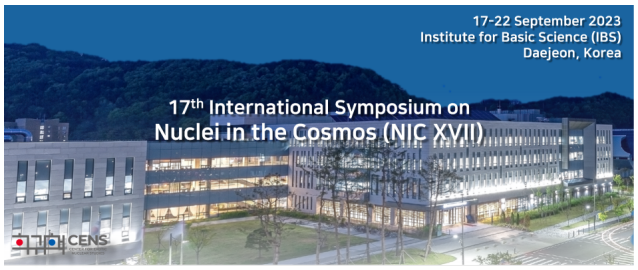


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# Constraining neutron-capture cross section for the i-process for the 151–153Nd(n,γ)152–154Nd reaction via the β Oslo

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Nucleosynthesis of heavy elements has been traditionally attributed to two neutron-capture processes, namely the *s* and *r* processes. Recent astronomical observations have revealed stars where the abundance distributions cannot be described by the aforementioned processes and for this reason the astrophysical *i* process was introduced (*i* for intermediate between *s* and *r*). While we know neutron densities are between the *s* and *r* process, the stellar site where it can occur has not yet been clearly identified and that is largely because of the nuclear uncertainties. The *i* process flow involves isotopes only a few steps from stability, and in this region the main nuclear physics uncertainty comes from neutron-capture reaction rates. Specifically neutron-capture reactions on Nd isotopes have been identified as important for the production of Eu and Sm. With this goal in mind, an experiment was run at the ATLAS facility using the low-energy beams delivered from CARIBU to constrain neutron-capture reactions of importance for the *i* process. $\beta$-decays and their corresponding $\gamma$-rays were identified using the SuN detector and the SuNTAN moving tape system. The $\beta$-decay of $^{152-154}$Pr into $^{152-154}$Nd was measured and the $\beta$-Oslo method was used to extract the nuclear level density and $\gamma$-ray strength function of $^{152-154}$Nd; preliminary results from this experiment will be presented here. From these statistical properties, $^{151-153}$Nd(n,$\gamma$)$^{152-154}$Nd reaction cross sections and reaction rates will be constrained and their significance to the *i* process will be presented.

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