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Presentation Title: Numerical results on planetesimal growth in binary systems

It is thought that rocky planets, and likely the cores of giant planets form via collisional agglomeration of small planetesimals. In binary systems, planetesimals are perturbed by gravity from the companion star, as well as by gravity and gas drag from a massive eccentric gas disk. We model the effects of these forces to determine size-dependent collision velocities. We find that generally in tight planet-hosting binary star systems such as γ-Cephei, some planetesimal collisions occurred at speeds on the order of 1 km/s, leading to planetesimal destruction, but others were more gentle. To determine the effect of these collisions on planetesimal growth, we run a multi-annulus coagulation code to track the evolution of the planetesimal size distribution. We use this code to determine how large the initial planetesimals must be in order for planetary embryos to form within a mega-year. We explore a variety of disk parameters: mass, eccentricity, apsidal alignment, amplitude of random planetesimal motions, and whether we include disk gravity in the dynamical description of the collision velocities. For the most part, the behaviour of the required initial planetesimal size as these parameters are varied can be qualitatively understood by simple scaling arguments. As found in our previous work, disk gravity can substantially lower the required size of the initial planetesimals, provided a favourable set of disk properties. Generally initial planetesimals of a few to a few tens of kilometres are needed in order for planetary embryos to form.