[구IM-05] Modeling Polarized Dust Emission from Aligned Grains by Radiative Torques

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We model the polarized dust emission from aligned grains by radiative torques in molecular clouds. We consider various models of molecular clouds and calculate the polarization spectrum from aligned grains by both internal and external radiation fields. We show that some polarization spectrum exhibits the bump at wavelengths $\lambda < 100\mu m$, which can be explained due to the polarized emission from a population of small grains aligned by internal radiation fields. Our polarization spectra can explain the anomalous spectra observed by Hildebrand et al, with the rising polarization toward short wavelengths.

[구IM-06] Pixel Intensity Histogram Method for Unresolved Stars: Case of the Arches Cluster

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The Arches cluster is a young (2-4 Myr), compact (~1 pc), and massive ($\sim 2\times10^4$ $M_\odot$) star cluster located ~30 pc away from the Galactic center (GC) in projection. Being exposed to the extreme environment of the GC such as elevated temperature and turbulent velocities in the molecular clouds, strong magnetic fields, and larger tidal forces, the Arches cluster is an excellent target for understanding the effects of star-forming environment on the initial mass function (IMF) of the star cluster. However, resolving stars fainter than ~1 $M_\odot$ in the Arches cluster partially will have to wait until an extremely large telescope with adaptive optics in the infrared is available. Here we devise a new method to estimate the shape of the low-end mass function where the individual stars are not resolved, and apply it to the Arches cluster. This method involves histograms of pixel intensities in the observed images. We find that the initial mass function of the Arches cluster should not be too different from that for the Galactic disk such as the Kroupa IMF.