Contribution ID: **66** Type: **Submitted oral (In person)**

HISTARS: A High-Performance Detector for Nuclear Excited-State Lifetimes at HIE-ISOLDE

Thursday 4 December 2025 15:20 (12 minutes)

To exploit the vast possibilities offered for research in nuclear structure, nuclear astrophysics and other fields at ISOLDE, the HIE-ISOLDE Timing Array for Reaction Studies (HISTARS) project aims at building a detection device for the measurement of lifetimes of excited states populated in reactions. Nuclear excited-state lifetimes are essential to have direct access to electromagnetic transition rates, which are sensitive to the details of nuclear wavefunctions.

HISTARS combines a charged particle inner detector system with enhanced capabilities for reaction tagging with excellent timing response and an external gamma fast-timing array based on $LaBr_3$(Ce) detectors. The system aims to benefit from recent advancements in instrumentation and electronics, utilizing improvements in digital signal processing and innovative analysis techniques based on genetic algorithms. The project will expand research opportunities for the large community of accelerated beam users at ISOLDE.

The presentation will address the HISTARS conceptual design, the technical design study including Monte Carlo simulations, and the performance evaluation of fast-scintillator systems for gamma rays and charged particles. Test physics cases to showcase the potential of the instrument will be also introduced.

Authors: Prof. FRAILE, Luis M (CERN); CABALLERO RODRIGUEZ, Miriam (Universidad Complutense (ES)); BERNIER, Nikita (Universidad Complutense (ES))

Co-authors: Dr ILLANA SISON, Andres (Universidad Complutense (ES)); SONEIRA LANDÍN, Cayetano (GFN - Complutense University of Madrid); Dr NACHER, Enrique (IFIC (CSIC - Univ. of Valencia)); BENITO GARCIA, Jaime (Universita e INFN, Legnaro (IT)); BRIZ MONAGO, Jose Antonio (Universidad Complutense (ES)); LLANOS EXPOSITO, Marcos (Universidad Complutense (ES)); TENGBLAD, Olof (Consejo Superior de Investigaciones Cientificas (CSIC) (ES)); GAITAN DOMINGUEZ, SARA; MARTINEZ NOUVILAS, Victor (Universidad Complutense (ES)); SANCHEZ TEMBLEQUE, Victor (Universidad Complutense (ES))

Presenter: BERNIER, Nikita (Universidad Complutense (ES))

Session Classification: Session 7