EPSC Abstracts
Vol. 5, EPSC2010-290, 2010
European Planetary Science Congress 2010

Observational signatures of turbulence and sedimentation in protoplanetary disks

E. Di-Folco (1), S. Charnoz (1), C. Pinte(2), L. Fouchet (3), E. Pantin (1), J-F Gonzalez (4), F. Menard (2)

(1) Laboratoire AIM , Université Paris Diderot /CEA/CNRS France (2) Laboratoire d'Astrophysique de Grenoble CNRS/Université Joseph Fourrier (UMR5571) France (3) Physikalisches Institut, Universitaet Bern SWITZERLAND (4) Laboratoire CRAL, Université de Lyon, Ecole Normale Supérieure de Lyon FRANCE

Abstract

Gaseous proto-planetary disks are believed to be subject to large-scale MHD turbulence. This turbulence controls the dynamics of dust grains as a function of their size, producing differential vertical sedimentation and radial migration and strongly affecting the aspect of the disk at various wavelengths. Multi-wavelength observations of the dust component therefore gives precious information on the properties of the underlying gaseous disk and offer observational diagnostics to constrain the strength and impact of turbulence.
We have recently coupled a dynamical dust code (Charnoz & Fouchet 2010) including a stochastic turbulence model, with the radiative transfer code MCFOST (Pinte et al., 2006). With these tools, we explore how turbulent processes affect the grain distribution (size and location) in the vertical and radial directions, as well as its evolution along the disk lifetime. We will first compare the thermal emission of the grains for laminar and turbulent disks and then discuss how turbulent processes affect the large-scale emission of proto-planetary disks based on a comparative study of a few well-known systems.