Geophysical Research Abstracts
Vol. 20, EGU2018-9533-1, 2018
EGU General Assembly 2018

Temperature and thermal emission of cosmic dust in the vicinity of the Sun, Vega and Fomalhaut

Margaretha Myrvang, Carsten Baumann, Ingrid Mann, and Johann Stamm
UiT, The Arctic University of Norway, Faculty of Science and Technology, Institute of Physics and Technology, Norway

Many stars are known to have debris disks, which are created through collisions between planetesimals, comparable to comets and asteroids in our solar system. The cosmic dust is distributed throughout these disks and in certain systems some of the dust is also observed in the close vicinity of stars, including the Sun. Observations of dust near the Sun will also be done with the ESA mission Solar Orbiter. Cosmic dust around a star absorbs electromagnetic radiation and re-radiates at a longer wavelength, determined by its temperature. In this work, model calculations of the temperature and thermal emission of cosmic dust around the Sun, Vega and Fomalhaut are presented. By using absorption efficiencies based on Mie scattering, we calculated the dust temperatures. It was assumed that the dust is in thermal equilibrium, meaning that the absorbed energy is equal to the emitted energy and the temperature of the dust remains constant. The temperature was calculated for dust with assumed composition of amorphous carbon, astronomical silicate, organic refractory, ice or a mixed iron/magnesium oxide. This has been done for dust with sizes in the range of 5 nm to 20 μm. Initially, it was assumed that the dust resides in a narrow ring from 0.18 to 0.2 AU around the star, a constraint set by (Su. et al. 2013) and that the dust consist of a mixed iron/magnesium oxide. The computed thermal emission of the dust depends on the temperature of the dust, the size distribution and the total emission cross-section of the dust. Based on this, we provide a spectral energy distribution (SED) for the hot dust as in (Su. et al. 2013). The variation of the SED with dust material and distance from the star will be studied.

References:
Kate Y. L. Su et. al (2013): Asteroid belts in debris disk twins: Vega and Fomalhaut. The astrophysical journal, 763:118.