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Nuclear Structure Investigations at DESPEC

Content

The HISPEC/DESPEC collaboration is part of NUSTAR (NUclear STructure, Astrophysics, and Reactions), one of the four key scientific pillars of the international FAIR facility currently under construction in Darmstadt, Germany. The collaboration focuses on two main experimental approaches: high-resolution in-flight spectroscopy (HISPEC) and stopped-beam experiments (DESPEC). In the future, both HISPEC and DESPEC experiments will utilize exotic secondary beams provided by the new Superconducting FRagment Separator (Super-FRS). These beams will be produced when high-energy ions, accelerated by the SIS-18 and SIS-100 synchrotrons, interact with the Super-FRS production target.

The DESPEC setup was successfully commissioned in 2020 as part of the 'FAIR Phase-0' program, using exotic beams from the SIS-18 and the existing FRagment Separator (FRS) at GSI. Several experimental campaigns have since been conducted between 2021 and 2025.

Several key highlights from the DESPEC Phase-0 campaigns will be presented, including studies near the doubly-magic ^{100}Sn and comparisons with the shell structure of ^{132}Sn . Additionally, preliminary results from the in-flight fragmentation of ^{238}U and ^{170}Er beams will be discussed, offering valuable insights into the highly deformed rare-earth nuclear region. The talk will also outline perspectives for DESPEC experiments at the Super-FRS in the near future.

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Comments:

For the HISPEC/DESPEC collaboration

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