Solids concentration in turbulent protoplanetary disks

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Résumé

The formation of planetesimals is an open question of planet formation theory. Collisions and radial drift of pebbles strongly limit their growth up to planetesimal size. The favored scenario assume a concentration mechanism for these pebbles followed by a gravitational collapse of the cluster. However the exact way the solids can be concentrated, such as the streaming instability or Rossby wave instability, is highly debated as many instabilities may be active in these disks resulting in a turbulent dynamic, with a low amplitude of turbulence. We here consider a turbulent disk and study how this turbulent flow concentrate solids. We have developed new methods and tools to characterize this clustering properties, that are borrowed from the fluid dynamics and dynamical systems community. In this poster we present tools to identify the clustering of particles, and we study the dynamic of these clusters. Such methods can be applied to understand planetesimal formation in turbulent protoplanetary disks.

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