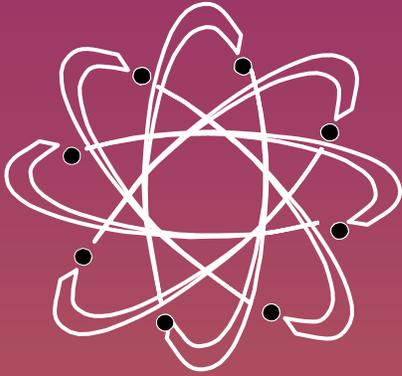


The Department of  
Physics



Carnegie Mellon

# McWilliams Center for Cosmology Colloquium

Dr. Hy Trac  
Harvard Smithsonian Center for  
Astrophysics

**Cosmic Reionization of Hydrogen:  
Simulating the Inhomogeneous Radiative  
Transfer of Ionizing Photons from Early  
Galaxies**

**Friday, December 5, 2008**

**2:30pm**

**DHA 301D**

**Abstract:**

*The cosmic reionization of hydrogen was the last major phase transition in the evolution of the universe, which drastically changed the ionization and thermal conditions of the cosmic gas. This important epoch marks the emergence of the first stars, galaxies, and quasars and alters the cosmic environment for subsequent baryonic structure formation. The ultra-violet radiation from the luminous sources produced ionized bubbles that expand and merge with one another until they overlap all of space. With modern computer simulations, we have finally converged on a general picture for the complex reionization process. We present results from state-of-the-art cosmological simulations that evolve the dark matter, cosmic gas, and ionizing radiation using N-body, hydrodynamic, and radiative transfer algorithms. In particular, we focus on the imprint of inhomogeneous reionization on observables such as the 21 cm signal and the Lyman alpha forest. Many unsolved problems still remain in this young and exciting field of cosmology and continuing progress on the theoretical front is necessary to compliment the promise of upcoming observations.*