Investigating the asymmetry in the dust emission in the inner parts of protoplanetary disks : a dust-trapping vortex ?

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Interferometric observations conducted with the VLTI have revealed asymmetric near-infrared dust emission in the innermost regions of protoplanetary disks (for instance around the young star HD 163296). Moreover, some of these observations also show a temporal variability in the asymmetry, which can not be explained by purely axisymmetric disk models. To account for this asymmetry, we explore the hypothesis that a vortex generated by the Rossby Wave Instability (RWI) in the disk is responsible for dust trapping, therefore locally enhancing the emission. To investigate this scenario, we implement density and temperature profiles in the FARGO3D code to mimic the transition between the magnetically active (turbulent) and the magnetically inactive (non-turbulent) regions of the disk. This transition corresponds to a pressure bump unstable to the RWI and is a key location for understanding planetary formation and evolution. We carry out 2D and 3D hydrodynamical simulations using FARGO3D and then post-process the results of these simulations with the radiative transfer code RADMC3D to produce synthetic dust near-infrared emission maps. In order to compare our results to observations, we then compute interferometric observables using the public code ASPRO2. Our poster will show under which conditions this dust-trapping scenario can explain the asymmetry in the HD 163296 disk, as seen by the MATISSE instrument.