

The Origin of the Elements from Nuclear Physics to Galaxy-Scale Simulations

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Following the evolution of chemical elements across cosmic time is a multidisciplinary challenge that involves nuclear physics, stellar evolution, galaxy evolution, and cosmology. Observations, experiments, and theories need to work together in order to build a comprehensive understanding of how the chemical elements synthesized in astronomical events are spread inside and around galaxies and recycled into new generations of stars. In this talk, I will present our efforts to create permanent connections between the different fields of research involved in the process of chemical evolution. In particular, I will highlight the impact of nuclear physics and galaxy evolution uncertainties on our interpretation of the origin of the elements and isotopes. To do so, I will discuss a variety of topics including the r-process and gravitational waves, the i-process and the Solar composition, and the radioactive composition of the early Solar System, as inferred from meteorite data analysis.