



PHYSICS AND ASTRONOMY SEMINAR

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First Stars, Black Holes, and Galaxies in the Universe

Cosmic structure forms hierarchically through smooth accretion and dark matter halo mergers. As a consequence, all galaxies are the product of the dozens of mergers over billions of years. However, one can ask, "What were the first stars and galaxies in the universe?" I will review the current state-of-the-art simulations of early galaxy formation, starting with the formation of the first stars, which are initially devoid of metals and are suggested to have a characteristic mass of tens of solar masses. Our recent work shows that faint supernovae could be responsible for enriching extremely metal poor stars that are carbon-enhanced. I will then present results from a suite of cosmological radiation hydrodynamics simulations that focus on the transition from the first stars to the first galaxies. Each simulation captures the radiative and chemical feedback from 10,000 first stars, leading to the formation of a 10^7 solar mass galaxy only 500 million years after the Big Bang. Last I will highlight how some of the earliest massive black holes form during these early epochs that could be the seeds of supermassive black holes that exist at the centers of all massive galaxies today.

Monday, May 24, 2021

2:00 p.m.

Zoom link: <https://uvic.zoom.us/j/82203756592>