AKARI observations of asteroidal dust

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The zodiacal emission is the thermal emission from the interplanetary dust and the dominant diffuse radiation in the mid- to far-infrared wavelength region. From the results of the Infrared Astronomical Satellite (IRAS) observations, it was found that there are many small-scale structures in the zodiacal emission distribution, such as dust band pairs at the ecliptic latitudes of +/-1.4 and +/-2.1 degrees (the inner band) and +/-9.3 degreed (the outer band). It is suggested that recent disruption events among multikilometer bodies in the main asteroid belt within the last several million years are major supply sources of the dust particles in the dust bands, and they produce a edge-brightened toroidal distributions of dust. We conducted observations of the asteroidal dust bands with the Japanese infrared satellite AKARI in mid- and far-infrared wavelengths region. AKARI clearly detects the zodiacal dust-band structures. We derived the heliocentric distances of dust bands from the AKARI observations: 1.9 AU and 2.2 AU from the Sun for the inner and the outer bands, respectively. Based on the AKARI spectroscopic observations in mid-infrared, the dust particles in the outer band show a slight different spectral shape of the silicate feature from those of other regions which are thought to be cometary origins. It is highly probable that we obtain the mid-infrared spectra of micron-sized asterodial dust grains for the outer band regions. We will discuss the size distribution and silicate composition for the dust grains in outer bands.

Keywords: zodiacal light, silicate, asteroids

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