Abstract Submitted
for the NWS17 Meeting of
The American Physical Society

Gravitational Coupling of Uniformly Rotating Resolved Stars in Star-Disk Systems.[1] WILLIS ROGERS, KATHRYN HADLEY, Oregon State University, JAMES IMAMURA, University of Oregon — Using linear hydrodynamics equations we modeled protostellar star-disk systems with resolved stars to determine the effect of gravitational coupling on the evolution of the star and the disk. We wanted to see if stars with low ratios of kinetic energy to gravitational potential energy, with star to disk mass ratio of 1:1, behave similarly to models of higher mass ratios. Stars were modeled as slowly rotating spheroids in uniform rotation (UR). For the systems modeled, the star in UR did not have an appreciable effect on the evolution of its associated disk. Gravitational coupling of the star and disk was found to be weak. The modeled disks show similar mode growth rates and frequencies when the star was represented as a point mass, and as a resolved mass in UR. Single armed modes in the disk displace the center of mass of the star, this suggests the stars orbital motion is being driven by angular momentum coupling. Stars in UR had weak multipole moments compared to the monopole, similar to the point star case. The multipole increases with flatness of the star, differentially rotating stars which can be flatter could support stronger gravitational coupling. Models with higher mass ratios show similar multipole properties with shorter growth times and larger frequencies.

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Date submitted: 05 May 2017 Electronic form version 1.4