Combined in–beam γ–ray and conversion electron spectroscopy with radioactive ion beams

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In–beam spectroscopic techniques have long been one of the most prominent tools in our effort to disentangle and interpret complex nuclear structure phenomena. In heavy nuclei, where internal conversion increasingly competes with γ–ray emission, the simultaneous study of γ rays and conversion electrons can provide a much more complete image than either of them independently.

The SPEDE spectrometer [1] aims to combine a silicon detector, for the detection of electrons, with the MINIBALL γ–ray detection array for in-beam studies employing radioactive ion beams at the HIE-ISOLDE facility at CERN. The setup will be primarily used for octupole collectivity [2] and shape coexistence studies [3] in Coulomb excitation experiments. In the shape coexistence cases the transitions between states of the same spin and parity have enhanced E0 strength [4]. Additionally the $0^+ \rightarrow 0^+$ transitions, typically present in nuclei exhibiting shape coexistence [5], can only occur via E0 transitions, i.e. via internal conversion electron emission.

SPEDE is one of the first attempts to combine in–beam γ–ray and conversion electron spectroscopy with radioactive ion beams. In this presentation an overview of the SPEDE spectrometer will be presented and discussed.

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[5] J.L. Wood *et al.*, Phys. Rep. **215** (1992) 101.