

Joint Astronomy/ EPS Colloquium

March 22, 2007

Tea: 3:30pm, 661 Campbell Hall Lounge

Colloquium: 4:00pm, 1 Le Conte

JOSH EISNER

UNIVERSITY OF CALIFORNIA, BERKELEY

Building Blocks of Planets around Young Stars

Planetary systems form in disks of dust and gas around young stars, and observations of these disks can shed light on the physical processes by which planets form. I discuss high angular resolution observations of protoplanetary disks that enable determination of several disk properties key to understanding terrestrial and giant planet formation. First, I describe millimeter-wavelength interferometric observations that constrain the mass content of hundreds of protoplanetary disks. I show that most disks are probably less massive than the nebula from which our solar system formed, and I argue that Jupiter-mass planets are rare if they form by the core accretion or disk fragmentation mechanisms currently proposed. Next, I show new results of near infrared interferometric observations that measure the spatial and temperature structure of gas and dust in terrestrial planet forming regions of disks. These new data show evidence of hydrogen gas and water vapor at very small stellocentric radii, with implications for giant planet migration, water delivery to terrestrial planets, and accretion onto the central star. Finally, I describe a program of upgrades to the Keck Interferometer that will soon provide new tools for investigating planet formation, and I outline several interesting projects that can be attempted in the near future.

