The Interstellar Dust Properties of Nearby Galaxies and the Contributions of *AKARI* to this Field

Frédéric Galliano[1,2]

[1]*IRFU, CEA, Université Paris-Saclay, F-91191 Gif-sur-Yvette, France*
[2]*Université Paris-Diderot, AIM, Sorbonne Paris Cité, CEA, CNRS, F-91191 Gif-sur-Yvette, France*

ABSTRACT

In this very brief proceedings, I discuss the unique advantages and contributions of *AKARI* for the study of the dust properties in nearby galaxies. I refer the reader to an exhaustive review on the subject.

Keywords: ISM: dust, Magellanic clouds, nearby galaxies, methods

1. SUMMARY

Nearby galaxies provide important laboratories to study the dust properties and evolution, as they allow us to observe grains in a much wider range of physical conditions (metallicity, star formation activity, *etc.*) than in the Milky Way. The *AKARI* satellite provides important contributions to this field. The main advantages of *AKARI*, compared to the other contemporaneous infrared observatories (*Spitzer*, *Herschel*, *etc.*) are the following.

- The *AKARI* IRC spectrograph provides unique constraints on the 2–5 μm range, that was not observed with *Spitzer*. This spectral window is unique as it provides invaluable constraints on: **(1)** the 3.3 μm aromatic feature; **(2)** the 3.4 μm aliphatic feature; **(3)** several ice absorption bands, including H_2O and CO_2 (*e.g.* Shimonishi et al. 2008; Yamagishi et al. 2015); **(4)** several ionic lines, including Brα.
- The all-sky survey of *AKARI* provides good quality constraints on several important objects that were not observed with *Spitzer* (*e.g.* Ikeuchi et al. 2018).

In terms of dust properties, the 3.3 μm feature is a crucial tracer to remove the degeneracy between variation of size distribution and variation of the charge encountered when studying only the 5–20 μm range (*e.g.* Kaneda et al. 2011; Mori et al. 2012; Wu et al. 2018). The 3.3-to-3.4 μm ratio is a unique constraint on the processing of hydrocarbons (*e.g.* Yamagishi et al. 2012). The constraints on the 2–5 μm range allowed Onaka et al. (2010) to show that the near-IR excess (*e.g.* Lu et al. 2003) was not consistent with free-free continuum of Brα emission, but was possibly due to very hot dust. These studies are important preparation for the *JWST* (launch in 2019).

The review I gave during the *AKARI* 2017 conference was based on an upcoming *Annual Review* on this subject (Galliano, Galametz, & Jones 2018). These different themes are extensively developed in this review, which I refer the reader to for a comprehensive discussion.

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Corresponding author: Frédéric Galliano
frederic.galliano@cea.fr

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