Contribution ID: **60** Type: **Poster**

Constraining dust parameters through observations of eccentric debris disks

Monday, 11 June 2018 17:13 (1 minute)

Debris disks contain very fine dust but the lifetime of these dust grains is much shorter than the stellar age. It implies that these dust grains are not primordial and must be replenished continuously through mutual collisions of dust-producing planetesimals.

We investigated the impact of mutual collisions on the observational appearance of eccentric debris disks. For this purpose we simulated the collisional evolution of selected debris disks configurations and derived observable quantities. The impact of the eccentricity, the level of the dynamical excitation of the eccentricities, and the material strength are discussed with respect to the grain size distribution, the spectral energy distribution, and spatially resolved images of debris disks systems.

The most recognizable features in different collisional evolutions are as follows: First, both the increase of the dynamical excitation in the eccentric belt of the debris disk system and the decrease of the material strength of dust particles result in a higher production rate of smaller particles. This reduces the surface brightness differences between the periastron and the apastron sides of the disks. For very low material strengths, the "pericenter glow" phenomenon is reduced and eventually even replaced by the opposite effect, the "apocenter glow". In contrast, higher material strengths and a decrease of the dynamical excitation level result in an increase of asymmetries in the surface brightness distribution. Second, it is possible to constrain the level of collisional activity from the appearance of the disk, e.g., the wavelength-dependent apocenter-to-pericenter flux ratio. Within the considered parameter space, the impact of the material strength on the appearance of the disk is stronger than that of the dynamical excitation level in the belt eccentricity.

Consider for a poster?

Yes

Primary authors: Mr KIM, Minjae (ITAP, Kiel Univ.); WOLF, Sebastian (Kiel University); Dr LÖHNE, Torsten (AIU, University of Jena); KIRCHSCHLAGER, Florian (UCL London); Prof. KRIVOV, Alexander (AIU, University of Jena)

Presenter: Mr KIM, Minjae (ITAP, Kiel Univ.)

Session Classification: Poster Presentations

Track Classification: Dust in planet-forming disks