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Self Gravitation of Differentially Rotating Resolved Stars in Protosteller Systems ATTILA VARGA, KATHRYN HADLEY, Oregon State University, JAMES IMAMURA, University Of Oregon — In protostellar systems, where a disk of hot gas surrounds a young protostar, gravitational coupling between the star and the disk can arise, resulting in modes driven by the star. A comparison between point-mass stars and resolved stars in linear hydrodynamic simulations can be made in an attempt to examine the coupling of different modes in the systems. Concurrent research has used a star to disk mass ratio 5-1, here we use a 1-1 ratio. In point star systems, orbital coupling is seen between the point mass and the disk. This is compared to a differentially rotating resolved star, where the star can couple rotationally through the quadrupole of the flattened star. We examine the instabilities in the disk and star where bar like modes will form for spherical stars. We find that by increasing the flatness of the star and approaching the dynamic threshold for bar like modes, the star will strongly couple and change the modes in the disk. For the most spherical stars, the disk coupling matches the point star. This behavior can be quantified by comparing eigenvalues of the systems, and qualitatively analyzed by comparing phase plots of constant phase loci for the star and disk where a qualitative difference is seen. Plots showed smooth winding arms distinct from bar modes.

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