

AKARI in Orbit—Scientific Potential for Understanding Galaxy Evolution

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Abstract. The AKARI (formerly known as ASTRO-F) mission is the first Japanese satellite dedicated for large area surveys in the infrared (Murakami *et al.* 2004). AKARI was launched successfully on February 22nd 2006 (JST) from JAXA's Uchinoura Space Centre, Japan. AKARI is now orbiting around the Earth in a Sun-synchronous polar orbit at the altitude of 700 km. The 68.5 cm aperture telescope and scientific instruments are cooled to 6K by liquid Helium and mechanical coolers. The expected liquid Helium holding time is now found to be at least one year after the successful aperture lid-opening on 2006 April 13th (JST). AKARI will perform the most advanced all-sky survey in 6 mid- to far-infrared wavebands since the preceding IRAS mission over 2 decades ago. Deep imaging and spectroscopic surveys near the ecliptic poles with pointed observations are also on-going in 13 wavelength bands at 2-160 μm (see Table 1, details are given in Matsuhara *et al.* 2006). AKARI is a perfect complement to Spitzer in respect of its wide sky area and wavelength coverage. Two unique aspects of the pointing deep surveys with AKARI are: many imaging bands including the wavelength gap of Spitzer (8-24 μm), and the slitless spectroscopic capability (Ohyama *et al.* in this proceeding). Not only the All-Sky Survey but also the deep pointing surveys near the ecliptic poles over $\sim 15 \text{ deg}^2$ in total will be particularly well suited to construct the luminosity functions of the infrared galaxies, to evaluate their clustering nature, and also to discover rare, exotic objects at various redshifts out to $z \sim 3$. AKARI is also capable of detecting and measuring the spectrum and the fluctuations of the cosmic infrared background. The in-orbit sensitivity and spatial resolution of the surveys are found to be sufficient to achieve the scientific goals listed above.

Keywords. space vehicles: instruments, galaxies: evolution, cosmology: observations

References

- Murakami, H., *et al.* 2004, *SPIE* 5487, 330.
Matsuhara, H. *et al.* 2006, *PASJ*, 58, 673.

Table 1. Overview of the AKARI extragalactic deep surveys

Name	Field Center (J2000)	Field Size and Shape	Imaging Bands
NEP-Deep	17h55m24.00s +66°37'32.0"	0.38 deg ² circular	13 bands in 2.4-160 μm
NEP-Wide	18h00m00.00s +66°36'00.0"	5.8 deg ² circular	13 bands in 2.4-160 μm
SEP Low-Cirrus	4h44m00.00s -53°20'00.0"	8 deg ² fan-shape	9,18,65,90,140,160 μm