AKARI mid-infrared all-sky survey: development of the new inter-planetary dust (IPD) map and the world-first all-sky PAH map

Daisuke Ishihara (Nagoya University), Hidehiro Kaneda (Nagoya University), Toru Kondo (Nagoya University), Tomoya Amatsutsu (Navoya University), Keiichiro Nakamichi (Nagoya University), Mitsuyoshi Yamagishi (Nagoya University), Shinki Oyabu (Nagoya University), Takafumi Ootsubo (Tohoku University), and Takashi Onaka (University of Tokyo)

We are constructing accurately calibrated 9 μm and 18 μm all-sky diffuse maps from the AKARI mid-infrared all-sky survey data.

These two maps are heavily affected by the foreground emission of the Zodiacal light, which shows an intensity peak at around these wavelengths. We carefully separate the Zodiacal emission component from the maps using the Kelsall's model. Through improvements of parameters in the Zodiacal light emission model, we obtained new insight on the structure and composition of the interplanetary dust (IPD) in our Solar system.

The Zodiacal light removed AKARI 9 μm map is the world-first all-sky PAH map. The 9 μm band map efficiently traces the emission features of Galactic polycyclic aromatic hydrocarbons (PAHs) at wavelengths of 6.2, 7.7, 8.6, and 11.3 μm. On a global scale, PAHs show good spatial correlation with tracers of general ISM, such as CO, HI, and far-IR dust emissions. On a local scale, we recognize the variation of physical state and compositions of hydrocarbons reflecting the variation of the local physical environment. As will be shown by the talks by Kondo et al. and Kaneda et al., this PAH map will be effectively used in diagnoses of various interstellar phenomena.