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Refurbishment of the Electrostatic Accelerators of iThemba LABS

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The two electrostatic accelerators in operation at iThemba LABS are a 6 MV CN Van de Graaff accelerator dating back to 1962 and a 6 MV EN Tandem accelerator dating back to 1971.

The reliability of the CN Van de Graaff has become a major problem and a decision was made to embark on a refurbishment of the accelerator. To refurbish a 50 year old accelerator while still maintaining a research program is a difficult task. Some of the topics that will be discussed are, amongst others, improvements to components with poor reliability statistics; digital monitoring of all the components in the terminal; implementation of a safety interlock system to monitor all aspects of the accelerator; much improved beam diagnostics; converting the vacuum system to computer control at minimum cost and remote computer control of the terminal potential stabilizer system. About 90% of all of the control elements have been moved over to the open source EPICS platform running on Linux.

At present the project is nearing completion and the benefits of the refurbishment are well evident in the much improved reliability statistics of the accelerator, as well as the positive feedback from the users.

A decision was made to refurbish and upgrade the 6 MV EN Tandem accelerator so that it can also be used for accelerator mass spectrometry. This project is also in an advanced stage and we hope to complete the project by the end of 2014. Some of the technical challenges relating to this project will also be discussed.

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