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## The iThemba LABS Facility: Coulomb excitation studies and future plans at HIE-ISOLDE

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HIE-ISOLDE will revolutionize the scientific outcome of multi-step Coulomb excitation and reorientation effect measurements. Particularly, in reorientation effect measurements, the magnitude and sign of the diagonal matrix element for the first  $2+$  excitation in even-even nuclei will be determined with a higher degree of precision, which will improve our current understanding of phenomena such as shape coexistence, prolate vs oblate shapes, surface vibrations or how nuclei rotate. Nonetheless, RIB facilities are generally deficient delivering high-intensity beams and higher-lying states may be difficult to populate using Coulomb-excitation reactions. This is the case, for example, of establishing shape coexistence by determining the spectroscopic quadrupole moment of the second  $2+$  state in many nuclei (e.g., CERN-INTC-2012-067, INTC-P-368).

Additional reorientation-effect measurements with stable ion beams have been carried out at iThemba LABS. A flexible chamber for particle-gamma coincidence measurements has been constructed and the pipe-line for Coulomb-excitation measurements (S3 detectors, electronics, feedthroughs, etc) finalized. The first experiments ran successfully last November-December 2013. Moreover, a new funding application for an array of 16 clover HPGe detectors (GAMKA) has been submitted to the National Research Foundation, which would allow angular distribution measurements. New exotic stable beams are also being developed at iThemba LABS using organometallic chemistry, which will allow the study of novel reorientation-effect measurements. These measurements with stable beams at iThemba LABS will prepare our students with hands-on and data-analysis skills for similar RIB measurements as well as complementing the physics case at HIE-ISOLDE. Coulomb excitation studies and supportive measurements at iThemba LABS, that will support the HIE-ISOLDE program, will be presented. Moreover, the prospect of a RIB facility at iThemba LABS is a strong motivation to strengthen our research program at HIE-ISOLDE.

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