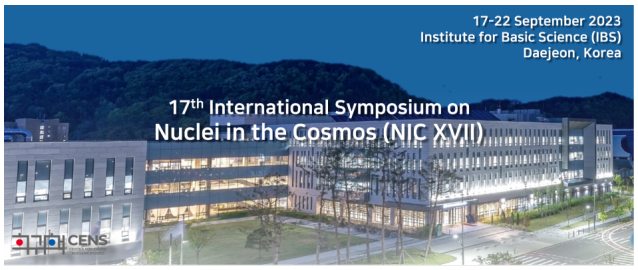

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Neutrino-Driven Outflows and the Origin of Light Heavy Elements

Friday, 22 September 2023 09:45 (15 minutes)

The light heavy elements between strontium and silver, can be synthesized in a primary process in either neutron- (weak r-process) or proton-rich (νp-process) neutrino-driven outflows of explosive environments [1]. Constraining the nuclear physics uncertainties, for example the (α,xn) reaction rates in the weak r-process [2,3], allows us to investigate the conditions that create the light heavy elements, by comparing to the abundances of Galactic metal-poor stars. In addition, the study of presolar stardust grains (SiC) can also reveal signatures of neutrino-driven nucleosynthesis in the Galaxy [4]. We have used an extensive library of astrophysical conditions of both neutron- and proton-rich neutrino-driven outflows, as well as combinations of the two to reproduce the abundance patterns observed in metal poor stars with enhanced light neutron-capture element production, such as HD 122563 (Honda star)[5]. Our preliminary results suggest that there are specific combinations of astrophysical conditions that can reproduce the light heavy elemental abundances observed in such stars.

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Primary author: PSALTIS, Thanassis (NCSU/TUNL)

Co-authors: ARCONES, Almudena (TU Darmstadt/GSI); HANSEN, Camilla (Goethe University Frankfurt); MONTES, Fernando (FRIB); SCHATZ, Hendrik (FRIB/MSU); JACOBI, Maximilian (TU Darmstadt); AVILA, Melina L (Argonne National Laboratory, Argonne, IL, USA); MOHR, Peter (ATOMKI); ONG, Wei Jia (LLNL)

Presenter: PSALTIS, Thanassis (NCSU/TUNL)

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