

SAN DIEGO STATE UNIVERSITY DEPARTMENT OF PHYSICS AND DEPARTMENT OF
ASTRONOMY COLLOQUIUM

Speaker: Dr. Joshua Simon -- Observatories of the Carnegie Institution of
Washington

Topic: The High Redshift Universe Next Door

Time: 3:00 PM, Friday, April 17, 2015 (refreshments served at 2:45 PM)

Place: Room 215, Physics-Astronomy Building (PA-215)

Abstract:

The dwarf galaxies around the Milky Way are extremely valuable laboratories for studying the nature of dark matter, the threshold for galaxy formation, and chemical evolution in the early universe. After reviewing the revolution in our understanding of the Milky Way's satellite population that resulted from the Sloan Digital Sky Survey, I will discuss how these objects provide unique new windows into processes that occurred at high redshift and can usually only be studied in the distant universe. Spectroscopy at both low and high resolution shows that a significant fraction of the stars in the least luminous galaxies are extremely metal-poor, with $[Fe/H] < -3$. I will describe a new survey using the Magellan telescopes that aims to identify a complete sample of the most metal-poor stars in Milky Way dwarfs. The chemical abundance patterns of extremely metal-poor stars are nearly identical in all galaxies where they are currently known, despite their host galaxies spanning a factor of 10^8 in luminosity, which suggests that the initial chemical evolution of all galaxies may be universal. These extremely metal-poor stars also have abundances that are consistent with model predictions for Population III nucleosynthesis, offering the possibility of constraining the first generation of stars that formed in our nearest galactic neighbors.