

From the Neutrino Mass to the Origin of the Elements: Probing our Universe with Rare-Isotopes

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ABSTRACT: The development of the Standard Model (SM) has been one of the crowning achievements in modern physics, and is the cornerstone of current subatomic studies. Despite its success, the SM is known to be incomplete, and providing limits on possible physics beyond the Standard Model (BSM) is crucial to our understanding of the natural universe. Although they are generally complex, nuclear systems can be exploited as a laboratory for these studies through the use of rare-isotope beams (RIBs). The production of these short-lived, very exotic isotopes also opens new venues for experimental studies on nuclei that are only found in the most extreme environments in our universe. This work is at the precision and sensitivity frontiers, and helps to bridge the gap between atomic, nuclear, and particle physics using novel, state-of-the-art detection techniques. In this talk, I will use these topics to highlight the significant role of the atomic nucleus in our understanding of the history (and possible future) of our universe.

ALL ARE WELCOME!