

## Transfer reactions with HIE-ISOLDE

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The evolution of the shell structure far from stability shows striking effects, due to changes in the underlying interaction. Spin-orbit and proton-neutron interactions, pairing, the vicinity of the continuum, induce effects that translate in observables such as the migration of single-particle levels, reduced or disappearing shell gaps, deformation. Precise spectroscopic information has been so far mainly provided by decay studies; with the development of intense and pure post-accelerated beams of unstable ions, however, the use of reaction methods has also become possible.

Transfer reactions, thanks to their selectivity, are a particularly valuable tool, as they can give access to the most complete information about the structure of the populated levels. They have been used extensively for the investigation of the structure of stable nuclei; with radioactive nuclei, the experimental conditions set severe requirements on the quality of the ion beams and the detection setup.

HIE ISOLDE will provide an important opportunity to apply transfer reaction methods in regions of the chart of nuclei which are not accessible at other facilities. One-nucleon transfers can be used to study the single-particle states in the vicinity of a closed shell nucleus, or their evolution along a series of isotopes between closed shells. We will present some concrete examples for the  $N=16$ , 20, 28 and  $Z=28$  regions, discussing the feasibility of measurements utilizing the present detection arrays and possible upgrades.

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