

**Carnegie Mellon University  
Department of Physics**

**McWilliams Center for Cosmology**

## **Colloquium**

**Tesla Jeltema  
University of California, Santa Cruz  
Lick Observatory**

**Wednesday, February 16, 2011**

**4:30 pm**

**DH A301D**

### **“Clusters of Galaxies: An All-Purpose Laboratory for Cosmology and Astroparticle Physics”**

**Abstract:**

**The formation and evolution of large-scale structure encode basic information about our universe. Observations of the most massive collapsed structures in the universe, clusters of galaxies, are advancing our knowledge of a broad range of topics from studies of cosmology to particle physics to galaxy evolution. I will discuss three exciting applications of cluster observations:**

- 1) The ability to derive precise constraints on cosmological parameters like the density of dark energy and its evolution,**
- 2) The acceleration of relativistic particles in clusters and constraints on their cosmic ray content, and**
- 3) Constraints on the particle properties of dark matter.**