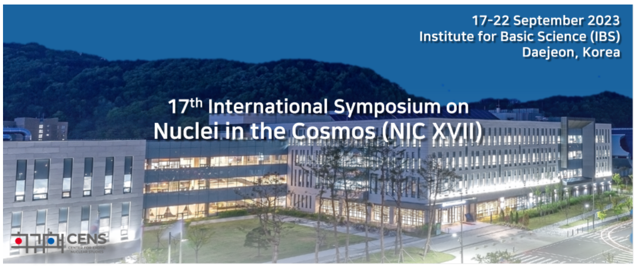

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New half-lives and beta-delayed neutron branchings for neutron-rich Ba to Nd nuclei (A~160) relevant for the formation of the r-process rare-earth peak

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Rapid neutron capture nucleosynthesis (the r-process) produces nearly half of the nuclei heavier than iron in explosive stellar scenarios.
The solar system r-process residual abundances show two peaks located at $A \sim 130$ and $A \sim 195$. Between these peaks lies the Rare-Earth Peak (REP), a distinct but small peak at mass number $A \sim 160$ that arises from the freeze-out during the final stages of neutron exposure. According to theoretical models and sensitivity studies, half-lives ($T_{1/2}$) and β-delayed neutron emission probabilities (P_{xn}) of neutron-rich nuclei, in the mass region $A \sim 160$ for 55≤Z≤64 are critical for the formation of the REP [1,2]. The BRIKEN collaboration [3] conducted an extensive measurement program of β-decay properties of nuclei involved in the r-process at the Radioactive Isotope Beam Factory (RIBF) located in the RIKEN Nishina Center, Japan. The BRIKEN-REP experiment has measured $T_{1/2}$ and P_{1n} of nuclei from Ba to Eu (A $\sim$ 160), belonging to the region that is the most influential to the REP formation [4,5]. In this contribution, we will present the experimental results of new $T_{1/2}$ and P_{1n} branchings within the Ba to Nd region. Furthermore, we will discuss how these new experimental data trends match with the trends from recent nuclear model calculations used for r-process simulations of the REP.

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Primary authors: Dr TARIFEÑO SALDIVIA, Ariel (Instituto de Física Corpuscular); PALLÀS SOLÍS, Max (Universitat Politècnica de Catalunya)

Co-authors: Dr ALGORA, A. (Instituto de Física Corpuscular); Dr ESTRADE, A. (Central Michigan University); Dr MORALES, A. I. (Instituto de Física Corpuscular); Dr KORGUL, A. (Faculty of Physics, University of Warsaw); Dr NAVARRO, A. (Universitat Politècnica de Catalunya); Dr TOLOSA DELGADO, Alvaro (CERN); Mr VITÉZ SVEICZER, Andras (Institute for Nuclear Research (ATOMKI)); Dr RASCO, B. C. (Department of Physics and Astronomy, University of Tennessee); Dr RUBIO, B. (Instituto de Física Corpuscular); Dr DOMINGO PARDO, C. (Instituto de Física Corpuscular); Dr GRIFFIN, C. J. (TRIUMF); Dr KAHL, D. (School of Physics and Astronomy, The University of Edinburgh); Dr NACHER, E. (Instituto de Física Corpuscular); Dr MOLINA, F. (Centro de Investigación en Física Nuclear y Espectroscopía de Neutrones (CEFNEN)); Dr CALVIÑO, Francisco (Universitat Politècnica de Catalunya); Dr CORTES, G. (Universitat Politècnica de Catalunya); KISS, Gabor (RIKEN Nishina Center); Dr BABA, H. (RIKEN Nishima Center); Dr SAKURAI, H. (RIKEN Nishima Center); Dr SUZUKI, H. (RIKEN

Nishima Center); Dr TAKEDA, H. (RIKEN Nishima Center); Dr DILLMANN, I. (TRIUMF); Dr AGRAMUNT, J. (Instituto de Física Corpuscular); Dr LIU, J. (Department of Physics, University of Hong Kong); Dr ALLMOND, J. M. (Physics Division, Oak Ridge National Laboratory); Dr ROMERO BARRIENTOS, J. (Centro de Investigación en Física Nuclear y Espectroscopía de Neutrones (CEFNEN)); Dr TAIN, Jose Luis (Instituto de Física Corpuscular); Dr MIERNIK, K. (Faculty of Physics, University of Warsaw); Dr RYKACZEWSKI, K. P. (Physics Division, Oak Ridge National Laboratory); Dr WANG, K. (Central Michigan University); Dr HARKNESS BRENNAN, L. J. (Department of Physics, University of Liverpool); Dr LABICHE, M. (STFC Daresbury Laboratory); Dr MADURGA, M. (Department of Physics and Astronomy, University of Tennessee); Dr PIERSA SILKOWSKA, M. (Faculty of Physics, University of Warsaw); Dr SINGH, M. (Department of Physics and Astronomy, University of Tennessee); Dr WOLIŃSKA CICHOCKA, M. (Heavy Ion Laboratory, University of Warsaw); Dr FUKUDA, N. (RIKEN Nishima Center); Mr MONT GELI, N. (Universitat Politècnica de Catalunya); Dr NEPAL, N. (RIKEN Nishima Center); Dr BREWER, N. T. (Department of Physics and Astronomy, University of Tennessee); Dr HALL, O. (School of Physics and Astronomy, The University of Edinburgh); Dr AGUILERA, P. (Centro de Investigación en Física Nuclear y Espectroscopía de Neutrones (CEFNEN)); Dr COLEMAN-SMITH, P. J. (STFC Daresbury Laboratory); Dr WOODS, P. J. (School of Physics and Astronomy, The University of Edinburgh); Dr CABALLERO-FOLCH, R. (TRIUMF); Dr GRZYWACZ, R. K. (Department of Physics and Astronomy, University of Tennessee); Dr YOKOYAMA, R. (Center for Nuclear Study, The University of Tokyo); GO, S. (RIKEN Nishima Center); Dr KOVÁCS, S. (University of Debrecen); Dr KUBONO, S. (RIKEN Nishima Center); Dr NISHIMURA, S. (RIKEN Nishima Center); Dr DAVINSON, T. (School of Physics and Astronomy, The University of Edinburgh); Dr ISOBE, T. (RIKEN Nishima Center); Dr SZEGEDI, T. N. (Institute for Nuclear Research (ATOMKI)); Dr SUMIKAMA, T. (RIKEN Nishima Center); Dr KING, T. T. (Department of Physics and Astronomy, University of Tennessee); Dr PHONG, V. (RIKEN Nishima Center); Dr SAITO, Y. (TRIUMF); Dr SHIMIZU, Y. (RIKEN Nishima Center)

Presenter: PALLÀS SOLÍS, Max (Universitat Politècnica de Catalunya)

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