



all-sky science examples with AKARI

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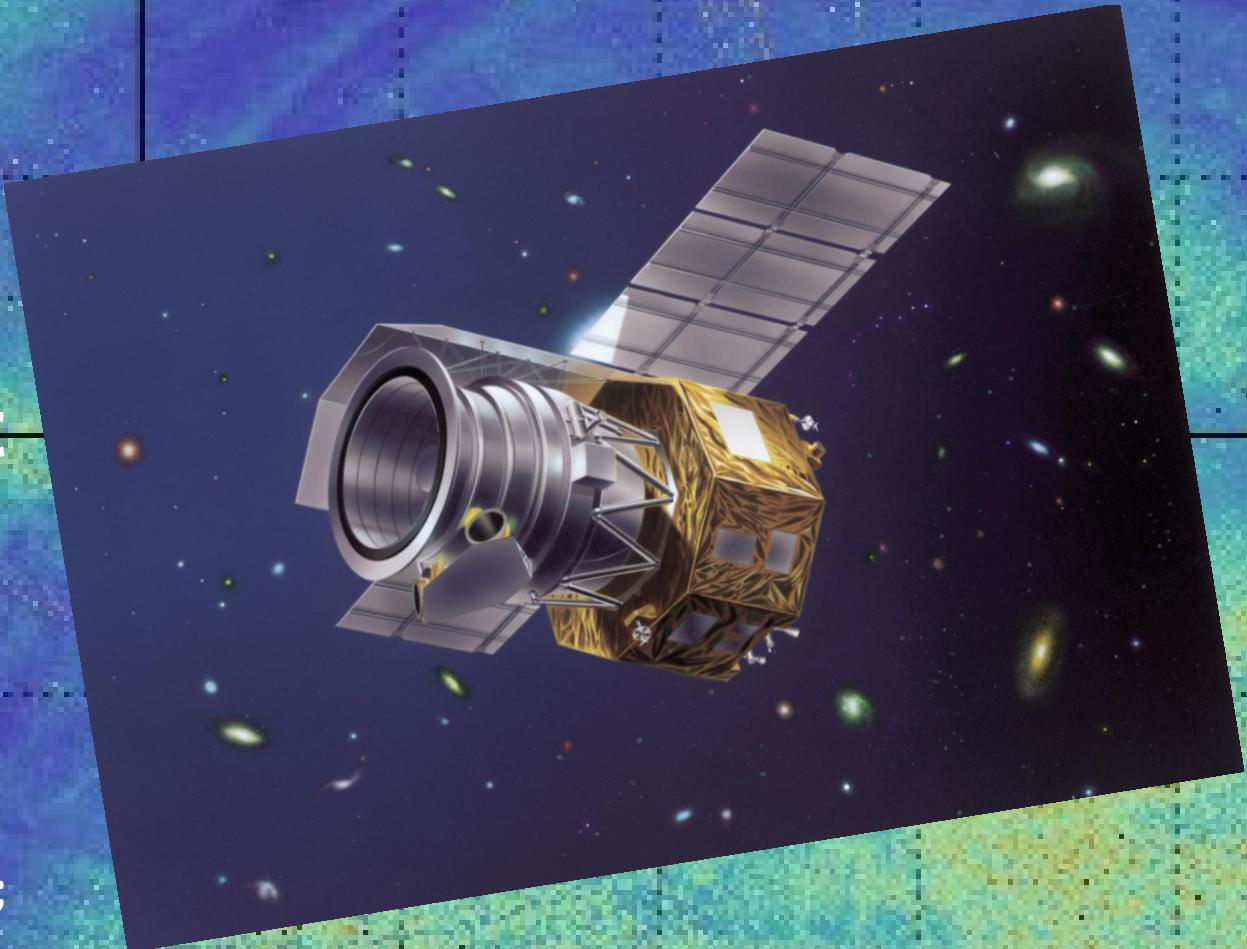
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With:

T. Onaka, Y. Doi, I. Sakon, R. Ohsawa (U.Tokyo);
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H. Kaneda, D. Ishihara, (Nagoya U.);
M. Giard, (IRAP)





What is AKARI?
(あかり)

What is AKARI? (あかり)

The screenshot shows a mobile application interface for a Japanese dictionary. At the top, there is a red header bar with the search term 'あかり' in white. Below the header, a green bar indicates '1 exact match'. The main content area displays several Japanese entries with their English definitions and some red-colored Japanese text (likely links or specific terms). Each entry includes a right-pointing arrow for more details. A green bar at the bottom indicates '6 additional results'.

- 明かり, 明り, 灯り, 灯, 灯…
light, illumination, glow, gleam, la... [>](#)
- 明かり障子 「あかりしょうじ」
paper screen door for admitting li... [>](#)
- 明かり窓, 明り窓 「あかりまど」
transom, skylight, dormer windo... [>](#)
- 明かりを消す, 灯りを消す 「あかりをす」
to turn the lights off / das Licht a... [>](#)
- 明り先, 明りさき 「あかりさき」
source of light / (f) Richtung, aus... [>](#)
- 明かり取り, 明り取り, 明…
skylight, dormer, transom, dorme... [>](#)
- 明る 「あかる」 CONJUGATED [>](#)
to become bright, t...

What is AKARI?

- A Japanese IR space telescope:
 - 2007: Launch
 - 2010: Warm mission start
 - 2015: Far IR map release (Doi+ 2015)
 - 2016: Mid IR Zodi-subtraction (Kondo+ 2016)
 - ?2017?: Mid IR map release (Ishihara+ in prep.)
- Bright example of international collaboration:
 - Japan, EU, Korea

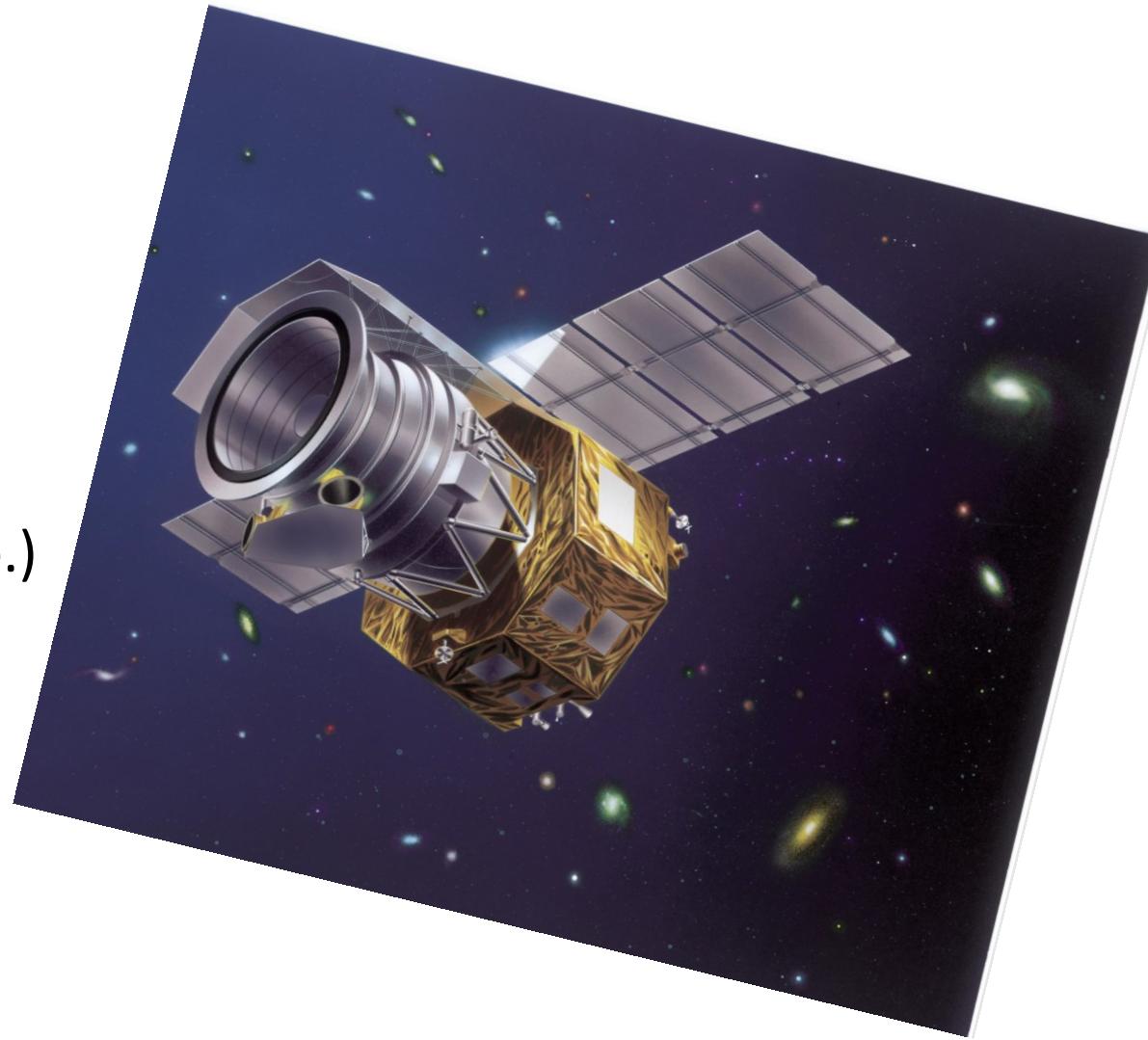


Image politely stolen from the JAXA/ISAS web page.

See http://global.jaxa.jp/press/2006/05/20060522_akari_e.html for more information.

What is AKARI?

- A Japanese IR space telescope:
 - Near IR to Far IR Coverage
 - (\sim 3 to 170 microns)
 - Near IR spectroscope
 - 70 cm aperture
 - Liquid He Cryocooled
 - Geocentric orbit

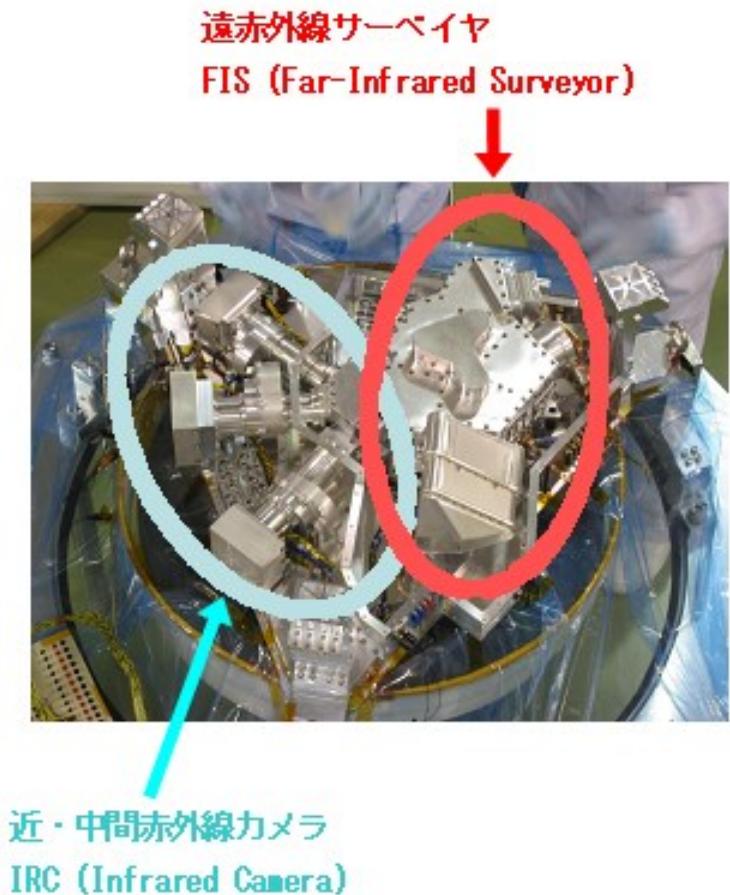


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See http://global.jaxa.jp/press/2006/05/20060522_akari_e.html for more information.

What is AKARI?

- A kind of “Super IRAS”*
- All sky IR surveys with:
 - Higher resolution:
~ 10 to 60 arcsec
 - Improved zodiacal light subtraction (Kondo+ 2016)
 - Two more bands than IRAS

*IRAS:

An IR space telescope
launched in 1983 by US, UK,
and the Netherlands

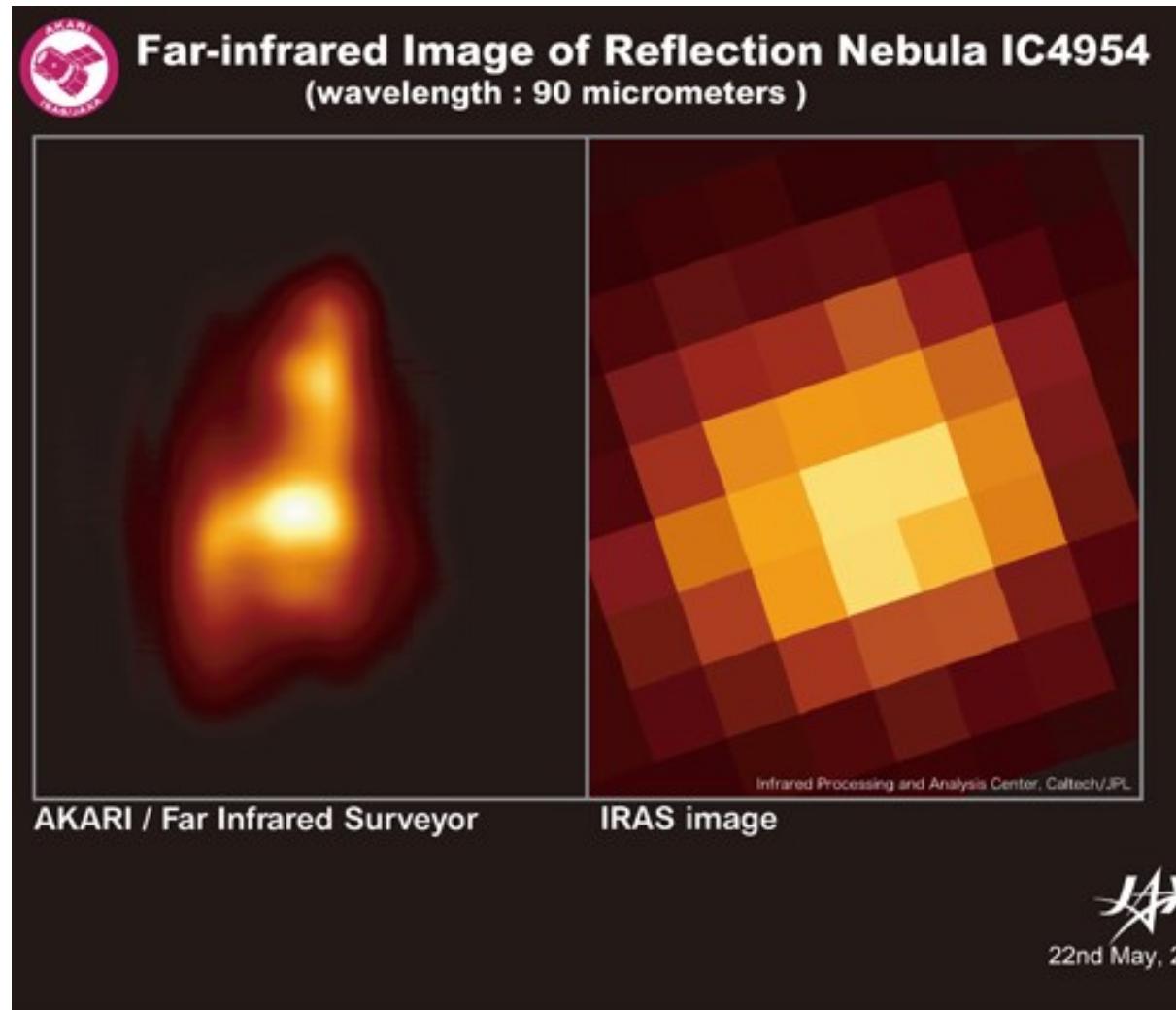
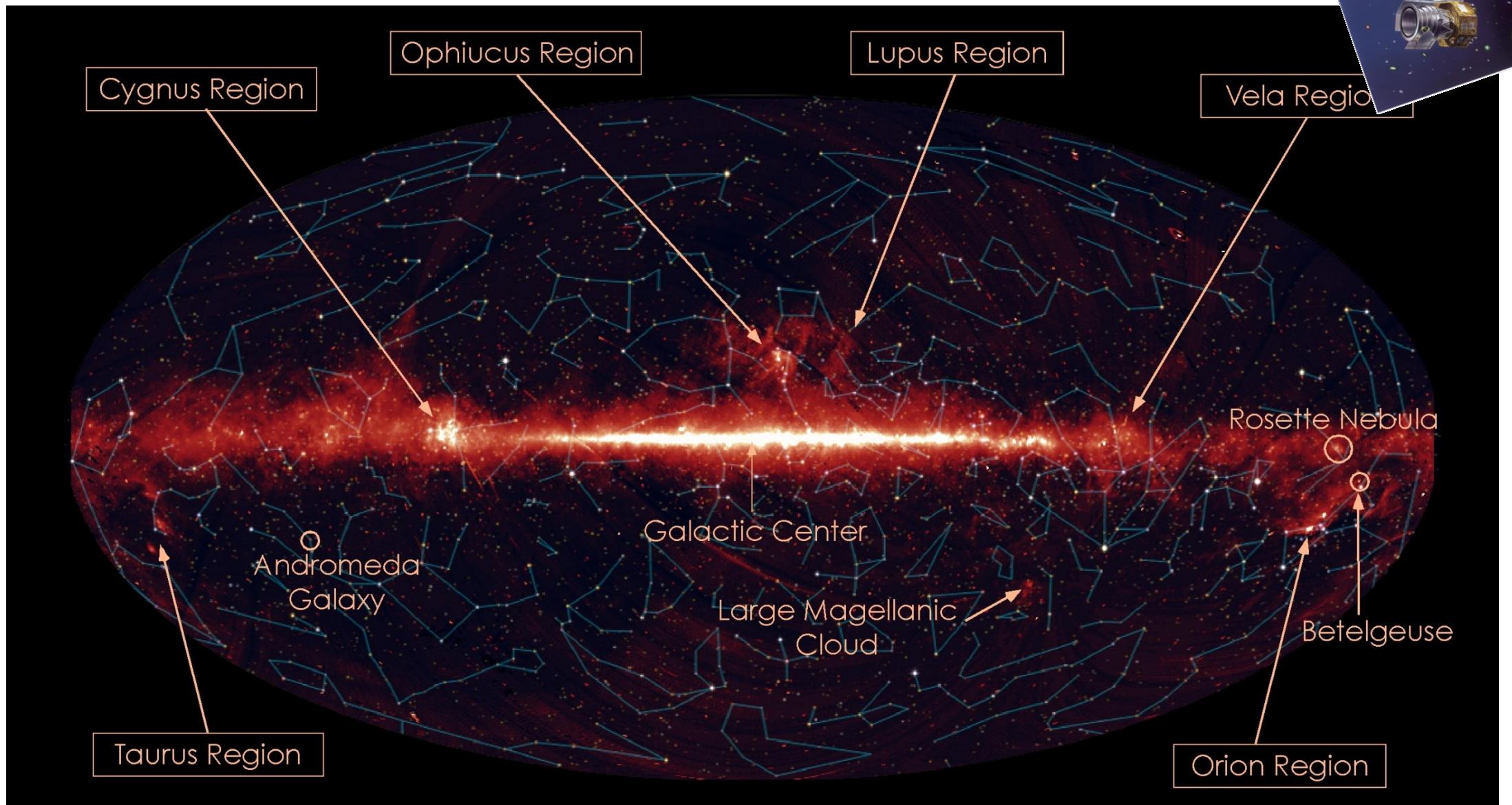


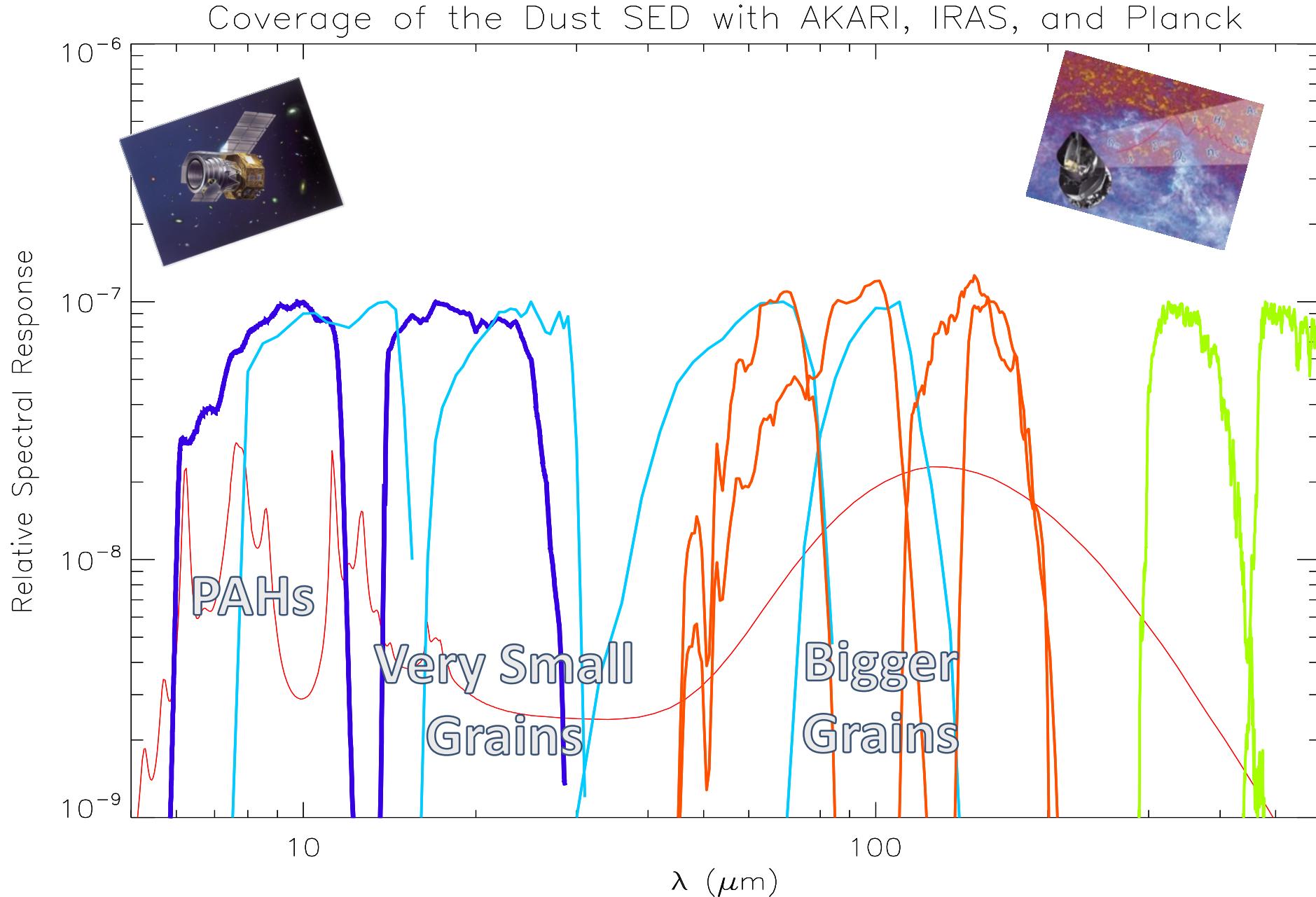
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See http://global.jaxa.jp/press/2006/05/20060522_akari_e.html for more information.

What is AKARI? All sky maps overview

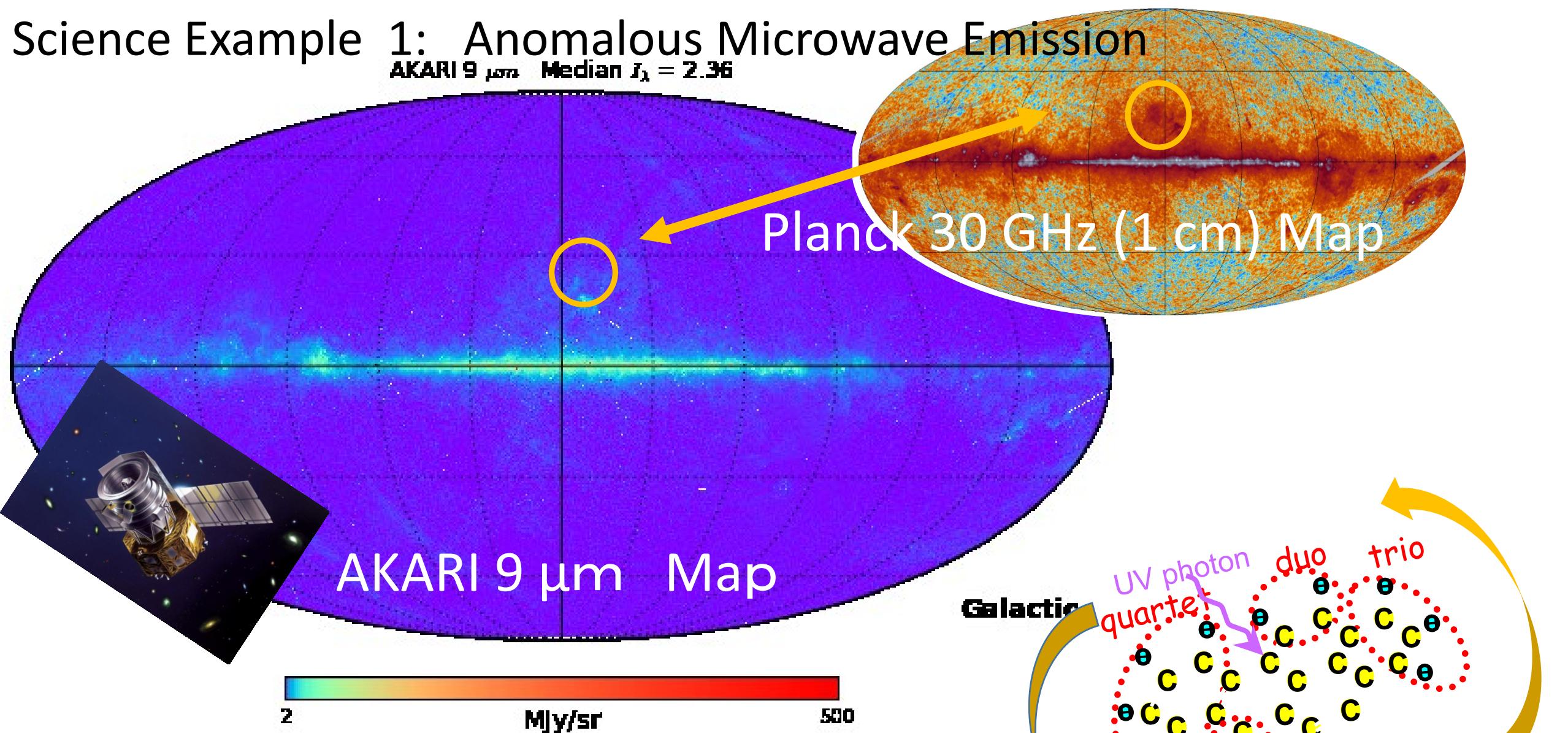


AKARI all-sky map demonstration. This map is the AKARI FIS 140 micron map: Image courtesy of JAXA/ISAS and ESA

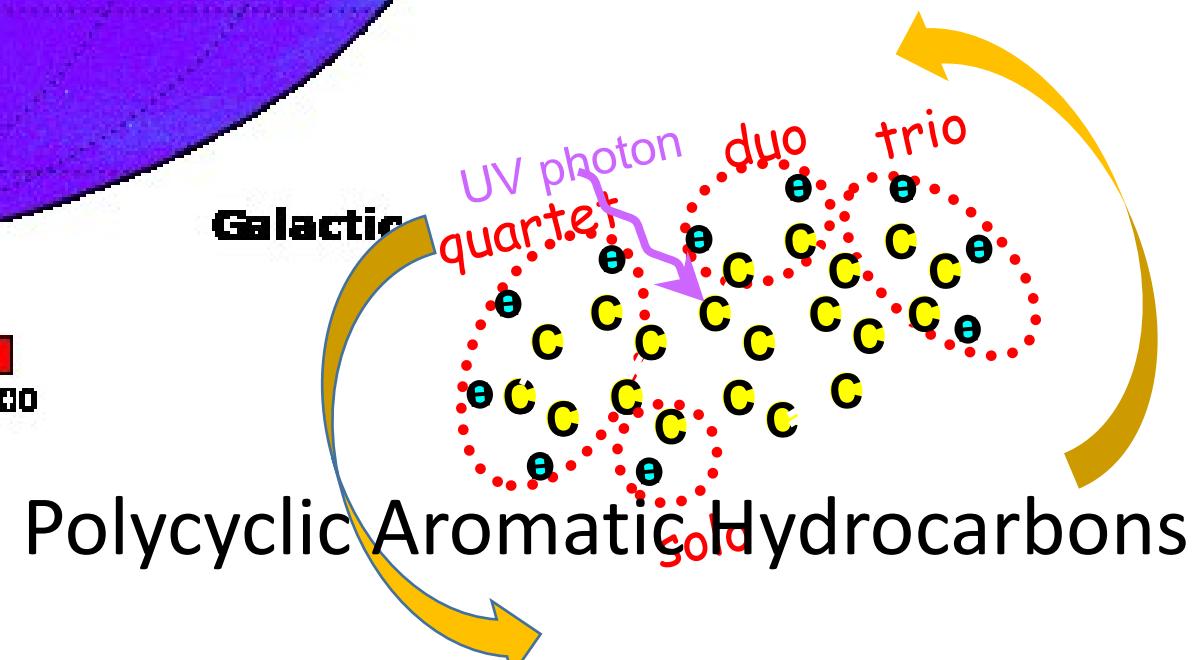


- AKARI/IRC:
9 and 18 μm
- AKARI/FIS:
65, 90, 140,
160 μm
 - Typical thermal peak
- Planck/HFI:
345 and 550 μm
 - Constrains the FIR
- Dust SED:
DustEM,
Compiegne+11

Science Example 1: Anomalous Microwave Emission

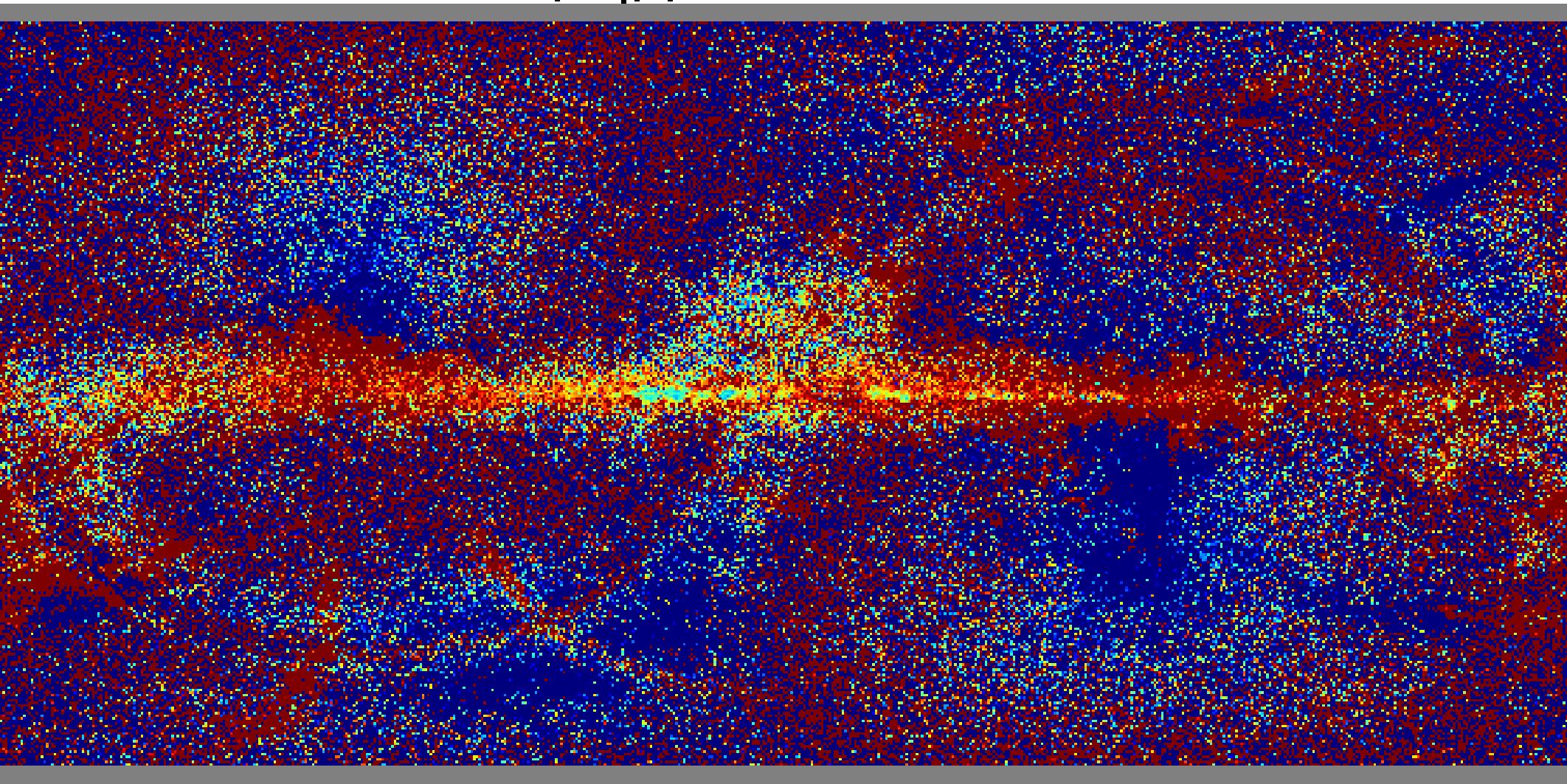


- AKARI all-sky map by Ishihara+ (in prep.)
- Zodi-subtraction by Kondo+ (2016)
- 30 GHz map from Planck Collaboration
- PAH Diagram courtesy of I. Sakon.

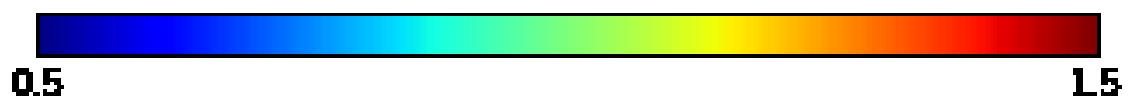


Science Example 2: All-sky variations of PAH ionization

$I(9\mu m)/I(12\mu m)$; Offset-corrected

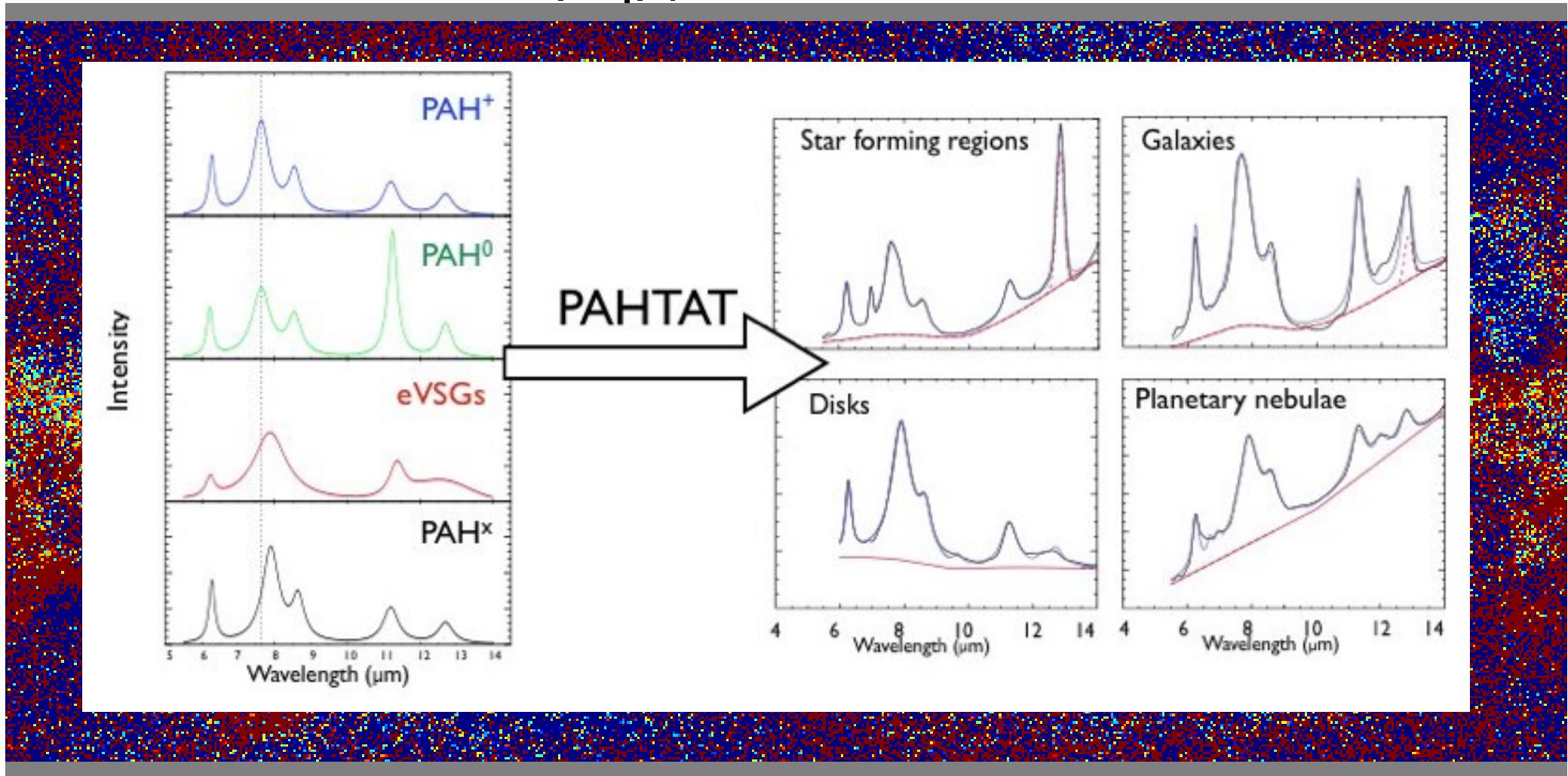


- 9:12 micron ratio map (AKARI and IRAS)



Science Example 2: All-sky variations of PAH Ionization

$I(9\mu m)/I(12\mu m)$; Offset-corrected



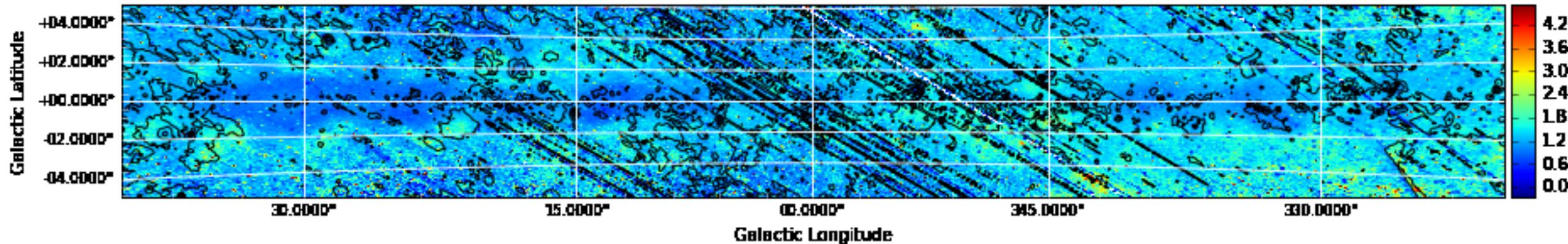
9:12 micron ratio map (AKARI and IRAS
IRAP-Toulouse PAH templates (Joblin+ 2015)

0.5

1.5

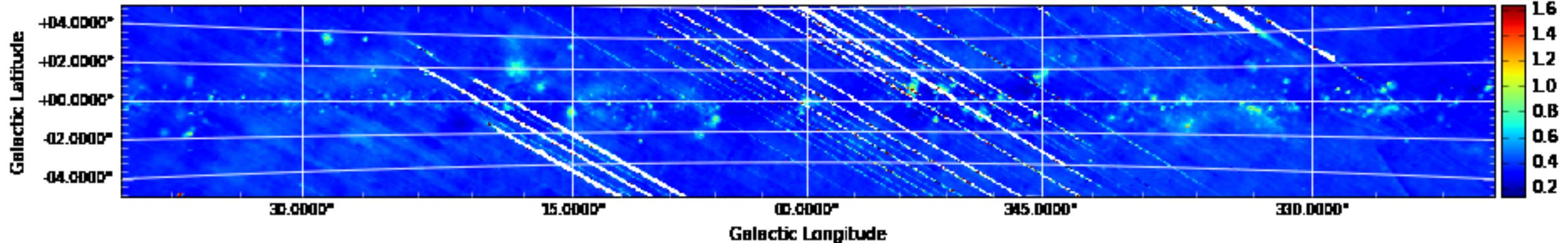
Science Example 2: All-sky variations of PAH Ionization (In the Galactic Plane)

9:12 micron ratio map:



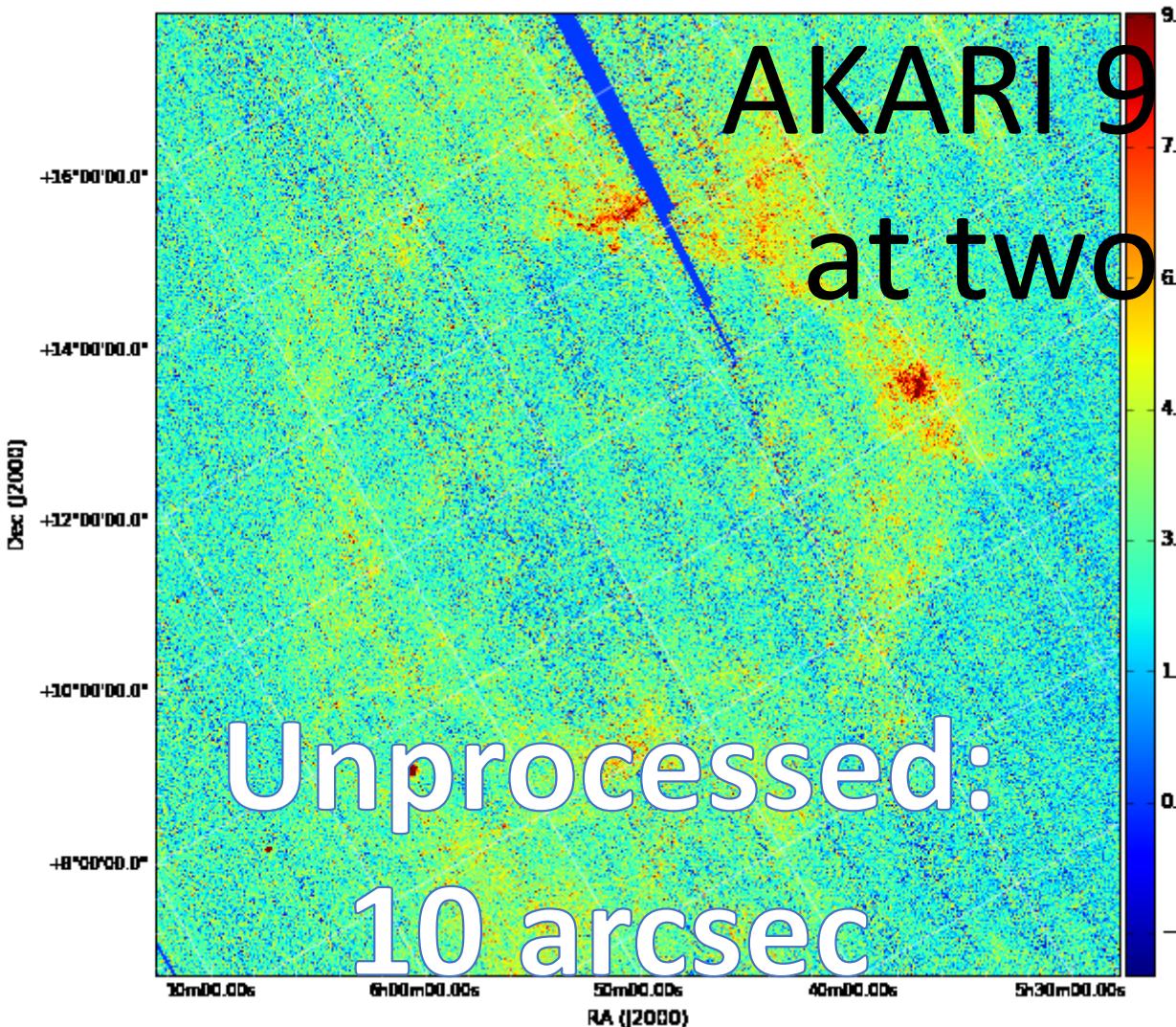
60:90 micron ratio map:

Indicating regions of stronger interstellar radiation

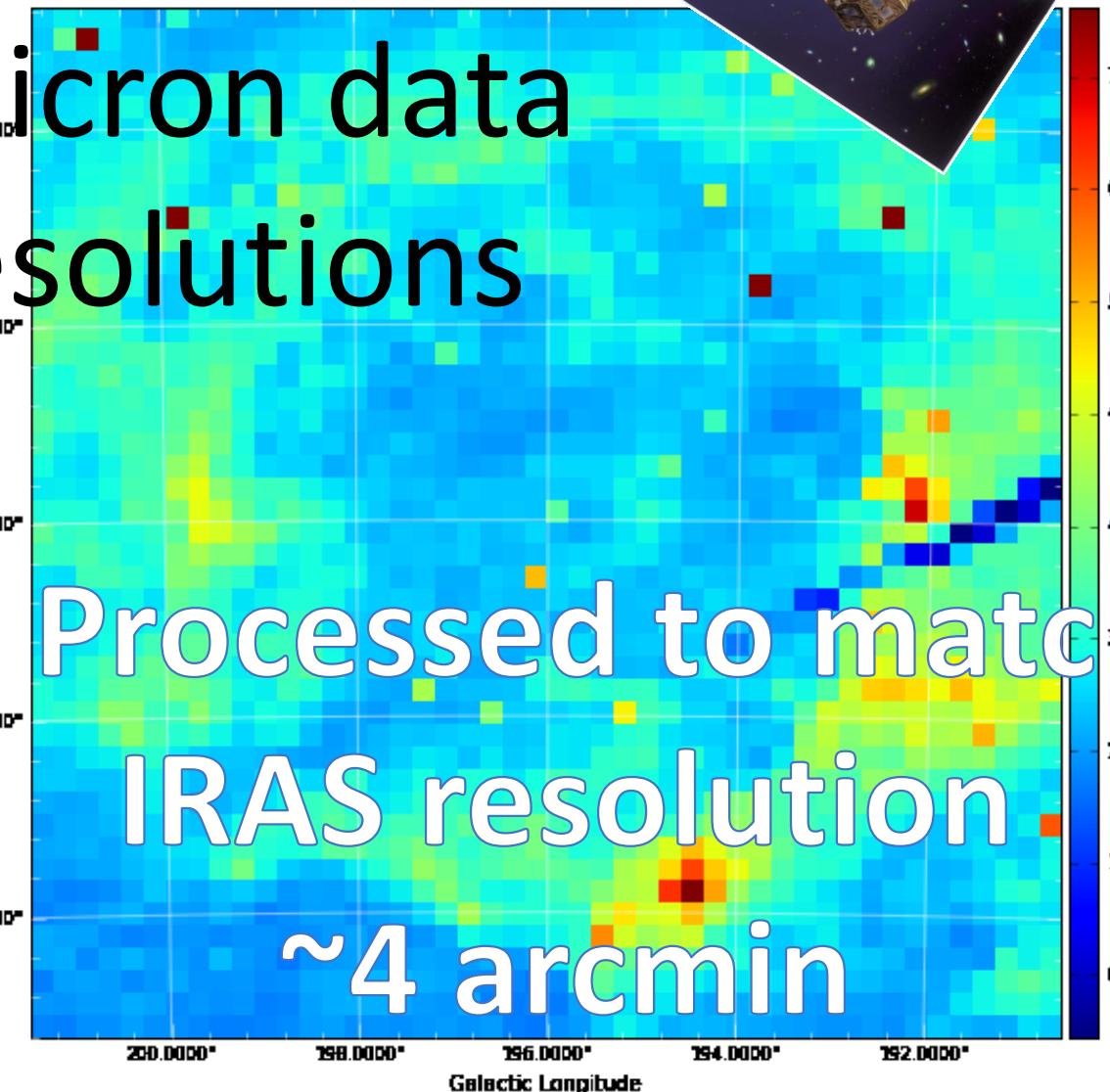


- 9:12 micron ratio map (AKARI and IRAS)
- 60:90 micron ratio map (AKARI)

Science Example 2: Dust variations in large structures unobserved by Spitzer
Lambda Orionis Molecular Ring (The Head of Orion)

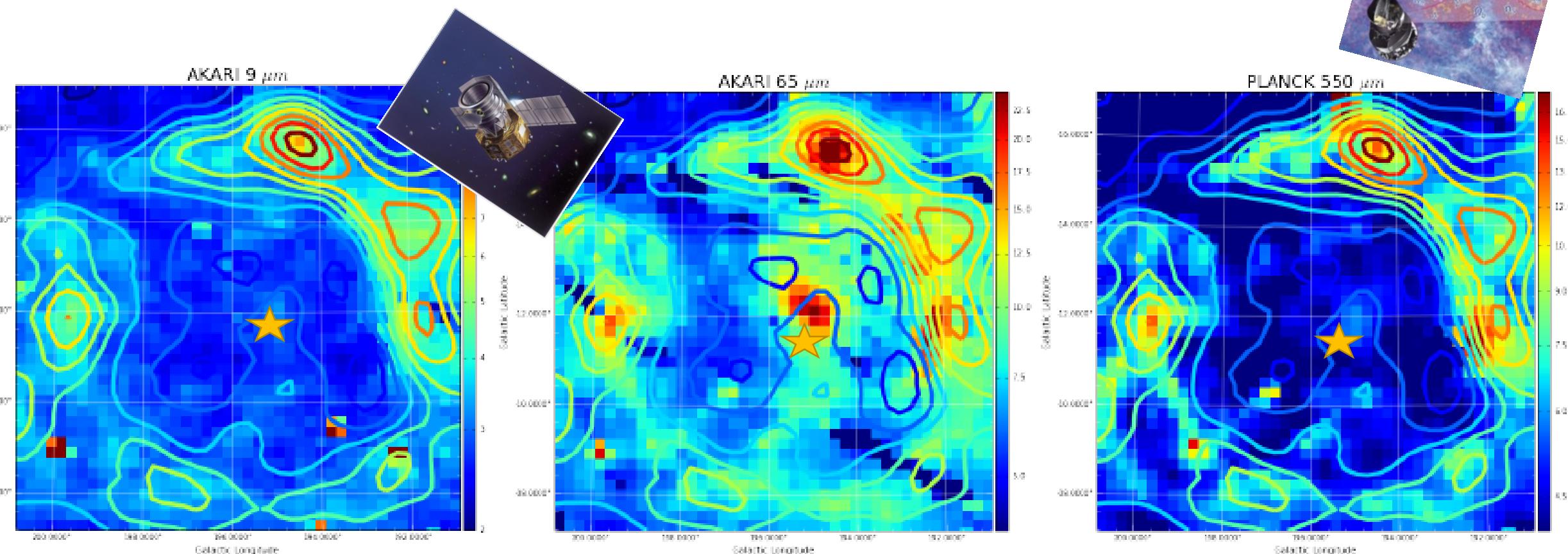


AKARI 9 micron data
at two resolutions



Science Example 2: PAH/Dust variations in large structures unobserved by Spitzer

Lambda Orionis Molecular Ring (*The Head of Orion*)



AKARI and Planck images with AME contours, all showing good structural agreement in the *Meissa ring* region, but with disagreement within the HII region around λ Orionis.

Science Example 2: Dust variations in large structures unobserved by Spitzer

Perseus Molecular Cloud Complex: Exploring PAH emission in and around molecular cores



Blue:

AKARI 9 um

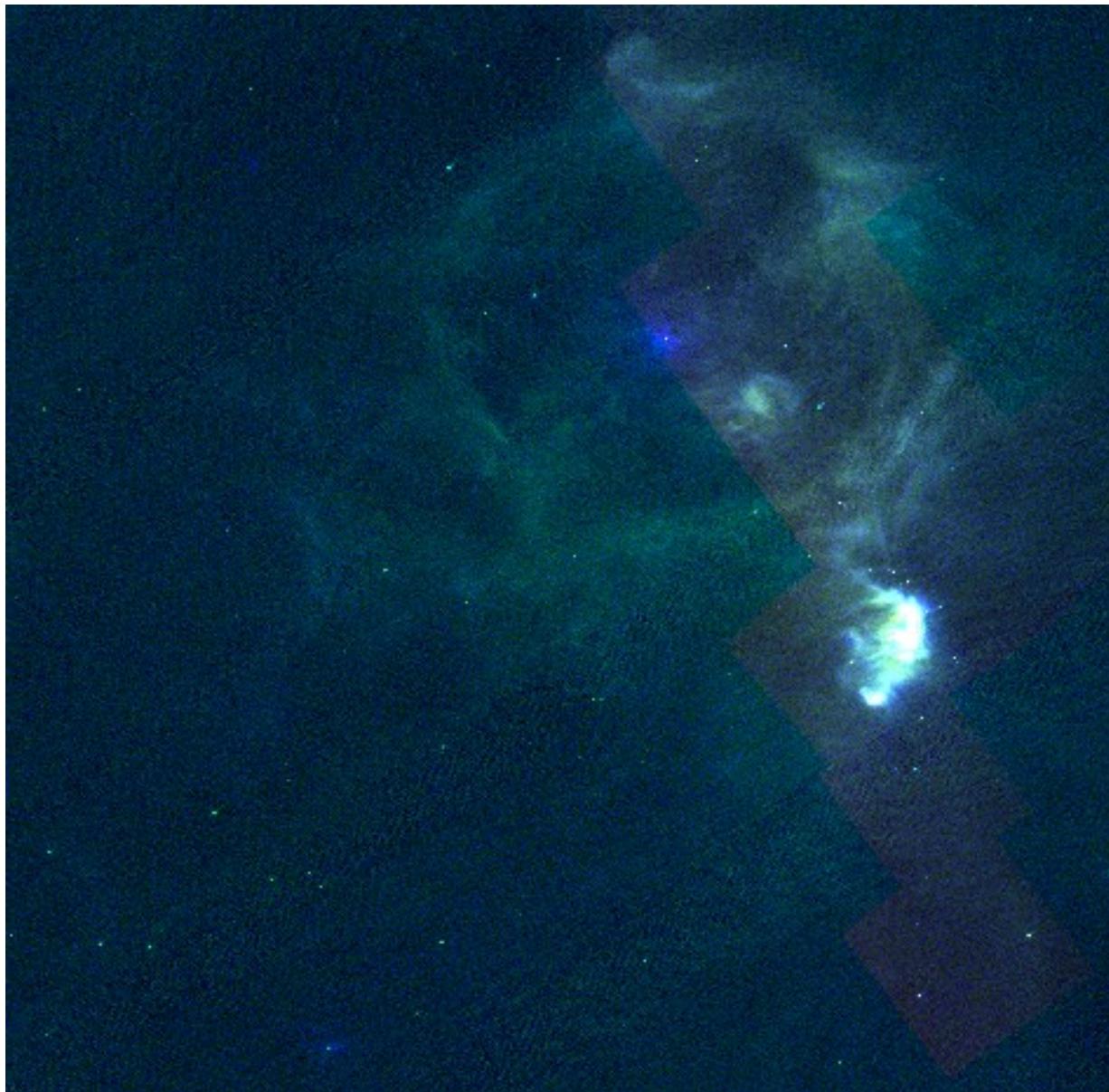
Green:

AKARI 18 um

Red:

Spitzer 8 um*

*Red chosen for visibility



Conclusion:

AKARI offers all sky data offers:

- Resolution advantages over IRAS
- Spatial coverage advantage over Spitzer
- A wide range of science cases by combining archival data from:
 - IRAS
 - Spitzer
 - Planck

And in the future...

- AKARI-TAO-ALMA science?
 - Using AKARI as an general “Dust/PAH Guide” for focused TAO/ALMA observations.
- GAIA?
 - Investigating ISM around interesting GAIA stars?

Closing remark:

つづけて一緒にがんばりましょう

Let's keep showing the world how international / intercultural friendship (through science) can flow even when other obstacles arise.