Contributed Talk

Splinter Exoplanets

Constraints on the structure of hot exozodiacal dust belts and their observability in the MIR

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Hot exozodiacal dust emission was detected around several main sequence stars at distances of less than 1 au using NIR and MIR interferometry. Studies of exozodis offer a way to better understand the inner regions of extrasolar planetary systems, and the possible presence of small grains in exozodiacal clouds is a potential problem for the detection of terrestrial planets in the habitable zone of these systems.

We modelled the observed excess of nine of these systems and found that grains have to be sufficiently absorbing to be consistent with the observed excess, while dielectric grains with pure silicate compositions fail to reproduce the observations. The dust should be located within $\sim 0.01 - 1$ au from the star depending on its luminosity. Furthermore, we found a significant trend for the disc radius to increase with the stellar luminosity. The dust grains are determined to be below $0.2 - 0.5\,\mu$m, but above $0.02 - 0.15\,\mu$m in radius. The dust masses amount to $(0.2 - 3.5) \times 10^{-9}\,\mathrm{M}_\oplus$. The near-infrared excess is probably dominated by thermal reemission.

In addition, we assessed the feasibility of observation and characterization of exozodis with the upcoming MIR instrument MATISSE at the Very Large Telescope Interferometer (VLTI). We find that MATISSE is potentially able to detect dust emission in five of the nine systems and will allow one to constrain the dust location in three of these systems, in particular to determine whether the dust piles up at the sublimation radius or is located at radii up to 1 au.