

**Mid-Infrared Extinction and Far Infrared  
Emission: Evidence for a Population of Large, Micrometer-  
Sized Dust in the Interstellar Medium**

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Interstellar grains span a wide range of sizes from a few angstroms to a few micrometers. The ultraviolet/optical extinction constrains the dust in the size range of a couple hundredth micrometers to several sub-micrometers. The near- and mid-infrared emission including the IRAS and COBE-DIRBE broadband photometry and the PAH emission spectroscopy constrains the nanometer-sized grains and angstrom-sized large molecules. However, the quantity and the size distribution of the micrometer-sized dust remain unknown as it is gray in the ultraviolet/optical extinction and it is too cold to be detected by IRAS or Spitzer/MIPS. In this talk we argue that the  $\sim 3\text{-}8$  micrometer mid-infrared extinction which is flat in various regions including the Galactic plane, the Galactic center and the Large Magellanic Cloud is a powerful tool for constraining the quantity, size, and composition of the micrometer-sized dust component. The cold thermal emission from this dust component will also be discussed and compared with Herschel observations.