

FIR and Submm Optical Properties of Astrophysically Relevant Minerals

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Cosmic dust being ubiquitous, the knowledge of the optical properties of dust analogues is a prerequisite for the interpretation of observations of astrophysical environments. Motivated by data from infrared spatial missions, a lot of theoretical and experimental studies have focused in the mid-infrared (MIR) domain in which the optical constants of astrophysically relevant materials are well constrained, enabling astronomers to identify the different dust components, to study their evolution and their coupling with the environment, and eventually to interpret the observations.

In contrast, the far-infrared and submillimeter (FIR/submm) domain, where cold submicronic dust grains emit, has less been studied. FIR/mm observations of dust emission are used to trace dense matter within the Galaxy, from diffuse clouds to pre-stellar cores, and to trace cold matter within distant galaxies. Understanding the nature of the FIR-mm dust emission is therefore critical for studies of star formation, of the interstellar medium evolution and of nearby galaxies, but also for the subtraction of the foreground 'contamination' by dust and gas in the interpretation of the extragalactic and cosmological data. The Herschel and Planck space missions have opened up the FIR/submm range to detailed studies and have furnished abundant data whose detailed interpretation requires reliable FIR/submm optical constants of dust.

In this talk I will review the experimental and theoretical work aimed at deriving the optical properties of analogues of interstellar dust in the FIR/submm range and discuss the various sets of experimental data and modeling tools available for interpreting astronomical observations.