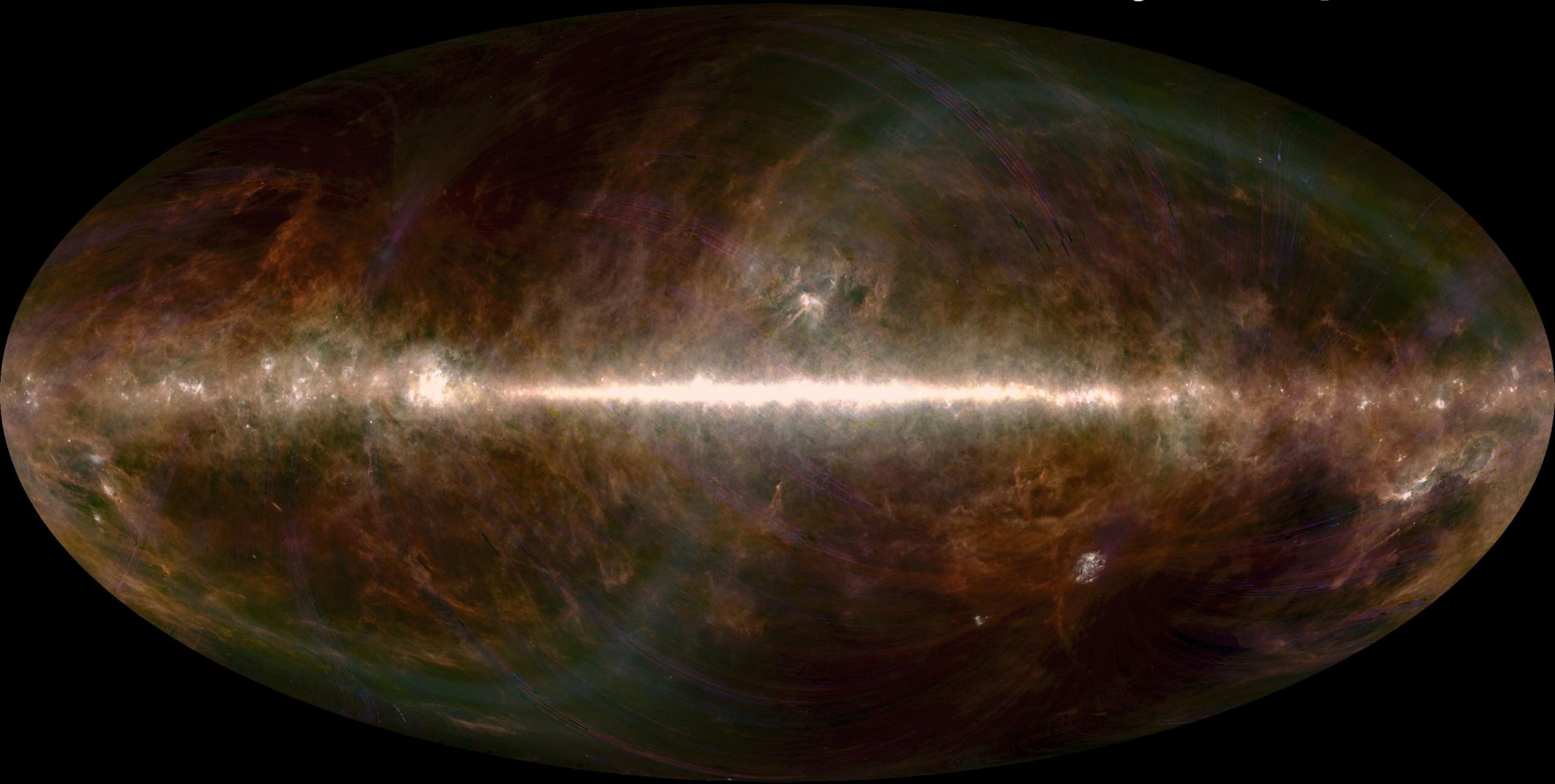
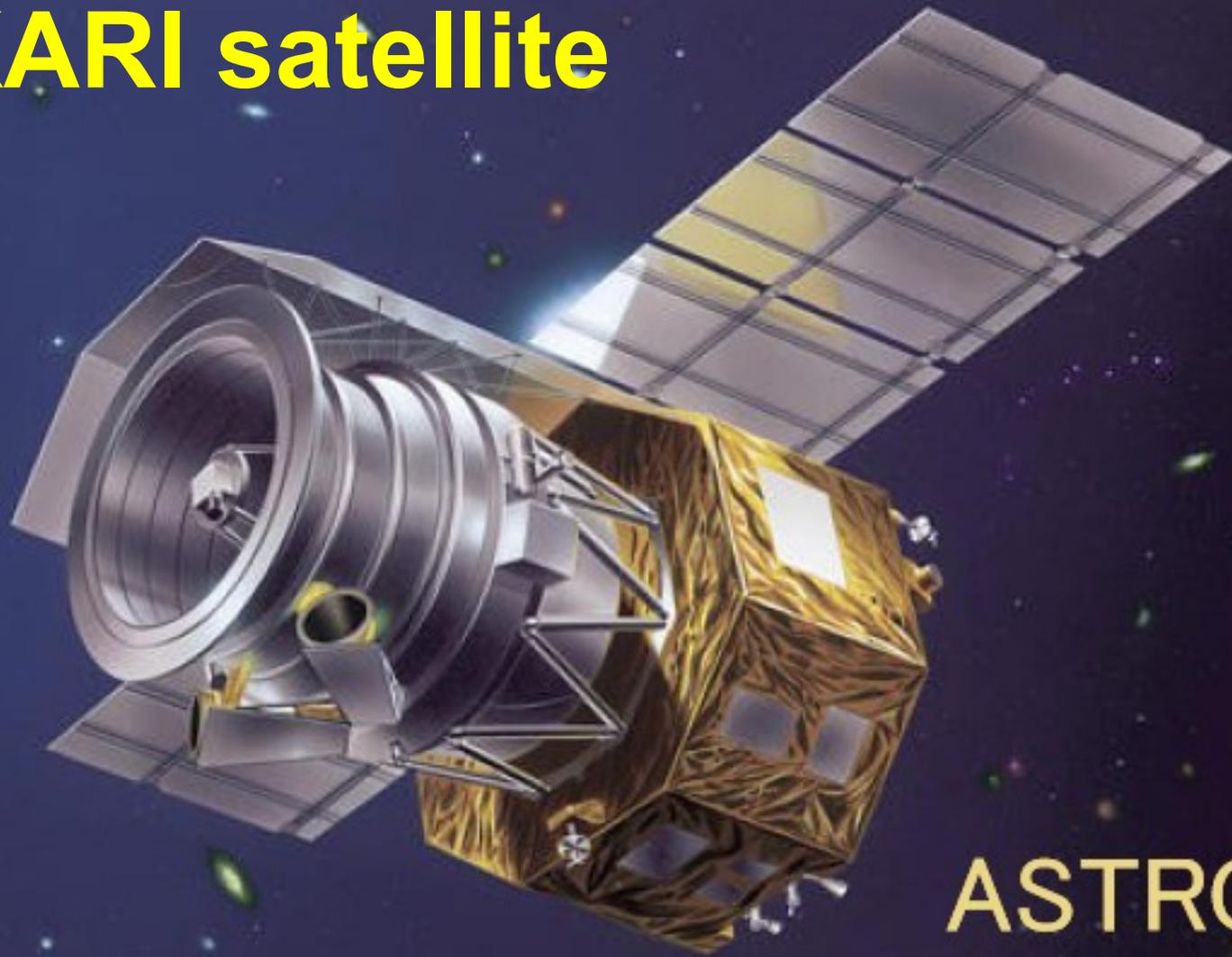


# AKARI Far-Infrared All-Sky Maps



Yasuo Doi (U of Tokyo)  
FIS diffuse map making team

# AKARI satellite

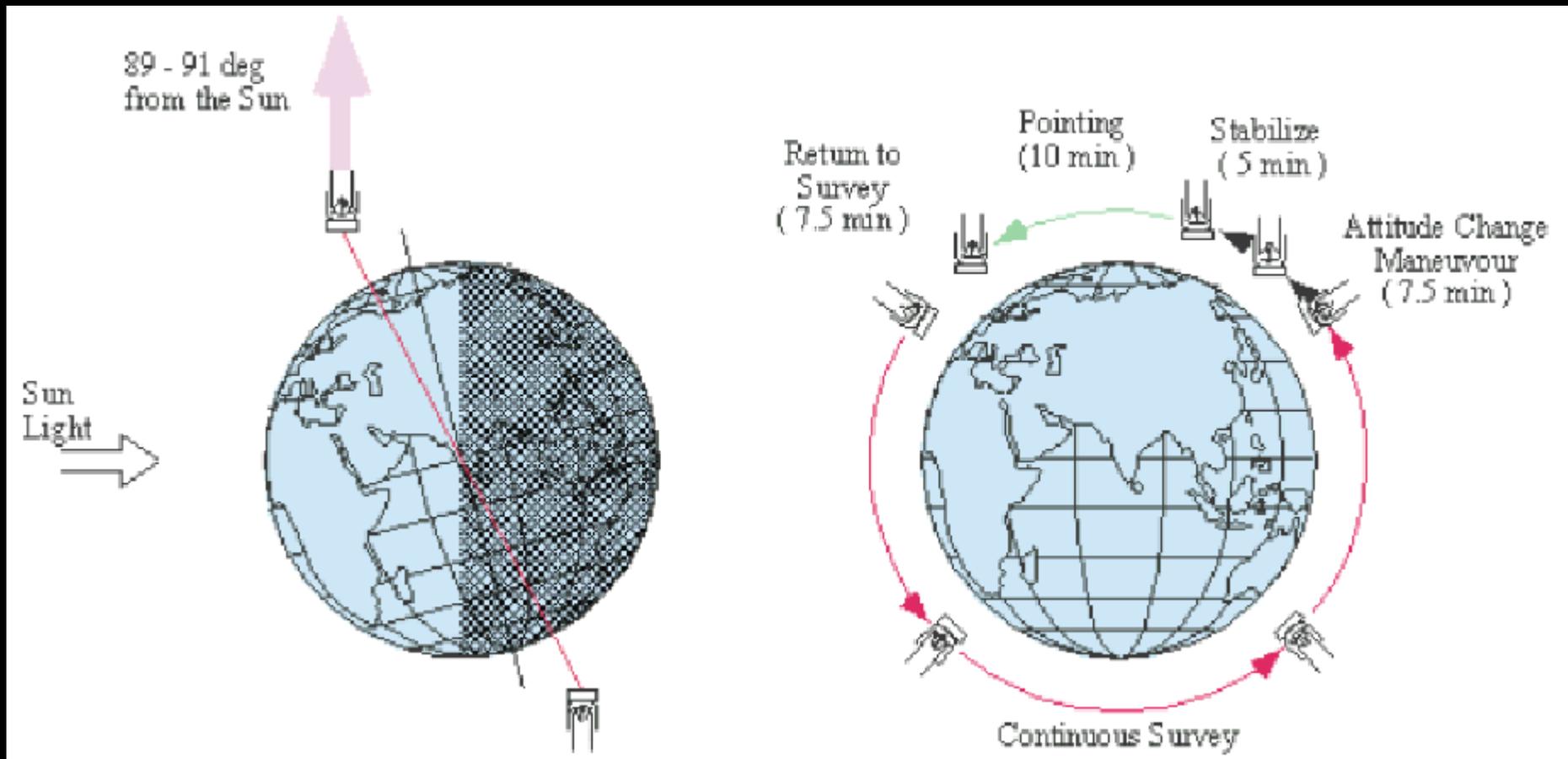


## ASTRO-F

- ◆ Launch: early 2006
- ◆ Main mirror: 685 mm
- ◆ Obs. band: 2–180  $\mu\text{m}$

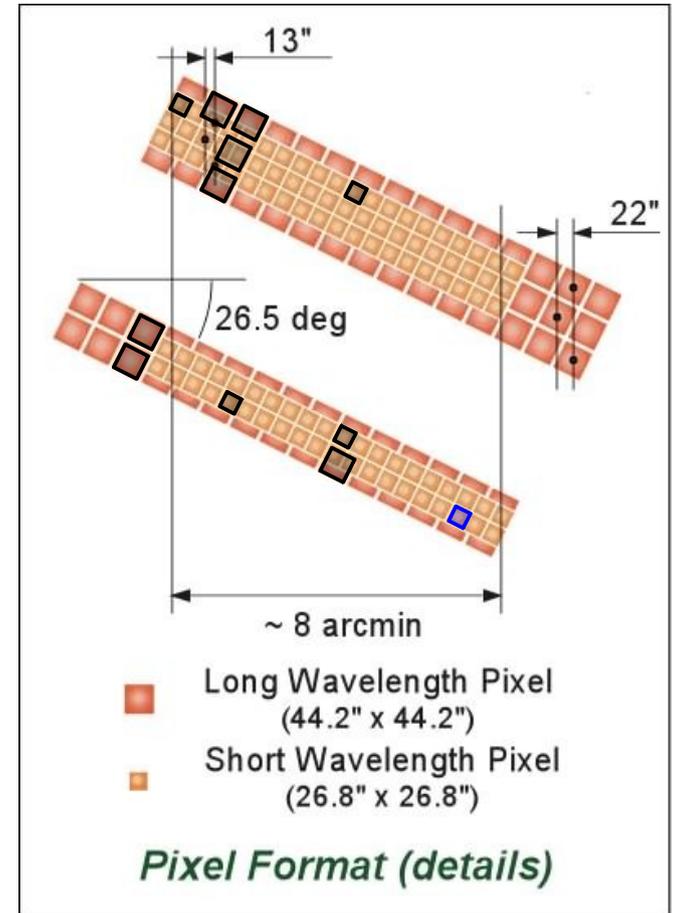
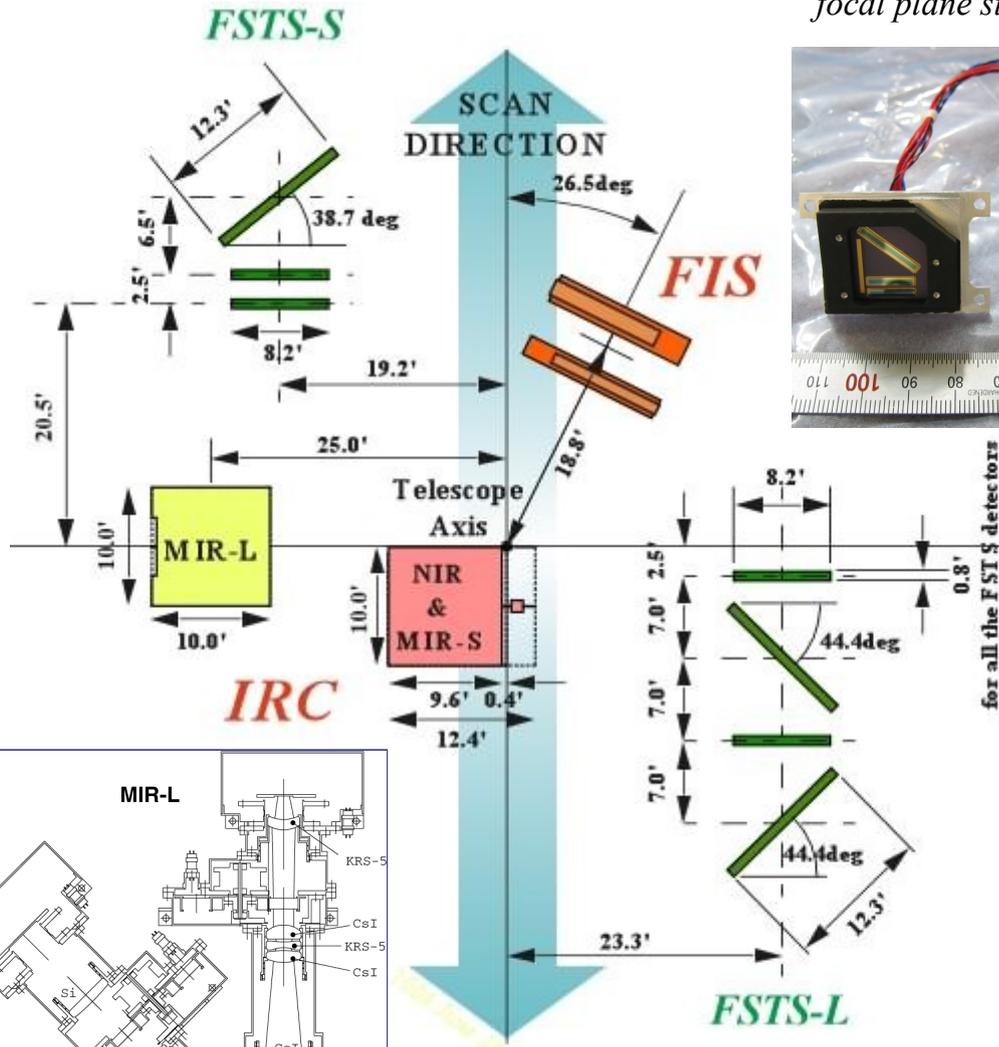
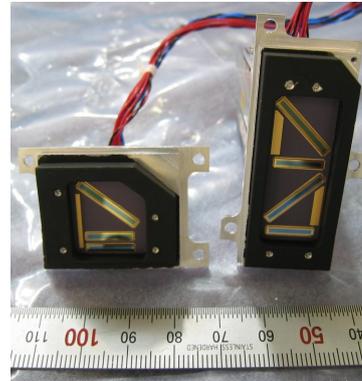
# Continuous All-Sky Survey Mapping

- Sun synchronous polar orbit – just like IRAS
- 900 km orbital altitude / 98 min orbital period



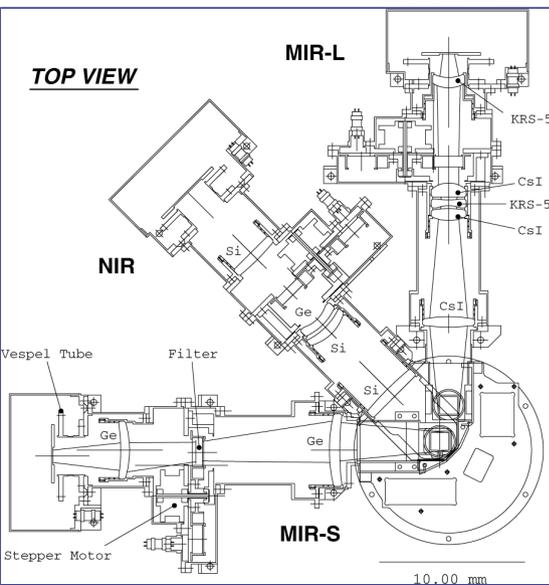
# Focal Plane Layout

*FSTS*  
focal plane star sensor

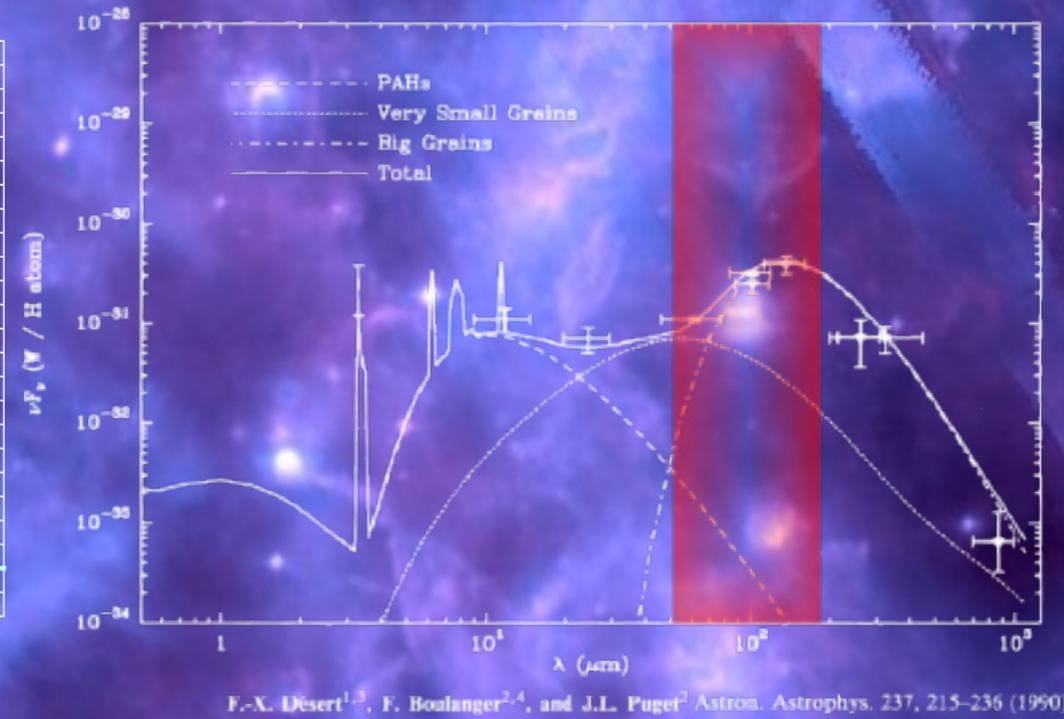
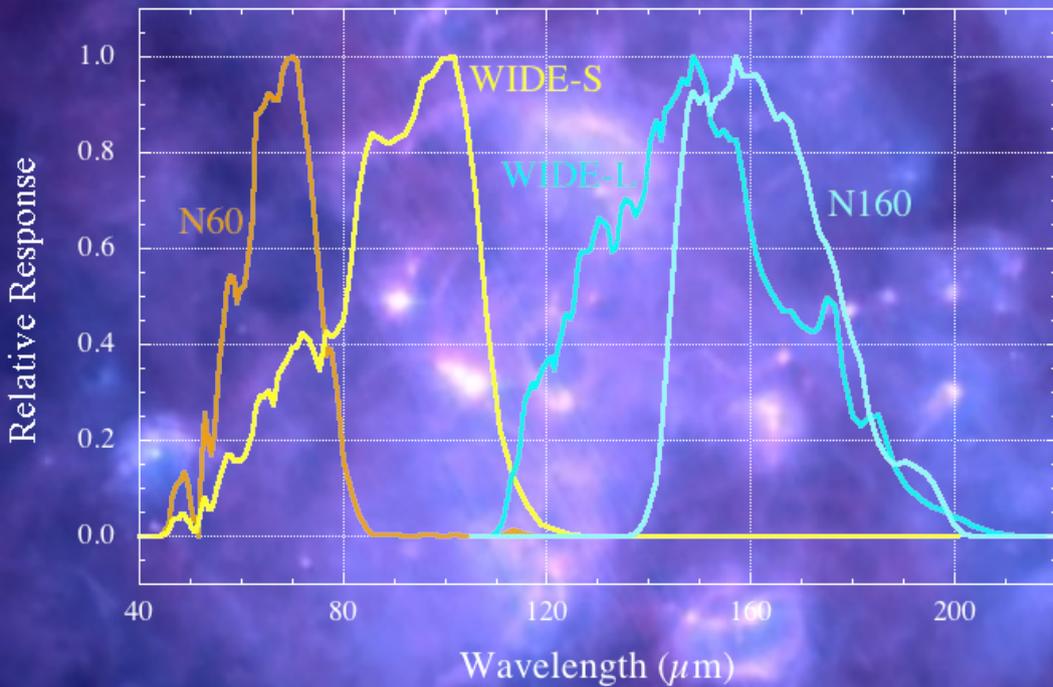


## BAD PIXELS

SW: 5 pixels (including 1 noisy pixel)  
LW: 7 pixels



# Far-infrared all sky mapping



F.-X. Désert<sup>1,3</sup>, F. Boulanger<sup>2,4</sup>, and J.L. Puget<sup>2</sup> *Astron. Astrophys.* 237, 215–236 (1990)

<b>Band center [um]</b>	<b>65</b>	<b>90</b>	<b>140</b>	<b>160</b>
<b>PSF size [arcsec]</b>	<b>74x56</b>	<b>93x64</b>	<b>107x85</b>	<b>94x78</b>
<b>Detection limit [1<math>\sigma</math>, MJy/sr]</b>	<b>12</b>	<b>2</b>	<b>4</b>	<b>7</b>

(Preliminary)

**AKARI** 90um+140um Cygnus

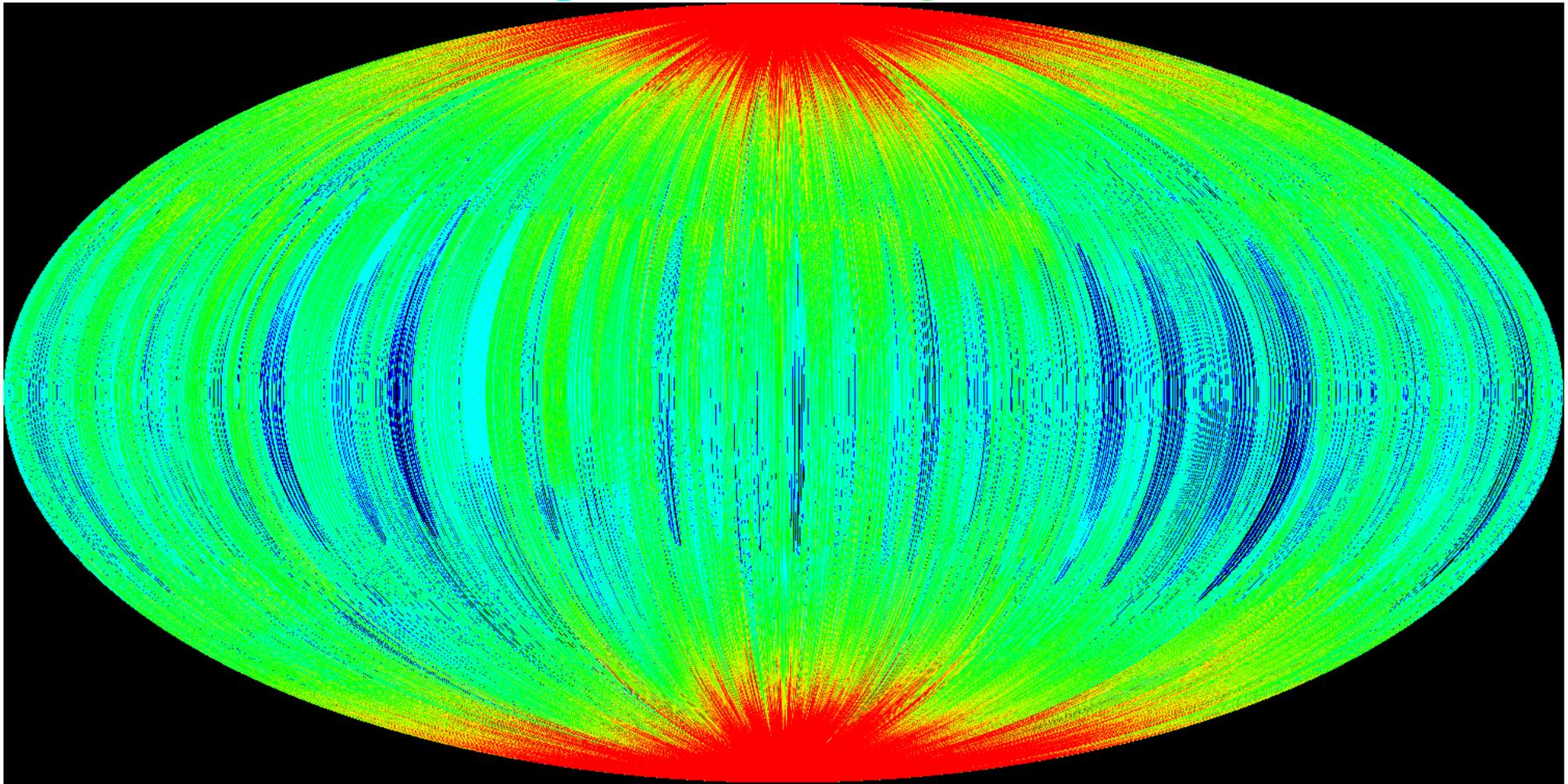
# Survey coverage

Scan coverage	Covered region	Multiply covered region	$\geq 5$ times	$\geq 10$ times	Not covered
N60 .....	99.1%	96.9%	60.3%	13.5%	0.9%
Wide-S .....	99.1%	97.0%	61.0%	13.8%	0.9%
Wide-L .....	99.5%	98.4%	78.7%	25.9%	0.5%
N160 .....	99.5%	98.4%	76.8%	24.1%	0.5%

- $>99\%$  of the sky has been covered,  $>97-98\%$  of them are multiply scanned
- Scan coverage is not spatially uniform
  - stripy non-observed regions around the ecliptic plane
  - Data quality depends upon Nscan (under investigation)
- Better coverage is expected with careful investigation/recovery of the data around Moon

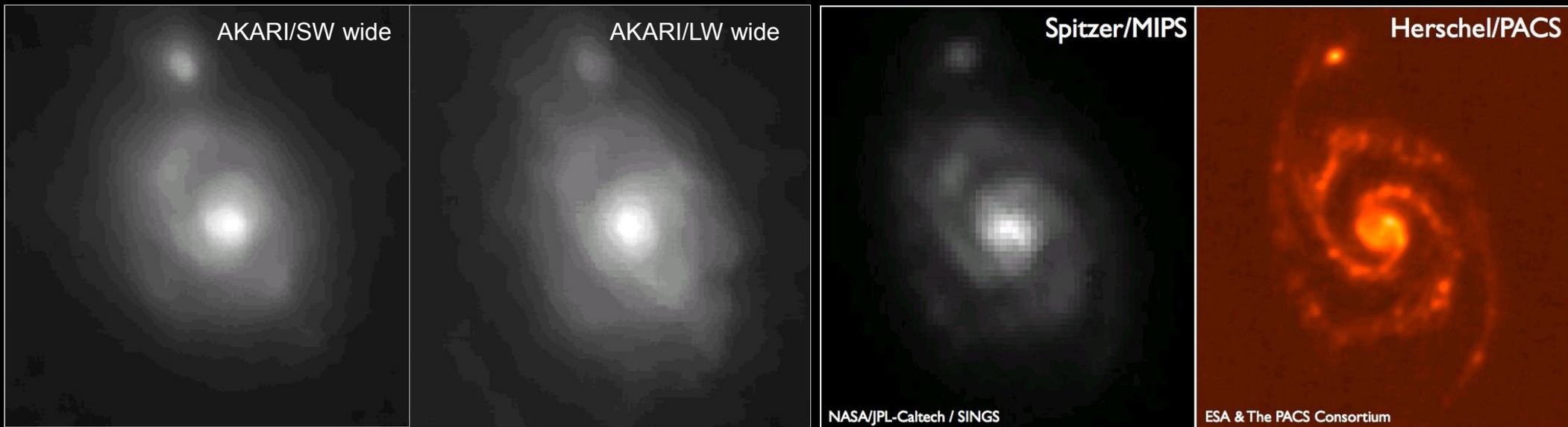
# Survey coverage

black: 0    blue: 1    light blue: 2    green: 3~    red: 10~



all sky map in ecliptic coordinates

# Higher spatial resolution than IRAS, comparable to Spitzer



AKARI covers the whole sky with  $\sim 1'$  resolution

FIS  $90\mu\text{m}$

FIS  $140\mu\text{m}$

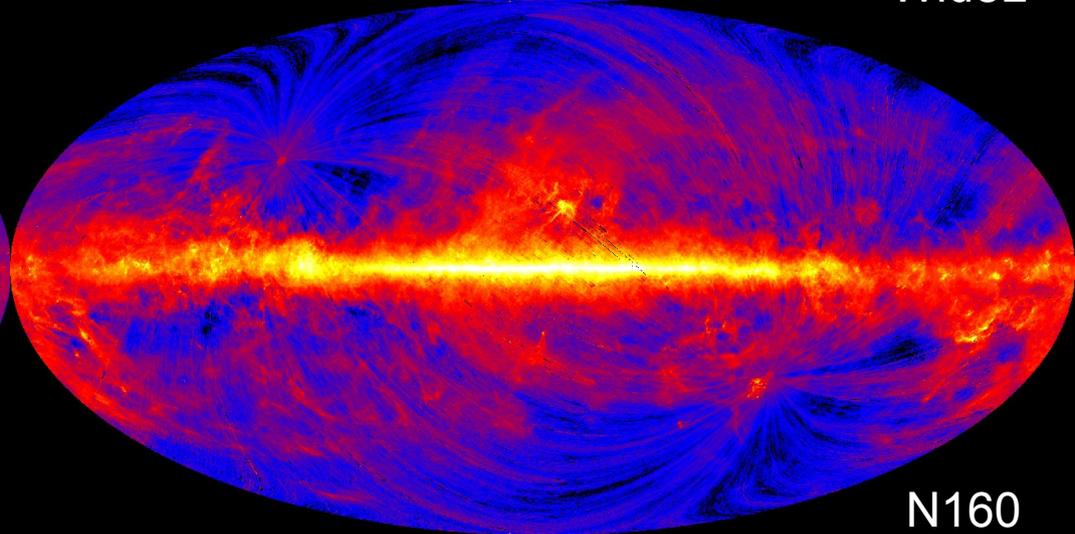
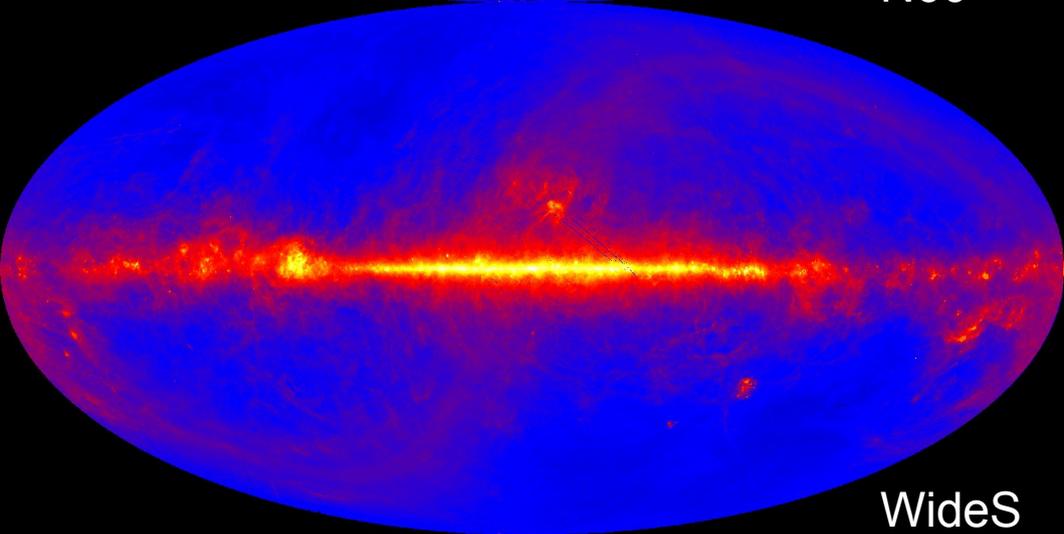
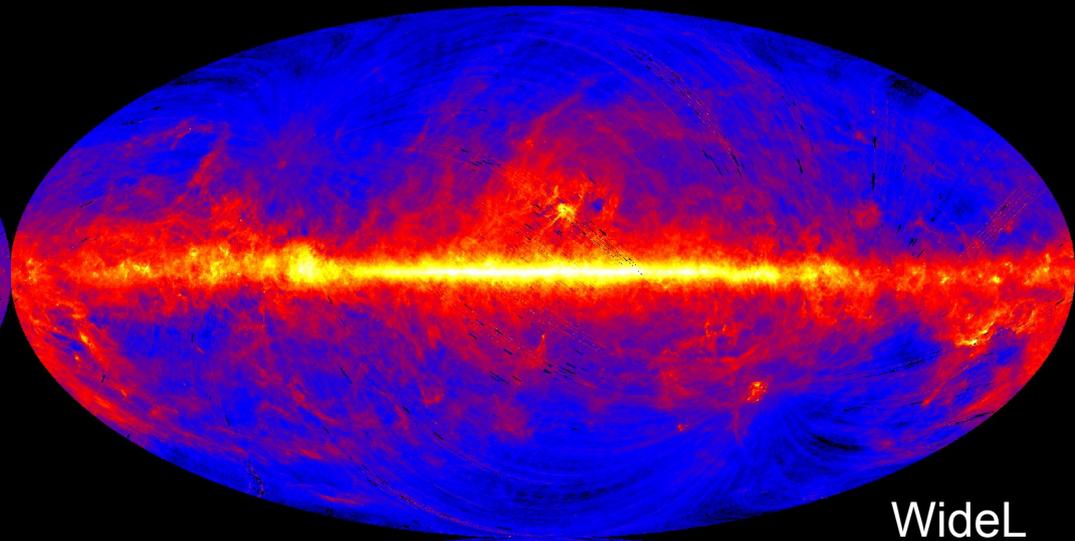
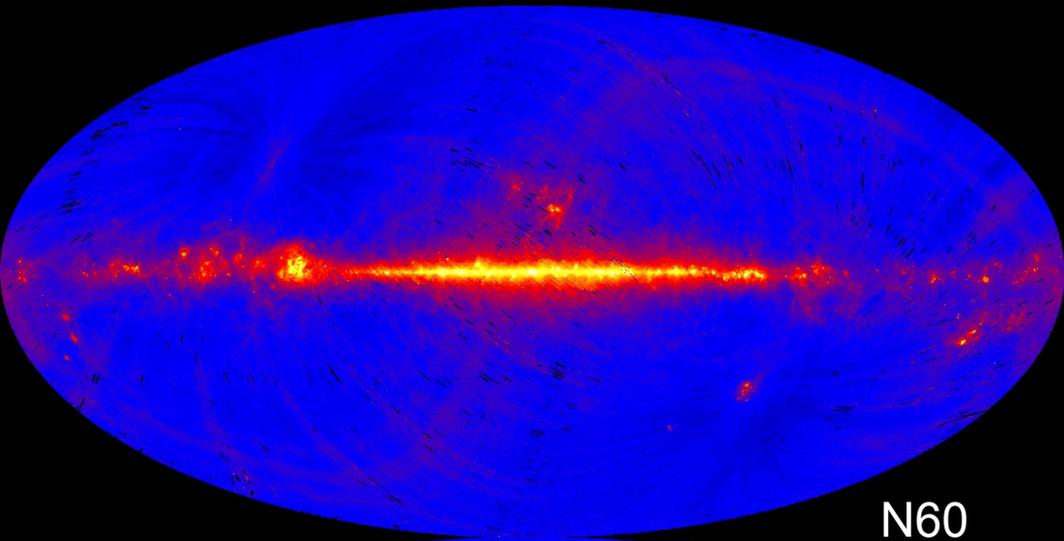
Spiral Galaxy M51 ("Whirlpool Galaxy") in the Far Infrared ( $160\mu\text{m}$ )

MIPS  $160\mu\text{m}$   
HPBW  $38''$

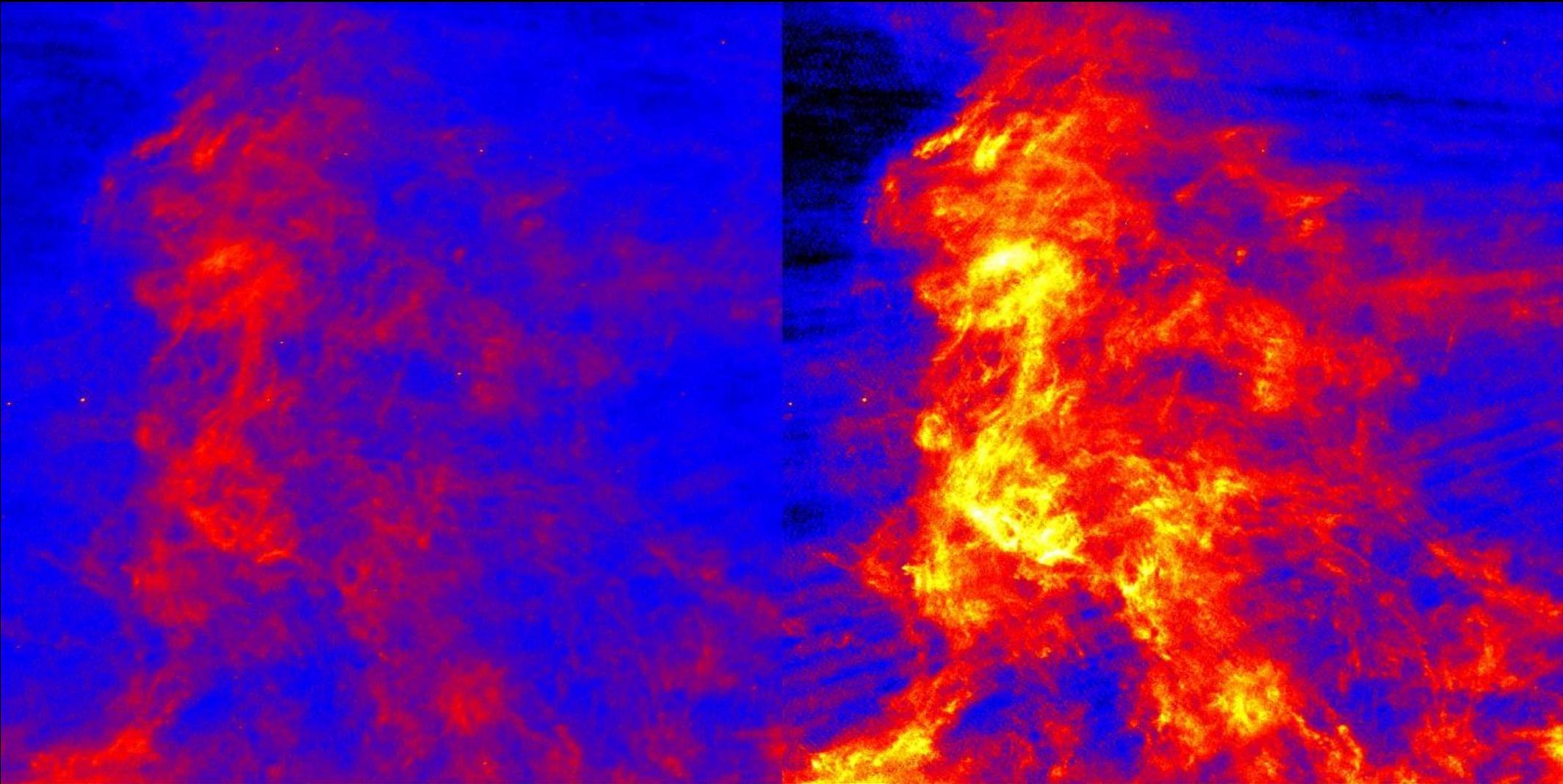
Herschel  $160\mu\text{m}$   
HPBW  $12''$

# All sky images

- Shorter wavebands  $\propto$  ISRF intensity
- Longer wavebands  $\propto$  ISRF intensity  $\times$  dust column



# Polaris Flare (15°×15°)



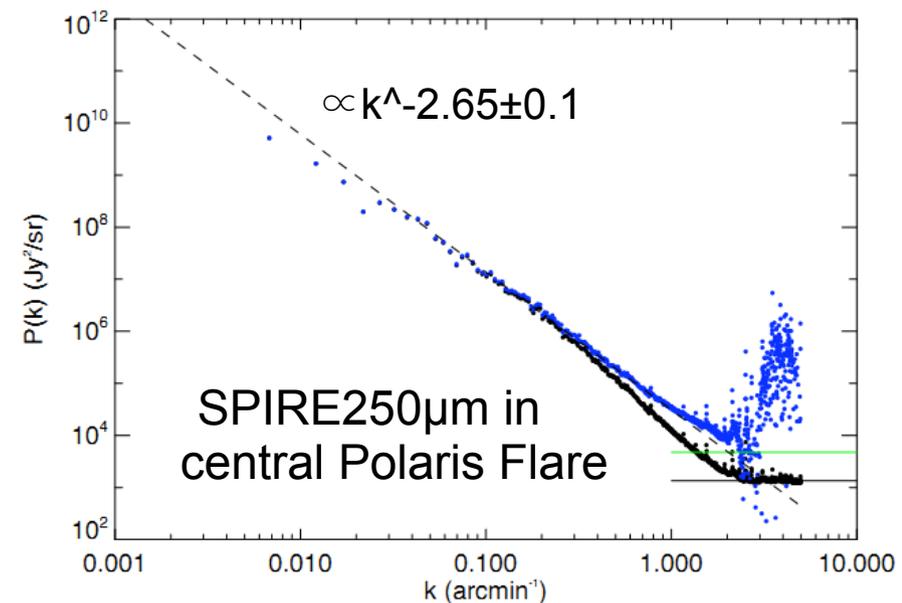
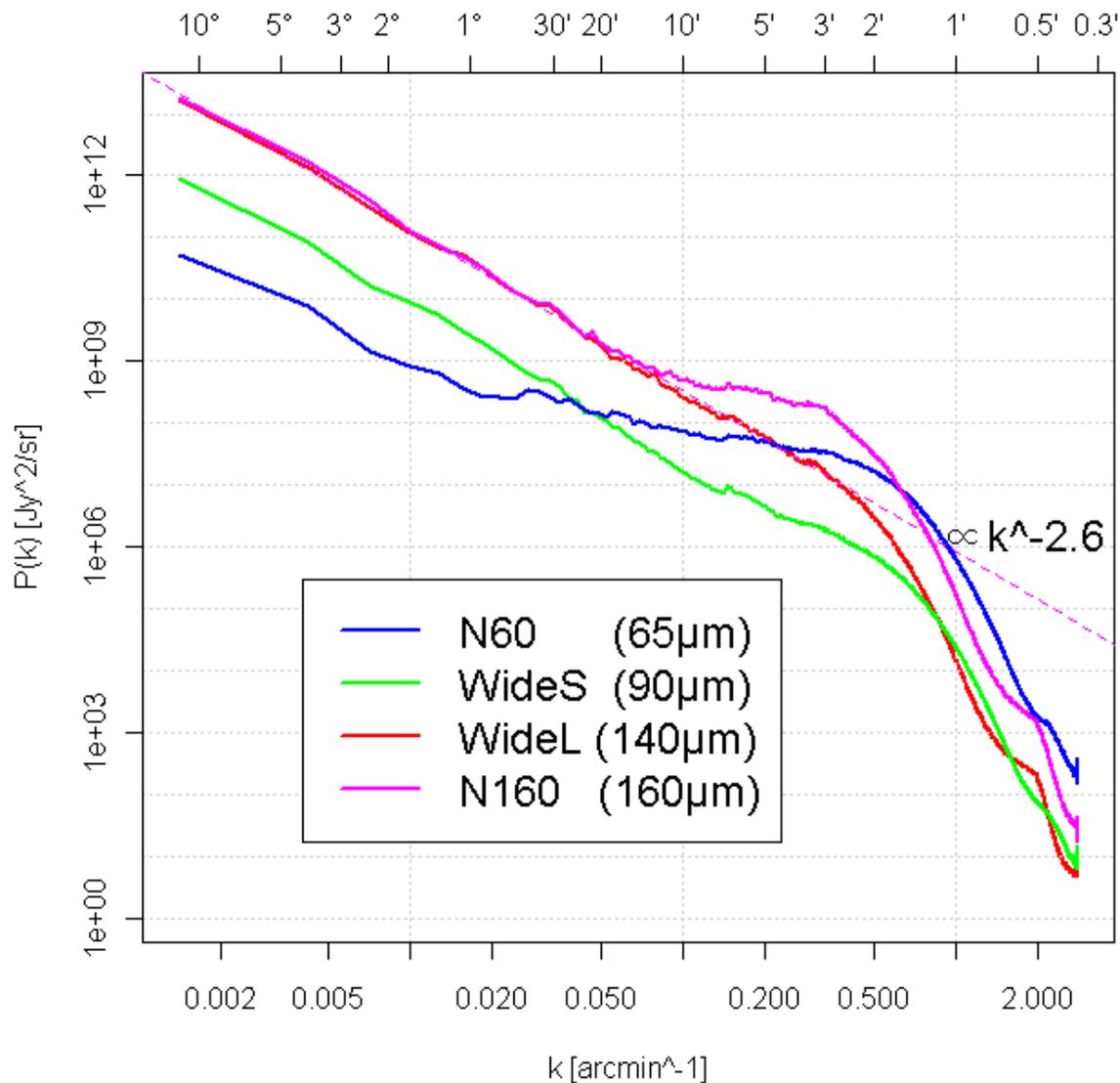
WideS(90 $\mu$ m)

WideL(140 $\mu$ m)

# Spatial power spectra

Structure down to  
 $\sim 2'$  (WideL) &  
 $\sim 1'$  (WideS) can be  
successfully traced

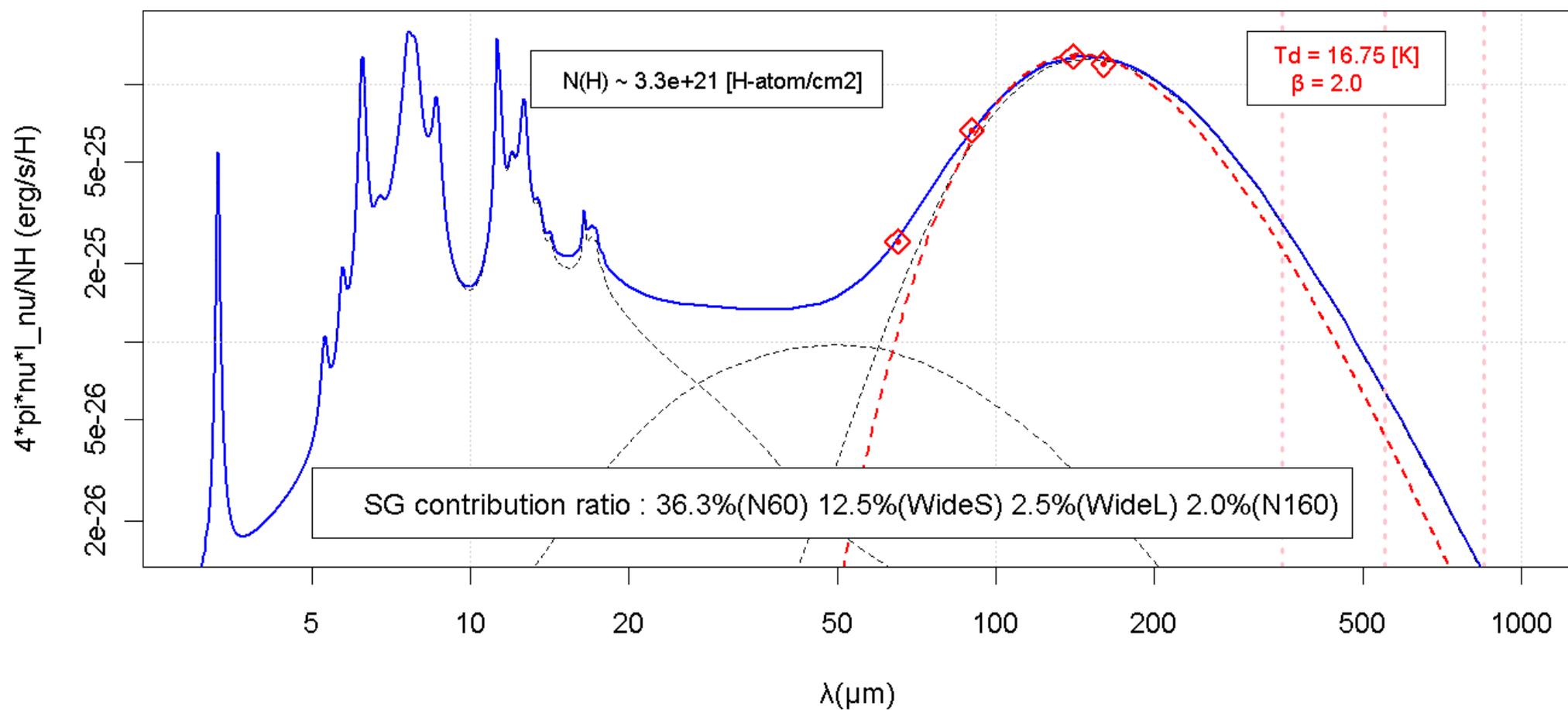
Depends on the surface  
brightness



# Polaris Flare SED

Model by DustEM (Compiegne 2011)

DustEM nominal composition with  $G0=0.45$ ,  $Y_{\text{vsg}}=1$ ,  $Y_{\text{pah}}=1$



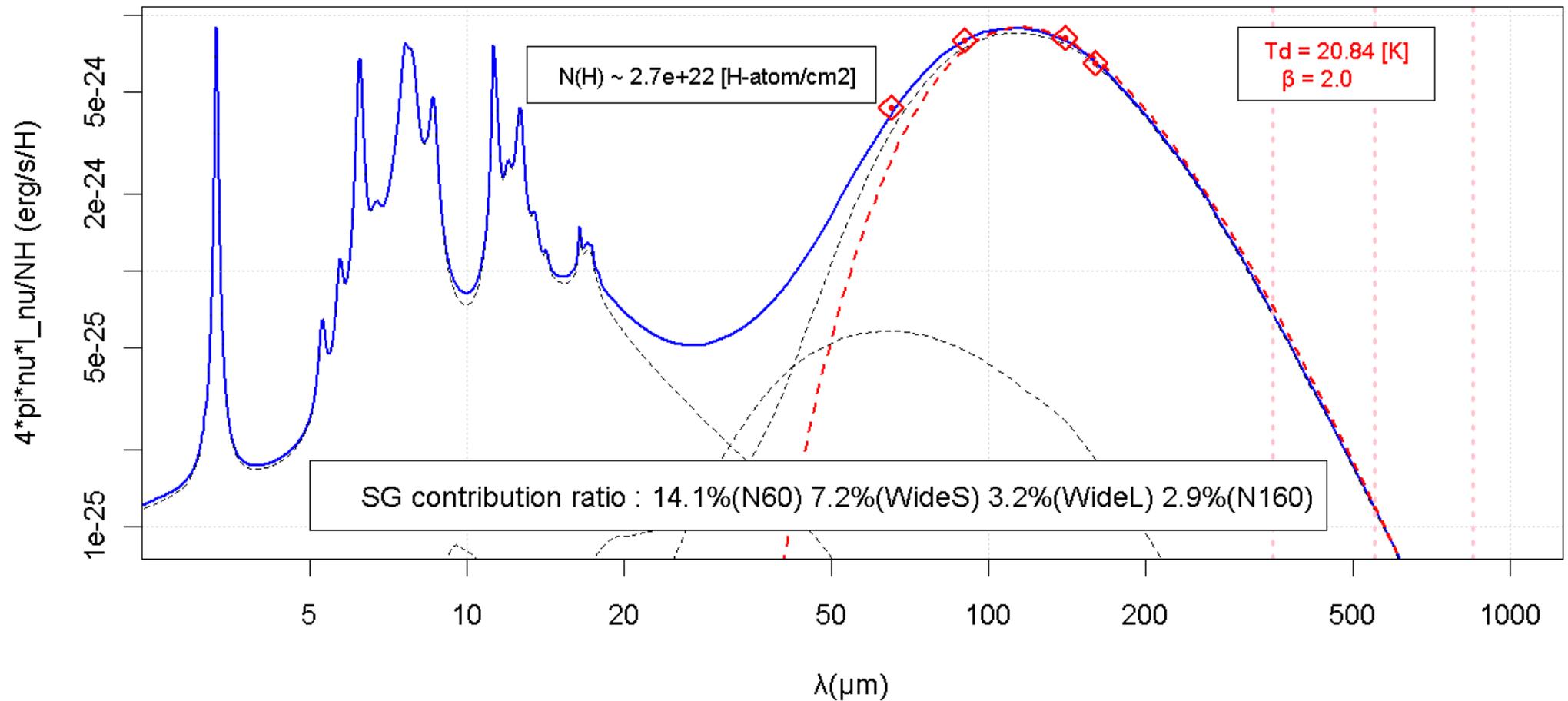


Cygnus X ( $20^{\circ} \times 15^{\circ}$ , 65, 90, 140 $\mu\text{m}$ )

# CygnusX SED

Model by DustEM (Compiegne 2011)

DustEM DL7 composition with  $G0=3.5$ ,  $Y_{\text{vsg}}=1$ ,  $Y_{\text{pah}}=1$



# AKARI/FIS all-sky survey image

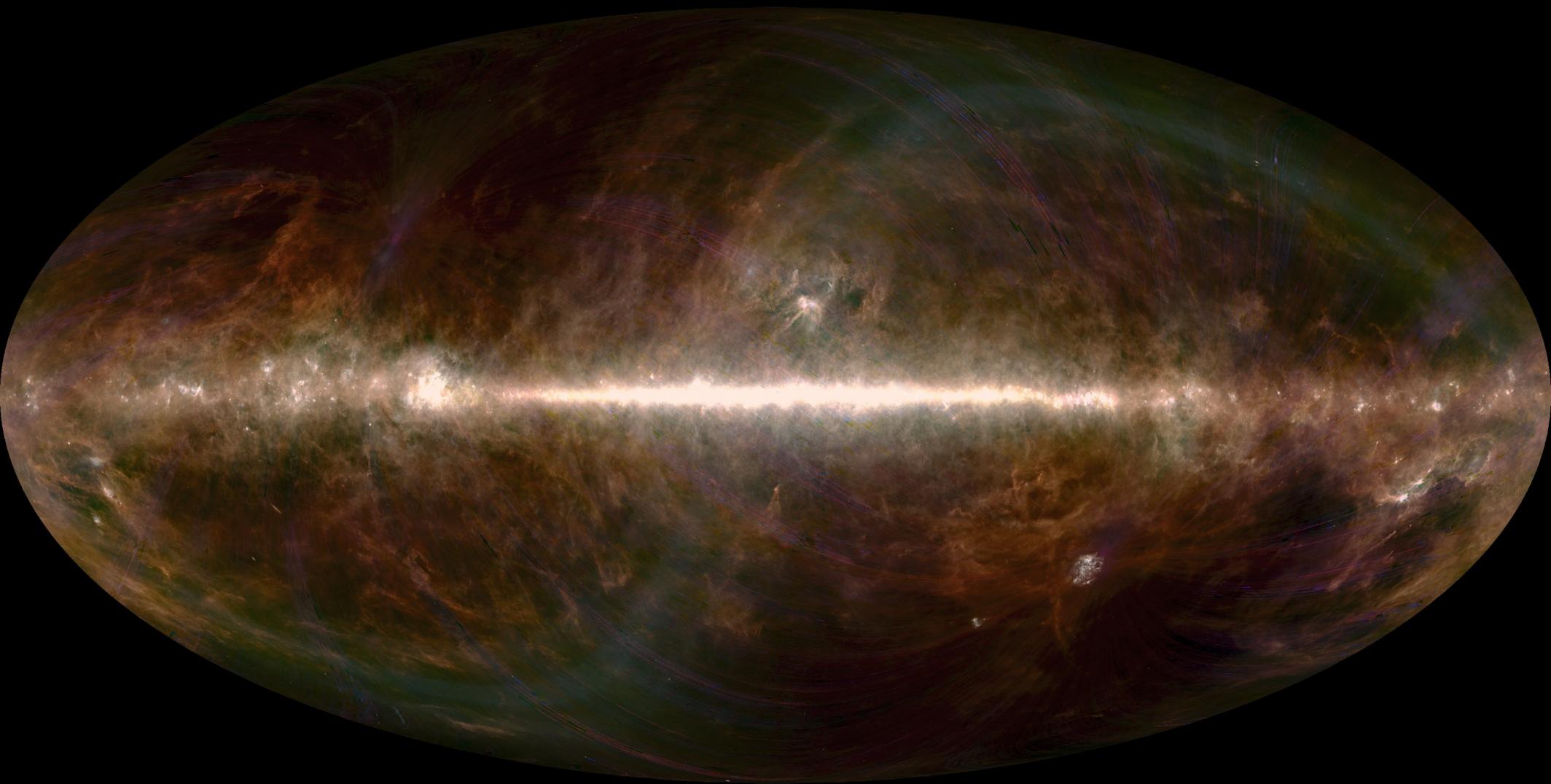
- Multiple-waveband coverage at the peak of the dust SED
  - BGs color temperature, dust column evaluation
  - Dust composition, evolution
  - Combination with Planck data must be powerful!
- Good spatial resolution, huge dynamic range
  - From global picture of diffuse ISM/giant molecular complex down to prestellar cores!!
  - Structure formation, phase transition, radiative transfer in denser regions, ...

# Data release!!

- Team release of the data has just been made!
- proprietary period is **ONLY 6 months!!**
- All the data will become publicly available in summer
- Further improvement of the data quality is foreseen
- OPEN for collaboration during proprietary period



Contact/approach any of AKARI team members  
(incl. me :)



. . . finito.