



Contribution ID: 76

Type: **Contributed poster presentation**

Using Solar r-process abundances to probe nuclear masses with Markov Chain Monte Carlo

R-process nucleosynthesis is an important astrophysical process that is responsible for generating many of the heavy elements that we see in stars and in our own Solar System today. The exact events that occurred which enriched our Solar System with heavy elements is still a mystery. For example, the origin of the rare earth peak at $A \sim 164$ that arises in between the second and third peak from shell closures is still unknown. In addition to exploring astrophysical conditions, information on nuclear masses is required to predict the reaction rates that influence the r process. To learn about the masses and conditions that enriched our Solar System, we employ the Metropolis-Hastings algorithm to search a physically constrained parameter space of possible masses. This algorithm finds the combination of masses and astrophysical conditions that best match the Sun's abundance pattern as well as experimentally determined masses. This work thus provides estimates of neutron rich isotope masses for experiments to verify, illuminates the physical mechanisms behind the abundance pattern of the Sun, and provides insights into the r process events that enriched our Solar System. The work presented here will explore more astrophysical conditions than previously considered in the literature, including weak r process cases to explore the possible origin of the solar Light Precious Metal Peak.

Primary author: MAGOR, Aiden

Presenter: MAGOR, Aiden

Session Classification: Reception & Poster Session