ABSTRACT ONLY

A LOCAL APPROACH OF PLANETESIMAL FRAGMENTATION APPLIED TO PLANET FORMATION

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One of the challenges in planetary formation models is, including the main physical phenomena in that process, to explain the diverse architectures of planetary systems observed to date. The modelling of collisions and planetesimal fragmentation is key to reproducing planetary formation and evolution correctly. Our previous works show that the inclusion of a detailed model of planetesimal fragmentation, considering different compositions and relative velocities of planetesimals, may inhibit or favour the formation of giant planet cores, drastically changing the final planetary system architectures. However, in global planetary formation models, the detailed modelling of these processes is extremely expensive from a computational point of view. Generally, these models include the planetesimal fragmentation process locally. In this work, we study a local approximation of this process that simplifies the phenomenon numerically, significantly reducing the computing time required for our simulations. We compare these results to our detailed model of planetesimal fragmentation applied to giant planet formation and contrast it with other local approximations in the literature to determine its validity.

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