

Coulomb-excitation studies @ iThemba LABS

Wednesday, 20 March 2019 14:00 (30 minutes)

A new pipeline for Coulomb-excitation studies has been developed at iThemba LABS with the first particle-gamma coincidence measurements carried out during a two-month campaign in April-May 2016 using an XIA-based digital DAQ. We used the reorientation effect to determine the spectroscopic quadrupole moment of the first high-lying excitation in $T_z=0$ self-conjugate nuclei (^{20}Ne , ^{32}S , ^{36}Ar) - typically associated with clustering formation - and ^{40}Ar . These measurements present higher accuracy than previous work and, surprisingly, for ^{20}Ne , ^{36}Ar and ^{40}Ar they represent the first measurements done at safe bombarding energies, well below the Coulomb barrier, onto a heavy target. Our new results show a zig-zag pattern of nuclear shapes at the end of the sd shell and will be compared with state-of-the-art mean-field calculations. Five MSc degrees have been awarded from these data sets.

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