
Constraining the dust physics in the innermost regions of protoplanetary disks: a radiative transfer modelling approach to large VLTI interferometric surveys

Mathis Houllé¹, Karine Perraut¹, Lucas Labadie², Jonas von Cappel², Jean-Philippe Berger¹,
Antonia Drescher¹, Evelyne Alecian¹

¹ *Univ. Grenoble Alpes, CNRS, IPAG, Grenoble, France*

² *I. Physikalisches Institut, University of Cologne, Germany*

The innermost regions (< 1 au) of protoplanetary disks are sites of complex processes and peak dust densities, where rocky planets such as those detected via transits are formed. Stellar irradiation is intense enough to sublimate dust grains, creating an inner rim identified by hot dust emission at temperatures of 1000-1500 K, clearly detected in the near-infrared. Due to the tiny angular scales involved (< 10 milliarcseconds), only optical long-baseline interferometry has been able to resolve these regions. Large surveys with PIONIER and GRAVITY at the VLTI have provided measurements of inner rim radii, widths, and fluxes, as well as constraints on azimuthal asymmetries on a hundred of Herbig and/or T Tauri stars. In order to link these measurements to the physical nature of the dust, we are currently creating a grid of self-consistent disk models on a range of stellar luminosities, dust sizes and dust compositions with the radiative transfer code MCMax, which iteratively applies dust sublimation to compute the disk density and temperature. We will present comparisons of predictions from these models with measurements from large interferometric surveys, and discuss the constraints it provides on the dust morphology and chemistry. We will also discuss the amount of asymmetry caused by pure disk inclination effects predicted by the models, which hints at whether or not dusty local structures such as vortices have to be invoked to explain asymmetries detected by interferometry.
