ASTROPHYSICS SEMINAR SERIES

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Tuesday, April 9 12:30 pm - Rm 184 NSH

Stellar Archaeology: Forensic evidence on the early universe

The oldest, most metal-poor stars found in the Galactic halo and satellite dwarf galaxies retain in their atmospheres the chemical footprints of the high redshift Universe. Employing "stellar archaeology" – the diverse use of the chemical and dynamical properties of metal-poor stars – outstanding questions about the early Universe can be answered. Using high resolution optical and UV spectroscopic observations of the dataset of the most chemically interesting metal-poor stars, I aim to probe the nature of the first stars and supernovae explosions (SNe), the relevant nucleosynthesis processes responsible for the formation and evolution of the elements as well as early star and galaxy formation processes. In my talk, I will discuss how I've used the most metal-poor Galactic stars to help elucidate the nature of their first star progenitors and mechanisms of the SNe responsible for their chemical signatures. Additionally, I will explore major recent advancements in our understanding of the heaviest elements formation in the metal-poor stars via the r(apid) neutron capture process, especially in light of the recent ground-breaking gravitational wave discovery of the binary neutron star mergers event GW170817. I will also highlight how these iron-deficient stars could be used to test the conditions of stellar atmospheric physics in non-equilibrium conditions.

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