The Department of Physics and Astronomy
Presents Research Seminar Speaker

# Dr. Lynn Matthews

MIT Haystack Observatory

Friday April 9, 2010
Time: 3:00-4:00 p.m.
Location: AET 0.212

# A Documentary of High Mass Star Formation in Orion

A comprehensive theory for the formation of high-mass stars (i.e., those ~8-100 times the mass of the Sun) has remained elusive, in large part because of the enormous observational challenges of studying the dynamics of circumstellar material around massive young stellar objects (YSOs) on the relevant physical scales, which may be as small as only a few times the Earth-Sun distance. Using observations obtained with the Very Large Array (VLA) and the Very Long Baseline Array (VLBA) over several years, the KaLYPSO project has been overcoming these challenges and has now mapped the distribution, dynamics, and temporal evolution of the material 10-1000 astronomical units from the nearest high-mass YSO: Radio Source I in Orion. I will present some recent highlights from our work, including a "movie" that documents the motions of thousands of individual SiO maser-emitting gas clumps over 21 months. Our movie reveals gas entrained in a wide-angle bipolar wind emanating from a rotating, edge-on disk, providing some of the strongest evidence to date that massive stars form via a process of disk-mediated accretion in manner analogous to their lower mass counterparts. The detection of maser features along extended, curved filaments further suggests that magnetic fields may play a role in launching and/or shaping the wind.