

On the influence of a radiative disc on planetesimal and gas dynamics in binaries

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Abstract

Paardekooper et al. [1] performed hydrodynamical simulations of planetesimals moving in a gas disc in a binary system. They showed that planetesimal encounter velocities, critically depend on the eccentricity of the gas disc, when they are affected by gas drag. In a second work [2] they included the effect of collisions. Kley and Nelson [3] were interested in the evolution of planetesimals in a circumstellar disc orbited by a massive companion. Nevertheless they only used the local isothermal approach when modeling the disc's evolution. It is our aim to perform hydrodynamical simulations including the more sophisticated model of a radiative disc. For this we use an energy equation similar to Kley and Crida [4]. We determine the effect such a disc has on the evolution of different numbers of collisionless planetesimals. The evolution of discs strongly depends on the chosen inner boundary, therefore we use non reflecting boundaries as introduced by Godon [5] and different density distributions. We determine the evolution of the distribution of the planetesimals, their encounter velocities as well as the drift rates of the particles since it has been shown by [4] that inward migration can also be prohibited or even reversed in radiative discs.

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References

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