production and for research in nuclear physics and radiobiology. It plans to build the "South African Isotope Facility", comprising two phases; the first is the Accelerator Centre for Exotic Isotopes (ACE Isotopes) and the second is the Accelerator Centre for Exotic Beams (ACE Beams). Here we focus an ACE Isotopes, for which initial funding has been approved.

Radionuclides are currently produced with the SSC for local and export markets, with only longer lived isotopes available for export. iThemba LABS presently supplies 20% of the worlds 82Sr, 40% of the worlds 68Ge/68Ga generator and all of its 22Na. Ace Isotopes will see the acquisition of a new cyclotron dedicated to the production of radionuclides for medicine. The accelerator will be a negative-ion machine, capable of accelerating protons to 70 MeV and delivering currents of up to 700μA. Isotope production will increase by more than a factor of two with the commissioning of the new cyclotron.

The high-current cyclotron will take radionuclide production away from the SSC, freeing it up for an increased tempo of research. iThemba LABS plans to build a "Low Energy Radioactive-Ion Beam" (LERIB) facility based on the Isotope Separation OnLIne (ISOL) method. The SSC will be used as the driver accelerator to deliver a proton beam to various carbide production targets. Because the "flat-topping" implemented on the SSC is optimized to supply currents of up 350μA of 66 MeV protons, this energy will be used on production targets – a uranium-carbide target has been designed to produce up to 2×10^{13} fission/s using a 66 MeV proton beam of 150 μA intensity. The "front-end", housing the target/ion-source will be a copy of the front-end developed for the SPES project, which is itself derived from the ISOLDE front-end. LERIB will supply low-energy (60 keV) RIBs for research, which includes the study of the ⍰-decay of exotic isotopes, the use of radioactive ions as probes to study the properties of materials and as a way extract radionuclides of interest for therapy and diagnostics.

The next phase, ACE Beams, will see the RIBs post-accelerated to energies of at least 5 MeV/A.

Primary author: BARK, Robert (iThemba LABS)

Presenter: BARK, Robert (iThemba LABS)

Session Classification: Nuclear Structure Studies

Track Classification: Nuclear Structure Studies