

# Physics Colloquium

Michigan Technological University

Tuesday, October 30, 2007

11:00 am

Room 139, Fisher Hall

## Energetic Particle Transport in Solar Flares

**David Alexander**

Rice University

Houston TX

### Abstract:

Solar flares are amongst the most energetic events occurring in the solar system, releasing as much as  $10^{33}$  ergs in 100 - 1000s. Spatially, temporally, and spectrally resolved photon emissions, across a wide range of wavelengths, provide important diagnostic information on the astrophysical processes of particle acceleration and transport in a magnetically dominated environment. In this talk, I will focus, after a short general introduction, on what we are learning about the transport of energetic particles in solar flares using a combination of observational analysis and theoretical modeling and how this relates to the magnetic topology and energy release processes in the solar atmosphere. In particular, we use a Fokker-Planck kinetic code to model the particle transport and characterize the particle distribution function in realistic magnetic loop geometries. By employing this approach in conjunction with topological information from magnetic field data, we can place constraints on the acceleration and magnetic reconnection physics required to produce the observed flares. Understanding the processes of energy release and acceleration on the Sun provides a unique benchmark against which to compare similar processes occurring in the astrophysical regime.