

Spectroscopy of very heavy elements at and beyond the limits

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Limits for spectroscopy of heavy elements were pushed down to 10 nb level with tagged prompt spectroscopy of ^{246}Fm . The developments done within this collaboration to enable this experiment opened the way for prompt gamma-ray spectroscopy of Super Heavy Elements (SHE). In parallel we developed synthesis of a new isotopic MIVOC compound at IPHC Strasbourg that was successfully accelerated in the cyclotron of Jyväskylä University (JYFL, Finland) and has been prepared also for GANIL Caen (France) and FLNR Dubna (Russia).

Availability of intense ^{50}Ti beam permitted to step in the SHE region with the first prompt detailed gamma spectroscopy of ^{256}Rf ($Z=104$) using the state-of-the-art gamma-ray spectroscopic techniques with the association of JUROGAM II, RITU and GREAT at the University of Jyväskylä.

Ground states rotational structure observed for the first time in these two nuclei will be presented and compared to those of selected neighboring nuclei. The kinematic and dynamic moments of inertia deduced from these data will be discussed.

Focal-plane spectroscopy revealed in Very Heavy Elements (VHE) interesting high-K structures, providing anchor points for contemporary nuclear models in this mass region. A dedicated part of this contribution will shed light on recent result in high-K structures in this mass region. Their sensitivity to the underlying single-particle content is a useful tool to provide strong experimental anchor points for nuclear models in this mass region.

Focal plane spectroscopy has also the strong advantages to permit delayed alpha, gamma and electron coincidences and to have lower cross-section detection limit. The future Super Spectrometer Separator S3, developed in the SPIRAL2 framework, is built to take the best advantages of the high selecting power of a two stages recoil separation system associated to the high beam intensities that will be made available by the new linear accelerator LINAC. After a presentation of the SIRIUS focal plane detection system developed for S3, perspectives for future spectroscopic studies of VHE and SHE will be discussed in a last part of the presentation.

Notes

Author list

B. JP. Gall¹, P.T. Greenlees², J. Rubert¹, J. Piot¹, Z. Asfari¹, L.L. Andersson³, M. Asai⁴, D.M. Cox³, F. Dechery⁵, O. Dorvaux¹, H. Faure¹, T. Grahn², K. Hauschild⁶, G. Henning⁶, A. Herzan², R.-D. Herzberg³, F.P. Heßberger⁸, U. Jakobsson², P. Jones², R. Julin², S. Juutinen², S. Ketelhut², T.-L. Khoo⁷, M. Leino², J. Ljungvall⁶, A. Lopez-Martens⁶, R. Lozeva¹, P. Nieminen², J. Pakarinen⁹, P. Papadakis³, E. Parr³, P. Peura², P. Rahkila², S. Rinta-Antila², N. Rowley¹⁰, P. Ruotsalainen², M. Sandzelius², J. Sarén², C. Scholey², D. Seweryniak⁷, J. Sorri², B. Sulignano⁵, Ch. Theisen⁵, J. Uusitalo², M. Venhart¹¹ and the S3 collaboration.

¹ Institut Pluridisciplinaire Hubert Curien, UMR7178, F-67037 Strasbourg, France

² Department of Physics, University of Jyväskylä, FIN-40014 Jyväskylä, Finland

³ Department of Physics, University of Liverpool, Liverpool, L69 7ZE, U.K.

⁴ Advanced Science Research Center, Japan Atomic Energy Agency, Tokai, Japan

⁵ CEA Saclay, IRFU/Service de Physique Nucléaire, F-91191 Gif-sur-Yvette, France

⁶ CSNSM, IN2P3-CNRS, F-91405 Orsay Campus, France

⁷ Argonne National Laboratory, Argonne, IL 60439, USA

⁸ GSI, Planckstr. 1, 64291 Darmstadt, Germany

⁹ CERN-ISOLDE, Building 26, 1-013, CH-1211 Geneva 23, Switzerland

¹⁰ Institut de Physique Nucléaire d'Orsay, UMR8608, F-91406 Orsay, France

¹¹ Institute of Physics, Slovak Academy of Sciences, SK-84511 Bratislava, Slovakia

Primary author: Prof. GALL, Benoit (IPHC)

Presenter: Prof. GALL, Benoit (IPHC)

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