Local Laboratories for High-redshift Astrophysics: Testing Theories of Lyman Alpha Escape (and more) in Reionization-epoch Analogs

The Lyman alpha emission line is an important diagnostic tool, used widely in attempts to understand the properties of galaxies and the intergalactic medium at early cosmic times. With a relative ease of observation at z>2-3, and the potential to constrain outflows, dust, and neutral gas in the circumgalactic and intergalactic media, Lyman Alpha surveys have grown dramatically in the last decade. However, we are still challenged to predict Lyman alpha emission (or lack thereof); consequently, our ability to interpret high-redshift results is limited. In this talk, Dr. Henry will review some of the key high-redshift observations, and then turn to what we can learn from low-redshift galaxies. Dr. Henry will then discuss new results from a sample of low-redshift objects (the z~0.2 “Green Peas”) with strong line emission and low metallicity. Using UV spectroscopy from HST/COS, will test prevailing theories of Lyman alpha escape, including resonant scattering in an outflow, and the geometry of neutral gas. Finally, we will take a look forward to the ways that low-redshift galaxies can serve as local laboratories for other exciting high-redshift astrophysics.