



Wednesday
January 23, 2013
4:00 pm
Room 1017
Dow Building

Prof. Adam Frank
University of Rochester

Stars, Disks and Jets: The View From The Telescope, The Computer and The Lab

Stars and their environments present a wide range of hydrodynamic and magnetohydrodynamic phenomena for plasma physicists to consider. The traditional tools of observation, analytical methods and, more recently, simulation yield insights into the evolution of stars from their formation via the gravitational collapse of molecular clouds to their death as Planetary Nebula or Supernova. The addition of direct laboratory investigation of macroscopic volumes of plasma in astrophysical relevant regimes represents a fundamentally new window on stellar environments. In the last decade the field of High Energy Density Laboratory Astrophysics (HEDLA) has made considerable progress becoming a mature field that can now address open issues of concern to astronomers. In this talk I present three case studies of astrophysical questions which HEDLA studies can play a role in addressing. The first part of the talk focuses on magnetically dominated jets driven by stars in a variety of contexts. The second explores the formation of “wind capture” accretion disks in binary systems and the third explores the formation of molecular clouds (and stars) via colliding streams. In each case we unpack issues in the underlying physics that require further exploration and introduce current or future laboratory experiments that might address these issues.

About the Speaker: Adam Frank is a professor of Astrophysics at the University of Rochester which he joined in 1996. Prof. Frank received his Ph.D. in Physics (1992) from University of Washington. He held postdoctoral and visiting scientist positions at Leiden University and the University of Minnesota. In 1995, he was awarded a Hubble Fellowship and he received a University Bridging Fellowship in 2005. His principal research interests are computational magneto-gas dynamic studies of star formation and late stages of stellar evolution. He is the PI for the development of AstroBEAR, a multiphysics AMR code. Frank is also a popular science writer, author of two books and a contributor to NPR and the NY Times.