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Vortices in protoplanetary disks

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Large scale vortices in protoplanetary disks are thought to form and survive long enough to significantly change the global disk evolution. They can capture and concentrate the dust particles embedded in the gas possibly explaining asymmetries and dust concentrations recently observed at submillimeter and millimeter wavelengths. The high-concentration regions formed by the vortices could be preferred sites of planet formation where agglomeration processes and gravitational instabilities could lead to primordial bodies like planetesimals or planetary embryos. I will first review the various possibilities to form robust vortices by the Rossby wave or the baroclinic instability in the case of non-stratified and stratified disks. Then, I will present the dust/vortex interaction and the trapping mechanism. Finally, I will discuss the evolution of the vortices once heavily loaded with dust particles and the possibility to form planetesimals.

Biography

Pierre Barge integrated a permanent position in Astronomy in 1982 after a first thesis from Paris VII University; then he completed a PhD in 1991 from Marseille University. He was Chair of the Exoplanet Program of the CoRoT space mission from 1995 to 2009. He is now a Senior Astronomer from CNAP in Aix Marseille University. He has published more than 86 papers in refereed journals.

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