mipSe
Michigan Institute for Plasma Science and Engineering

Wednesday
October 9, 2013
4:00 pm
Room 1200
EECS Building

Prof. Michael Brown

Swarthmore College

Reconnection-driven MHD Turbulence on the SSX Plasma Wind Tunnel

High velocity merging experiments in the SSX plasma wind tunnel generate high Reynolds number (Rm = 1000) and high beta MHD turbulence. The turbulent plasma is fully ionized and fully magnetized (Larmor radius = 2 mm). Typical merged plasma parameters are T_i = 50 eV, T_e= 10 eV, n = 10^{21} m^{-3} and B = 0.5 T. Magnetic structure and fluctuations are measured with a 16 channel high-resolution probe array (4 mm spatial resolution, 30 MHz bandwidth). The turbulent MHD plasma is generated by multiple reconnection events and persists for many Alfven times. The goal of this research is to study the universality of statistical measures of MHD turbulence. Reconnection-generated MHD turbulence in SSX shows a power-law spectrum and correlation function similar to that observed in the solar wind. Comparisons of experimental results with simulations and solar wind measurements will be presented.

About the Speaker: Michael Brown is Professor of Physics and Chair of the Department of Physics and Astronomy at Swarthmore College. His area of research is experimental plasma physics with an emphasis on laboratory astrophysics, magnetic reconnection, self-organization, and turbulence. He is a Fellow of the American Physical Society and 2008 winner of the APS Award for Research at an Undergraduate Institution.