Opacities for protoplanetary disks

D.A. Semenov[1], Th. Henning[1], M. Ilgner[1], Ch. Helling[2], and E. Sedlmayr[2]

[1] *Astrophysikalisches Institut und Universitäts-Sternwarte, Schillergäßchen 2-3, 07745 Jena, Germany,*
[2] *Zentrum für Astronomie und Astrophysik, TU Berlin, Hardenbergstraße 36, 10623 Berlin, Germany*

The increase of computer power and the growing knowledge about dust and gas species in different astrophysical environments during the last decade allows the consideration of more complicated opacity models in a variety of hydrodynamical calculations. Unfortunately, there is a lack of studies which focus on calculations of the opacity due to both dust grains and gas species for temperatures between few and few thousands K, typical for protoplanetary disks, based on the best estimates on the dust composition and recent improvements in molecular line lists.

Our aim is to introduce such a model based on the unification of dust– and gas–dominated opacities. We show that the higher values of the Rosseland mean opacity, provided by this model, cause a hotter disk structure and a more extended, less dense and flared atmosphere. Evidently, the opacity model will affect the evolution of such disks dramatically.