Contribution ID: **184** Type: **Contributed Oral**

Microcalorimeters for Heavy Ions –a Tool to Investigate Multi-Nucleon Transfer Reactions

Thursday, 22 August 2024 15:20 (15 minutes)

Microcalorimeters determine the energy of an incoming ion by measuring the temperature rise in an appropriate absorber. It has been frequently demonstrated that they can measure the kinetic energy of heavy ions up to uranium with a relative energy resolution of the order of $\Delta E/E \leq 5 \times 10^{-3}$. Such detectors have already been applied for the investigation of the stopping power of heavy ions in matter as well as for the identification of the nuclear charges of fission fragments by their Z-dependent energy loss. In addition, the determination of the nuclear mass number A by combining a high-resolution energy measurement with a time-of-flight (ToF) setup, was demonstrated. For uranium ions, a mass resolution of 1 amu was achieved.
Multi-Nucleon Transfer reactions at the Coulomb barrier is the most promising nuclear reaction mechanism which could produce neutron-rich nuclei in the Terra Incognita region of the nuclides'chart. One issue for a deeper understanding of the reaction mechanism is to identify the products of the two body channels in mass (A) and charge (Z) numbers. To achieve this goal, a new ToF-ΔE-E method has been proposed at the GSI Laboratory and approved for an in-beam test. It combines four high-resolution time-of-flight detectors with a microcalorimeter and passive absorbers. In this contribution, the expected performance of this novel detection scheme will be discussed.

Funding Agency

Email Address

saskia.kraft-bermuth@mni.thm.de

Presenter if not the submitter of this abstract

Primary author: Prof. KRAFT-BERMUTH, Saskia (TH Mittelhessen University of Applied Sciences)

Co-authors: VARDACI, Emanuele (University of Naples and INFN); DI NITTO, Antonio (University of Naples and INFN); DICKEL, Timo (Justus-Liebig-University Giessen and GSI Helmholtz Centre); ALIFANO, Giuseppe (University of Naples and INFN); ASHADUZZAMAN, Md (University of Naples and INFN); BANERJEE, Tathagata (University of Naples and INFN); CALINESCU, Stefana (University of Naples and INFN); KLEHM, Anne (TH Mittelhessen University of Applied Sciences); KUMAR, Deepak (GSI Helmholtz Centre); PETRONE, Cristina (University of Naples and INFN); PURUSHOTAMAN, Sivaji (GSI Helmholtz Centre); SCHEIDENBERGER, Christoph (GSI Helmholtzzentrum f¨ur Schwerionenforschung GmbH, Germany; Justus-Liebig University, Germany); SAYHI, Nadia (TH Mittelhessen University of Applied Sciences); SETARO, Pia A. (University of Naples and INFN); SPRUCK,

Kaija (TH Mittelhessen University of Applied Sciences); VANZANELLA, Antonio (University of Naples and INFN)

Presenter: Prof. KRAFT-BERMUTH, Saskia (TH Mittelhessen University of Applied Sciences)

Session Classification: Applications, Facilities & Instrumentation

Track Classification: Instrumentation and Facilities