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Planet Formation in Warped Protoplanetary Discs

M.M. Fragner (1) and R.P. Nelson (2)

(1) School of Mathematical Sciences Astronomy Unit, Queen Mary University of London, London, U.K. (e-mail: m.fragner@qmul.ac.uk), (2) School of Mathematical Sciences Astronomy Unit, Queen Mary University of London, London, U.K. (e-mail: r.p.nelson@qmul.ac.uk)

Protoplanetary discs may occur in binary systems where the disc plane and the binary orbit plane are misaligned as a result of the star formation process. It is expected that the excitation of bending disturbances will lead to the formation of warped, precessing discs, as are believed to occur in numerous protoplanetary disc systems.
We study these systems using a three dimensional grid-based hydrodynamics code.
We examine the structure and evolution of discs whose parameters (disc thickness and viscosity) are appropriate to protoplanetary discs. We find that the disc adopts a warped and twisted configuration, and precesses uniformly at a well defined rate.
We introduce planetesimals into the system which interact with the binary via gravity, and with the disc via drag forces and gravity.
We find that as the planetesimal size is increased from 1 metre up to 1km, the planetesimal orbits become increasingly inclined with respect to the disc.
For sizes of approximately 1km and above, the planetesimals essentially orbit outside of the disc. We discuss the implications of these results for planet formation in binary systems