

The SpecMAT active target for transfer reaction studies at HIE-ISOLDE

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The SpecMAT active target will be used for the study of isotopes in the exotic regions of the chart of nuclide, to investigate the fundamental questions related to the shell structure of nuclei far from stability via nucleon-transfer reactions in inverse kinematics. The active target will be placed in a high and homogeneous magnetic field of up to 2.4 T at HIE-ISOLDE (CERN) for reconstruction of the energy of the recoil particles based on the curvature of their trajectories in the magnetic field. To extract additional information about the populated low-lying states in the transfer reactions, SpecMAT will be surrounded by an array of scintillation detectors for gamma-ray spectroscopy.

Currently, simulations indicate that energy resolution of up to 100 keV can be achieved in transfer reactions in active targets from the energy of the ejected charged particle. In SpecMAT, gamma-ray energy resolution below 4 % at 662 keV gamma-line in the magnetic field can be achieved using modern developments and innovative technologies in scintillation detectors. The high detector efficiency, combined with the energy resolution and full kinematic reconstruction, unfold new horizons on the study of exotic isotopes.

The recent progress in the construction and characterization of the detector will be presented.

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