



# 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 first stars.