

UCLA Department of Physics & Astronomy

COLLOQUIUM

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Early Galaxies and the (re)ionization of Intergalactic Hydrogen

Stuart Wyithe

Australian National University



Astrophysics seeks to both understand how the Universe works today, and to uncover how it formed and evolved throughout cosmic history. Fortunately, the finite speed of light allows us to view the Universe at large distances as it existed in the past. Recently the James Webb Space Telescope has further revolutionized our knowledge of the earliest galaxies in the Universe, pushing the epoch where galaxies are known to be forming stars out to $z \sim 15$, only a few 100 million years after the big bang. The ionizing radiation from these early stars ionized and heated hydrogen throughout the Universe, a process referred to as reionization which is constrained to end at a redshift of ~ 5 , approximately 10 billion years later. The evolution of cosmic hydrogen is tightly coupled with the formation of galaxies and is being studied by current and forthcoming radio telescopes including the Square Kilometer Array. In this talk I will present results from simulations that aim to describe this coupled evolution, including the implications of recent high redshift observations with the James Webb Space Telescope, and how early galaxy properties will be measured using the Square Kilometer Array.