Session:	**[B4A-2] S2 : Interstellar Matter, Star Formation and the Milky Way**
Date:	August 21, 2014 (Thursday)
Time:	11:00~12:30
Room:	Room B (Room 103)
Chair:	Jeong-Eun Lee (Kyung Hee University)

[B4A-2-1] **11:00~11:20**

[Invited] Organic Dust in the Interstellar Medium

Sun Kwok (The University of Hong Kong, Hong Kong, China)

Tradition view of dust in the interstellar medium is that they are made of graphite and silicates. In this talk, we discuss the evidence for complex organics being a major component of interstellar dust. Comparison between astronomical infrared spectra and laboratory spectra of amorphous carbonaceous materials suggests that organics of mixed aromatic-aliphatic structures are widely present in circumstellar, interstellar, and galactic environments. Scenarios for the synthesis of these compounds in the late stages of stellar evolution will be presented. We will also explore the relationship between interstellar organic dust and complex organics found in the Solar System.

[B4A-2-2] **11:20~11:40**

[Invited] Infrared Properties of Interstellar Dust Grains

Hidehiro Kaneda (Nagoya University, Japan), Daisuke Ishihara, Toru Kondo, Shinki Oyabu, Rika Yamada, Mitsuyoshi Yamagishi, Takashi Onaka, and Toyoaki Suzuki

In star-forming regions, dust and polycyclic aromatic hydrocarbons (PAHs) absorb a significant fraction of stellar ultraviolet (UV) photons and re-radiate them in the infrared (IR). Hence the IR luminosities due to dust and PAH emission are both powerful tools to trace star-forming activities in galaxies. However they are not merely tracers of star-formation activity. Spectral information on the dust and PAH emission would have much deeper physical implications for understanding the properties of the ISM. In this context, our Galaxy provides ideal laboratories for detailed studies of dust in particular conditions, while nearby galaxies provide us with a much wider range of the ISM physical conditions than our Galaxy.

With AKARI, we have performed a systematic study of interstellar dust grains in various environments of our Galaxy and nearby galaxies. Because of its unique capabilities, such as near- and far-IR spectroscopy combined with all-sky coverage in the mid- and far-IR, AKARI has provided new knowledge on the processing of dust, particularly carbonaceous grains including PAHs, in the interstellar space. The AKARI mid-IR all-sky diffuse map for the first time reveals that PAHs are widely and almost ubiquitously distributed along the Galactic plane. Near the Galactic center, we find a dust feature likely due to large graphite grains in the AKARI far-IR spectra taken from a cloud located near Sgr A*, which may indicate the past activity of the Galactic center.

For nearby galaxies, we find that copious amounts of large grains and PAHs are flowing out of starburst galaxies by galactic superwinds, which are being shattered and destroyed in galactic haloes. AKARI near-IR spectroscopy has revealed spatial variations in the ratio of the aromatic to the aliphatic hydrocarbon spectral feature in galaxies, indicating structural changes of carbonaceous grains possibly due to large-scale shocks. AKARI also detects near-IR absorption features due to interstellar icy grains from many nearby galaxies, providing unique tools to probe the chemical evolution of the ISM.

In this talk, we review the results obtained from our AKARI observations on the processing of interstellar dust grains in various harsh environments of our Galaxy and nearby galaxies, together with some results from Spitzer and Herschel observations. We also refer to our future prospect for this topic with SPICA, which is scheduled to be launched in the mid 2020's.

[B4A-2-3] **11:40~12:00**

[Invited] Microwave Emission from Spinning Dust: An Improved Model and Polarization Spectrum

Thiem Hoang (Ruhr University Bochum, Germany)

Planck results have reinforced that the electric dipole emission from rapidly spinning polycyclic aromatic hydrocarbons (PAHs) is a reliable explanation for the anomalous microwave emission that interferes with cosmic microwave background (CMB) radiation experiments. The emerging question is to what extent this emission component contaminates to the polarized CMB radiation. I will first present an improved model of spinning dust emission, which considers realistic dynamics of wobbling non-spherical grains and their impulsive interactions with ions in the ambient plasma. I will then discuss recent progress in predicting the alignment of small grains and present theoretically expected degree of polarization of spinning dust emission. Finally, I will present new constraints on the degree of polarization of spinning dust emission and polarization spectrum, which are obtained using inversion technique combined with theoretical calculations. The new results would be useful for interpreting incoming CMB polarization data from Planck and numerous CMB missions in the microwave frequency range.

[B4A-2-4] **12:00~12:15**

Mapping the 3D Multi-Band Extinction and Diffuse Interstellar Bands in the Milky Way with LAMOST

Haibo Yuan (Peking University, China), Xiaowei Liu, Maosheng Xiang, Yang Huang, and Bingqiu Chen

Constructing a 3D Galactic extinction map plays an essential role in Galactic astronomy, particularly in achieving the driving goals of the LAMOST Galactic Surveys. The nature and origins of diffuse interstellar bands (DIBs) are one of the most challenging problems in astronomical spectroscopy. With the modern large scale spectroscopic surveys, such as SDSS andLAMOST, Galactic astronomy is entering into an era of millions of stellar spectra. Taking advantage of such huge spectral database, we proposed
a) Using the "standard pair" technique to measure extinction (accurate to 0.01-0.03 mag) of a large sample of individual stars (Yuan, Liu & Xiang 2013) and b) Using the "template subtraction" technique to detect and measure DIBs in the SDSS and LAMOST low-resolution spectra (Yuan & Liu, 2012). Both methods can apply to most stellar types and are independent on the systematic errors of stellar parameters. In this contribution, we will report the results on mapping the 3D Galactic extinction maps, extinction law from Far-UV to mid-IR and its variations, and DIBs with about one million LAMOST spectra.

Poster Session **12:15~12:30**

Chair: **Jeong-Eun Lee** (Kyung Hee University)