

Dust in Molecular Clouds and the 3D Model of Interstellar Medium

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We use the Hi-GAL (the Herschel infrared Galactic Plane Survey) data to derive the 2D temperature map of the $l = 30^\circ$ field by fitting spectral energy distribution (SED) of dust far infrared continuum. This temperature map indicates the dust absorption of FUV photons. Based on the temperature map, the distribution of molecular clouds derived from GRS data, and the properties of H II regions in the $l = 30^\circ$ field, we construct the 3D model of ISM to calculate the absorption of dust grains associated with molecular clouds. The absorption calculated by 3D model is then projected to the Galactic Plane to derive a 2D simulated absorption map. The 2D absorption map varies with the 3D distribution of ISM density. We compare the simulated map with the one derived by SED fitting, to find a best-fit 3D distribution of ISM density. In the fitting process, Monte Carlo method is applied. We find that the dust associated with molecular clouds can provide about 60% absorption in the $l = 30^\circ$ field, indicating that 40% dust grains are not in molecular clouds.