Abstract Submitted
for the NWS17 Meeting of
The American Physical Society

Non-Axisymmetric Instabilities in Circumbinary Disks: Giant Planet Formation REBECKA TUMBLIN, JAMES IMAMURA, WILLIAM DUMAS, University of Oregon, KATHRYN HADLEY, Oregon State University, ERIK KEEVER, University of Oregon — Gravitational instabilities (GIs) in protoplanetary disks are a proposed mechanism of forming gas giants on timescales associated with the orbital period in the disk. Protoplanetary disks in the pre-T-Tauri phase of disk evolution are expected to be weakly ionized, massive, and relatively cool; conditions under which disk self-gravity is expected to play a large role in stellar and planetary evolution. Recent discoveries of binary and multiple star systems harboring planets could provide constraints on planet formation mechanisms because the tidal potential produced by orbiting binaries is expected to enhance GIs in protoplanetary disks by setting up a periodic forcing potential. We perform 3D grid-based hydrodynamic simulations of circumbinary disks using the radiative hydrodynamics code CHYMERA to test the viability of the disk instability model of Jovian planet formation. We model two systems previously studied without a binary companion, one subject to an m=1 mode and one subject to a j-mode to understand the effects of binarity on which unstable eigenmode dominates the evolution of the system. We find that for the m=1 mode, binarity suppresses instability, and for the j-mode, prompt fragmentation occurs on the orbital period of the disk.

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Date submitted: 28 Apr 2017 Electronic form version 1.4