Carnegie Mellon University
Department of Physics

McWilliams Center for Cosmology
Seminar

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Monday, March 28, 2011
2:30 pm
8220 Wean Hall

Reception at 3:30 pm in 8325 Wean Hall

"The Cosmic Dawn and Reionization"

Abstract:

The lecture will overview current theoretical work as well as planned observational programs concerning the earliest epoch of structure formation in the Universe. The first galaxies produced UV radiation that re-ionized hydrogen throughout the Universe. Since the galaxies at redshifts z.10 represented rare peaks in the underlying density distribution, they were strongly clustered on scales of up to ~100 comoving Mpc. Therefore, a proper numerical simulation of the reionization epoch requires a large dynamic range of scales, with a sufficiently large box size to be representative and a sufficiently fine resolution to capture the collapse of low-mass galaxies. Theoretical calculations predict that most of the star formation at z.10 occurred in galaxies that are more than an order of magnitude fainter than the deepest HST WFC3/IR survey. Observtaionally, the distribution of matter will be mapped over the coming decade through surveys of the first galaxies using the next generation of large telescopes, as well as through 21-cm tomography of cosmic hydrogen with new radio observatories.