

Management Strategies of the iThemba Labs Accelerator

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iThemba Laboratory for Accelerator-Based Sciences (iThemba LABS) is a multi-disciplinary research centre, operated by the National Research Foundation (NRF). It provides accelerator and ancillary facilities for:

- Treatment of cancer patients with energetic neutrons and protons and related research,
- Production of radioisotopes and radiopharmaceuticals for use in nuclear medicine, research and industry and related research, and
- Research and training in the physical, biomedical and material sciences.

iThemba LABS operates three cyclotrons and a 5.5MV Van de Graaff accelerator at Faure, near Cape Town and a 6 MV EN tandem accelerator in Johannesburg, South Africa.

The cyclotrons have been in operation for nearly 30 years. The operational schedule for the cyclotron facility at iThemba LABS is dictated by the users. It is primarily dictated by the beam requirement for patient treatment, followed by the production of isotopes and lastly for beam availability for nuclear physics research. Presently patients are treated during working hours on weekdays and the beam is made available for isotope production after hours. Nuclear physics research is limited to weekends.

The most important figure of merit for patient treatment at an accelerator facility is reliability. It is of utmost importance to deliver quality beam and minimize unscheduled interruptions to ensure that treatment is on schedule. Experience has shown that when unscheduled interruptions increase to more than 10% of scheduled time the medical community loses interest in the facility as a treatment modality.

For isotope production the reliability of the facility is also very important to maximize the amount of the required isotopes that can be delivered on time to all the users. The beam current intensity on the isotope production target is another important figure of merit because it increases the financial income from isotopes. With a 66 MeV proton beam it is possible to produce radio isotopes on tandem targets, thus two targets can be irradiated with the same beam. In addition, to increase the isotope yield even further, a beam splitter was installed in the beam line which allows simultaneous radio nuclide production in two irradiation vaults. It is thus possible to bombard four targets simultaneously.

The nuclear physics fraternity requires a wide variety of beams for their research. The efficiency, reliability and accuracy of the equipment that is required to produce a stable beam with the desired beam characteristics are essential for accurate measurements during experiments. The quality of the beam is essential in the outcome of their experimental research and subsequent number of publications, which serves as an important figure of merit.

Different aspects to ensure reliable operation of the cyclotron facility, which is close to 30 years old, and the Van de Graaff and tandem accelerators which are more than 40 years old will be discussed. The management structure, funding and the aspect of assuring expertise turnover will also be discussed.

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