

## A Monte Carlo approach to find the Progenitors of Ultra Metal-Poor Stars



Dr. Vinicius Placco

Department of Physics, University of Notre Dame

Ultra Metal-Poor (UMP) stars, with heavy metal abundances less than  $1/10,000$ th that of the Sun, are formed from gas clouds polluted by the very first (Population III) stars to be born after the Big-Bang. These Pop. III stars are thought to be massive and short lived, ending their lives in explosive events such as supernova type II. By studying the detailed chemical abundance patterns of UMP stars, it is possible to infer the main characteristics of their Pop. III progenitors, such as frequency, mass distribution, and explosion energies. In this talk I will present a Monte Carlo approach to find suitable stellar progenitors for UMP stars, based on the discovery of a new UMP star in the Galactic Halo. Results suggest that at least two types of progenitors are needed at the lowest metallicities, to account for the observed chemical abundances of UMP stars in the Milky Way. These results place important constraints on the initial mass function at early times, as well as models of the chemical evolution of the Galaxy and the Universe.

Tuesday

October 25

12:30 P.M.

Rm 184 NSH