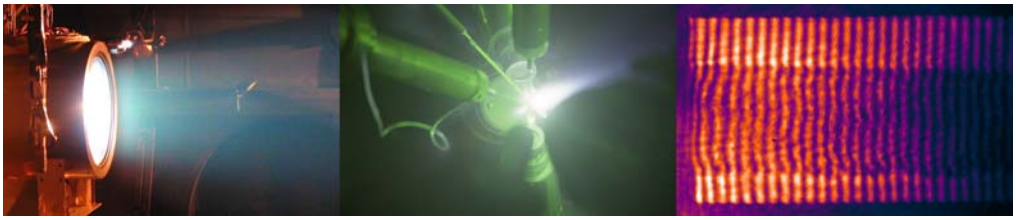

Michigan Institute for Plasma Science and Engineering Seminar

Universal Magnetic Structures

Prof. Mark Moldwin

Dept. of Atmospheric, Oceanic and Space Sciences
University of Michigan

Thursday, 19 Nov. 2009 - 3:30 pm
Room 2246 Space Research Building
(Refreshments will be served before seminar.)

Abstract

The understanding of the large-scale structure of matter in the universe can be organized principally by two force fields – gravitational and magnetic fields. Gravity gathers together material into moons, planets, stars, star clusters and galaxies. Magnetic fields principally push plasmas apart creating their own hierarchy of magnetized structures. The universe is full of distinctive magnetic forms that recur on widely different scales and in lab, heliophysics and astrophysical contexts. To organize this presentation of magnetically-defined structures, I put them in three groups and draw from the field of heliophysics: current sheets (e.g., the heliospheric current sheet); flux tubes (e.g., sun spots); and cells in which I include cavities (e.g., magnetospheres). The emphasis of this talk is on flux tubes, one of the fundamental examples of the magnetic organization of matter. The talk will address why plasmas organize around a small set of universal structures and provide examples on how thinking about discrete structures can add to our understanding of the solar-terrestrial relationship.

About the Speaker:

Mark Moldwin is a Professor of Space Sciences in the University of Michigan's Department of Atmospheric, Oceanic and Space Sciences in the College of Engineering. Prior to joining the faculty of UM in July of 2009, Dr. Moldwin was a Professor of Space Physics at UCLA (2000-2009), Professor Physics and Space Sciences at Florida Institute of Technology in Melbourne (1994-2000) and a Postdoctoral Research Fellow in the Space and Atmospheric Sciences and Non-proliferation and International Security groups at Los Alamos National Laboratory. Dr. Moldwin joined the LANL in 1992 after receiving his Ph.D. in Astronomy/Space Physics from Boston University. He was awarded a B.A. in Physics with Honors from the University of Alaska-Fairbanks in 1987. Dr. Moldwin's primary research interests are magnetospheric and heliospheric plasma physics, and pre-college space science education and outreach.