

# Investigation of nuclei beyond $N = 126$ shell closure region at the DESPEC Phase-0 campaign

*Tuesday, 25 March 2025 17:10 (20)*

In this contribution, the preliminary results obtained from implantation in Active Stopper during an experiment scheduled in June 2024 will be presented. This experiment is a part of the DESPEC collaboration at the GSI-FAIR Phase-0 campaign. The experiment focuses on exploring the region beyond  $N = 126$  shell closure, which is relevant to the modeling of the r-process as most nuclei in this region are formed by this process.

In the experiment, a  $^{238}\text{U}$  beam accelerated to 1 GeV/nucleon is directed on a  $^9\text{Be}$  target to produce heavy neutron rich nuclei by cold fragmentation reaction. The Fragment Separator (FRS) is used to separate the exotic nuclei by in-flight technique. These separated ions are then implanted in AIDA active stopper which consists of two triple-wafer DSSDs. The AIDA setup is placed between two plastic scintillators to measure the timing of the implanted ions. A DINTESPEC detector consisting of three DSSDs is positioned behind AIDA. The hybrid FATIMA + DEGAS array, consisting of 36 LaBr3 and 27 HPGe detectors has been used to extract  $\gamma$  decay and lifetime information.

We have observed  $\alpha$  decays from implants in the Active Stopper during our experiment and conducted some preliminary studies to characterize these decays.  $\alpha$  spectra for the X strips in DSSD0 have been obtained with  $\alpha$  energy aligned according to the ground-state  $\alpha$  decay of  $^{215}\text{Po}$ . Using an  $\alpha$ - $\gamma$  correlation analysis within a prompt time-coincidence window of approximately 4  $\mu\text{s}$ , we can successfully identify some peaks in the  $\alpha$  spectra. Additionally, an  $\alpha$ -tagged  $\beta$  delayed  $\gamma$  spectroscopy study was performed to investigate the  $\alpha$  decays with very short half-lives. The findings of these studies, including the identification of specific  $\alpha$  decays through this methodology will be presented in this contribution.

**Presenter(s)** : KUNDU, Mallicka

**Session Classification** : Session 6