

The SpecMAT active target –transfer reactions and gamma-ray spectroscopy in high-intensity magnetic fields

Wednesday 23 May 2018 15:40 (20 minutes)

Studies of nuclear orbitals migration in exotic isotopes far from stability is a great challenge for modern nuclear physics. Commonly a few experiments are needed to get the necessary information about single-particle states which later can be used for the nuclear orbitals mapping. However, the same information can be collected by performing one experiment where identification of spins and spectroscopic factors of single-particle states will be extracted from transfer reactions in coincidence with high-resolution gamma-ray spectroscopy. SpecMAT is an active target –time projection chamber designed to combine both of these experimental methods. Kinematics of the reaction in SpecMAT can be reconstructed with the resolution of up to 100 keV from the energy of the ejectile charged particles by measuring the curvature of their trajectories in a high-intensity magnetic field. Gamma-ray energy resolution below 4 % at 662 keV gamma-line can be achieved from an array of scintillation detectors. Full information about the reaction and relatively high resolution which can be reached by the detector in the harsh magnetic environment unfold new horizons on studies isotope in regions close to the driplines.

GEANT4 simulation of the scintillation array, tests of scintillation detectors and acquisition electronics in the 3T magnetic field as well as progress in the design and construction of SpecMAT will be presented.

Primary author: POLESHCHUK, Oleksii (KU Leuven, Institute for Nuclear and Radiation Physics)

Presenter: POLESHCHUK, Oleksii (KU Leuven, Institute for Nuclear and Radiation Physics)

Session Classification: session 7