# Interstellar Dust Properties Revealed by Diffuse Galactic Light Measurements

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In this presentation, we constrain interstellar dust properties by observing diffuse Galactic light (DGL). The DGL consists of scattered light and thermal emission from interstellar dust grains illuminated by the interstellar radiation field. Therefore, the DGL measurement is useful in constraining some properties of interstellar dust, such as size distribution, albedo, and scattering asymmetry of dust grains.

In the diffuse interstellar medium, the DGL observation has been limited due to its faintness, particularly in the near-infrared wavelengths. We thus reanalyze all-sky maps obtained from Diffuse Infrared Background Experiment (DIRBE) onboard the Cosmic Background Explorer (COBE) satellite in the four near-infrared bands (1.25, 2.2, 3.5, and 4.9 micron). As a result, we succeed in detecting the near-infrared DGL as a component that linearly correlates with interstellar 100 micron emission.

At 1.25 and 2.2 micron, our results are marginally consistent with the expected spectrum of scattered light assuming a recent interstellar dust model. At 3.5 and 4.9 micron, thermal emission from stochastic heating of very small grains and fluorescence of polycyclic aromatic hydrocarbon (PAH) dominate the DGL. Compared with a recent thermal emission model in the diffuse interstellar medium, we constrain the mass fraction of very small grains and PAH to the total dust to be more than 2%.

We also find that the intensity ratios of DGL to 100 micron emission are higher toward low Galactic latitudes at 1.25 and 2.2 micron. Since this trend is expected from forward scattering characteristic of dust grains, we compare the obtained latitude dependence with the scattered light model that takes into account the scattering asymmetry. The derived forward scattering characteristic is stronger than that expected from the recent dust model. This may indicate that size or shape of the interstellar dust grain is different from the model prediction.

## References

[1] Sano et al. 2015, ApJ, 811, 77
[2] Sano et al. 2016, ApJ, 818, 72
[3] Sano et al. 2016, ApJL, 821, L11