



Laboratory for Elementary Particle  
Physics (LEPP)

# Theory Seminar

## Searching for Dark Matter Annihilation in Nearby Galaxy Groups



**Siddharth Mishra-Sharma**  
*Princeton*

Galaxies and galaxy clusters outside the Milky Way are expected to be some of the brightest sources of dark matter (DM) annihilation in the sky. Further, galaxy catalogs such as the 2MASS survey tell us where thousands of these objects are located. The challenge, however, is that catalogs only detail the baryonic properties of individual galaxies rather than the halo properties of galaxy groups which are expected to correlate with the dark matter distribution. I will describe how to go from a catalog of galaxies to a map of the extragalactic dark matter distribution in the sky, taking into account systematic uncertainties in our knowledge of the galaxy-halo connection. I will then apply this method to several galaxy catalogs of the local Universe, constructing a nearly all-sky map of an expected DM annihilation signal. Finally, I will show the results of searching for this structure in Fermi gamma-ray data, producing sensitivity to DM annihilation comparable to that obtained using dwarf galaxies, and comment on implications for the DM interpretation of the Galactic Center excess.

**Wednesday, November 8<sup>th</sup> 2017**

**2:00pm**

***401 Physical Sciences Building***