

The X / γ - ray Milky Way

Diffuse / source
emission

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INTEGRAL / IBIS / ISGRI

- Coded mask experiment
- 15 keV – 1 MeV
- 19° FOV (FWHM)
- 12' angular resolution
- Point source localization accuracy ~ 2'
- Sensitivity ~ 1 mCrab (10^6 s)

INTEGRAL / IBIS / ISGRI



Can IBIS / ISGRI measure the diffuse Galactic emission ?

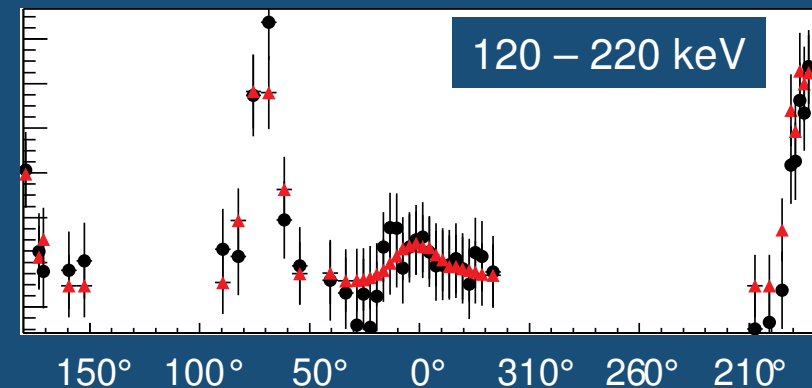
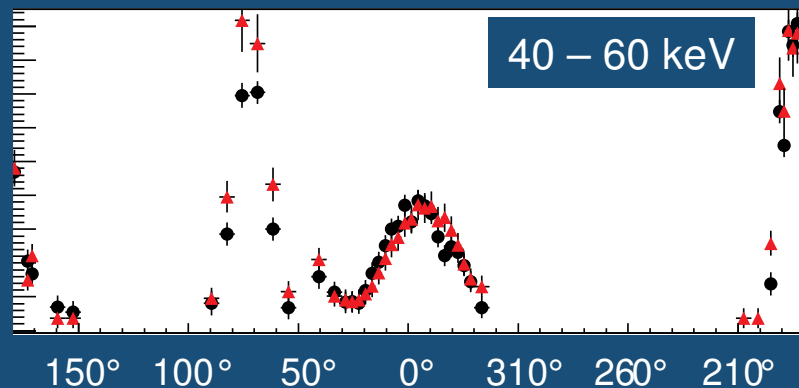
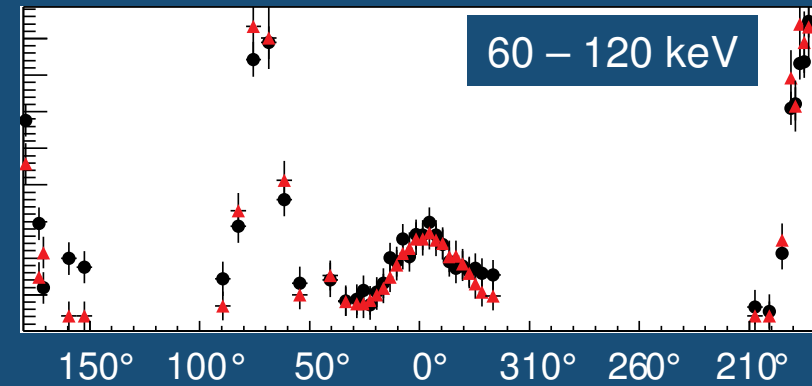
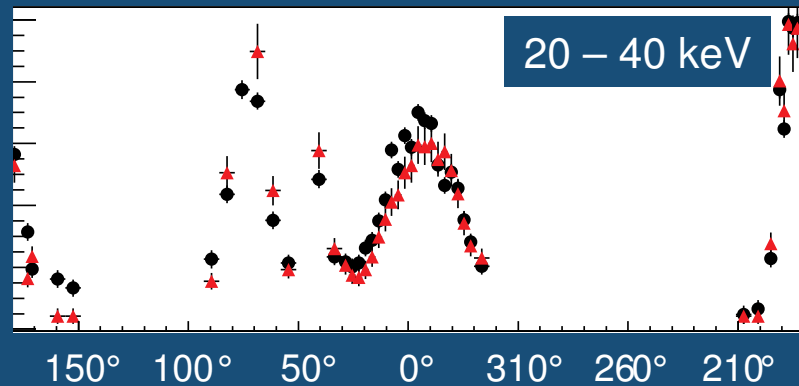
- Coded mask = high pass frequency filter
→ diffuse emission if any is washed out in the deconvolved images
- Can we see it with the ISGRI count rate ?
2 problems:
 - The instrumental background is variable ... but predictable
 - The sources are variable ... but measured

An IBIS / ISGRI map of the total galactic emission

- The count rate above 500 keV is completely dominated by the instrumental background → used to predict and correct variations in the low energy ranges (< 200 keV)
- Corrected count rates can be projected on the sky at the pointing location: map with $\sim 20^\circ$ resolution
- Longitude and latitude profiles can be built

Galactic emission

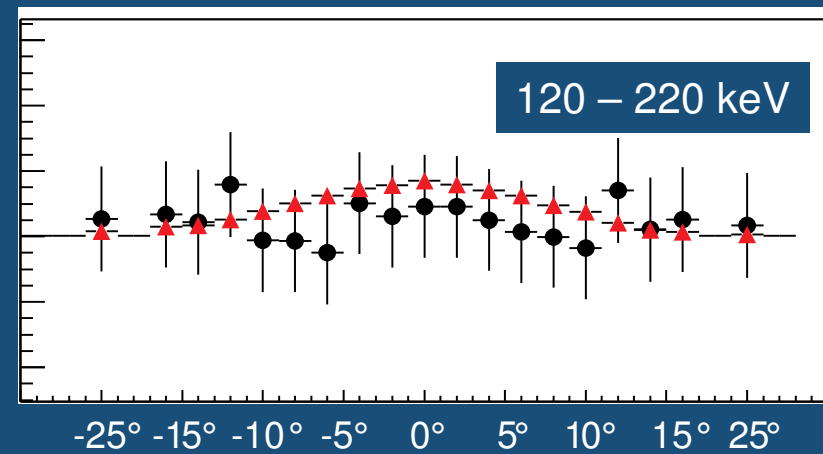
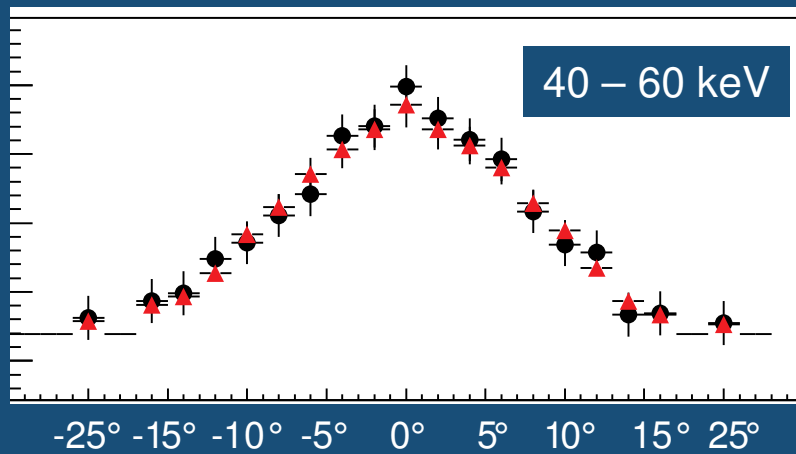
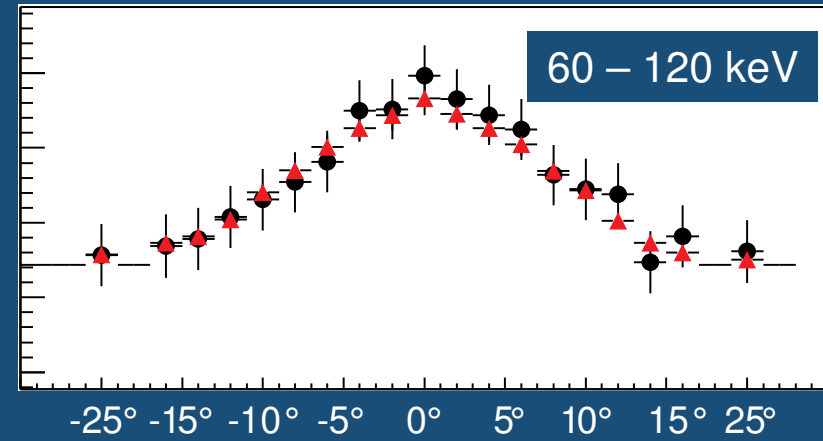
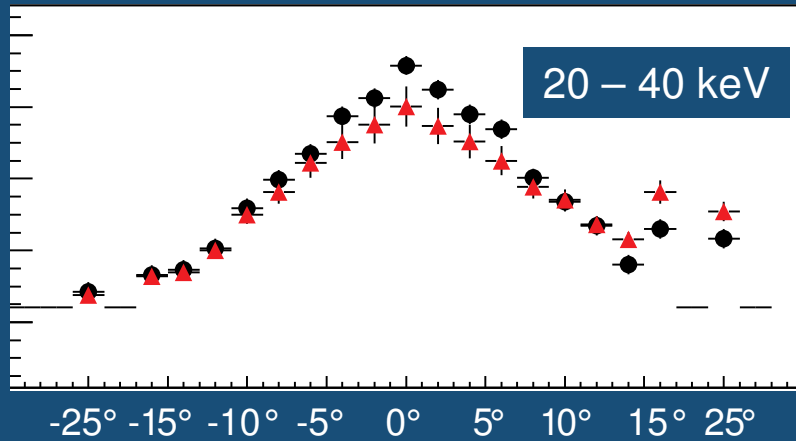
- Total ISGRI count rate
- ▲ Source count rate



Galactic longitude

Galactic emission

- Total ISGRI count rate
- ▲ Source count rate

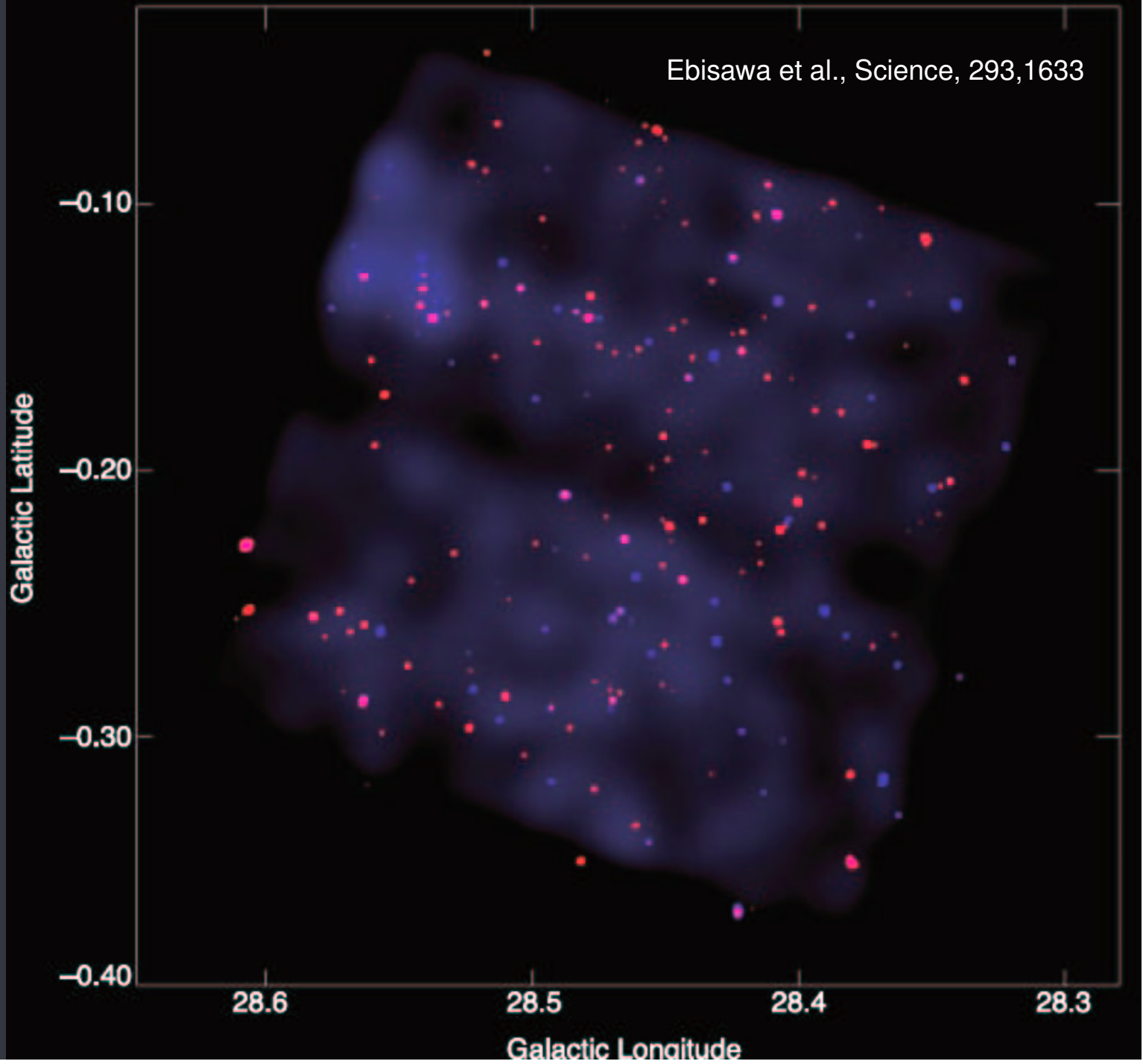


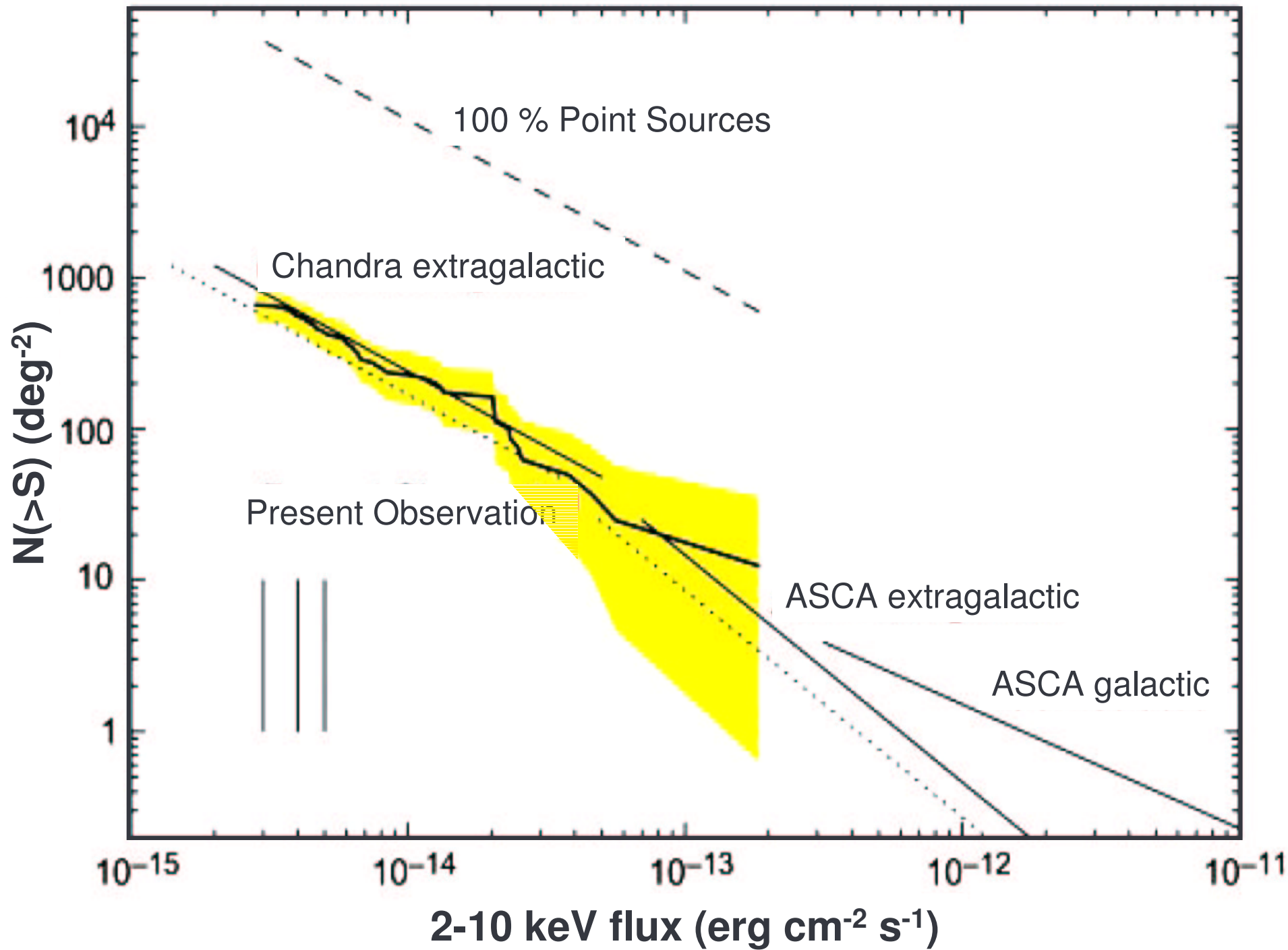
Galactic latitude

INTEGRAL: IBIS/ISGRI

- 20-60 keV → 91 sources > 6 sigma, mostly Galactic
 - ISGRI count rates (20-120 keV)
 - sources > 90%
 - Total SPI spectrum (sources + diffuse) and ISGRI sources (120-220 keV)
 - sources > 90%
- Galactic diffuse emission < 10% !**

Chandra: $l \sim 30^\circ$





Chandra

- Field 17'x17' at $l \sim 30^\circ$ (blank field)
 - 3-8 keV \rightarrow 53 sources $>$ 3 sigma
 - Extragalactic sources !
 - $<$ 20% of the total count rate
- \rightarrow diffuse emission dominates (SNRs ?)

Chandra / INTEGRAL in contrast

- Chandra (<10 keV)
 - Diffuse emission dominates, Galactic sources < 20%
- INTEGRAL (>20 keV)
 - Sources dominate, Galactic sources > 90%

Possibilities

- Diffuse emission has a spectrum much softer than that of the sources
- Diffuse emission seen by Chandra is mostly due to SNRs that appear as point sources to IBIS/ISGRI

We do not cover the entire spectral range (at least 5 keV – 30 keV) with the same angular resolution and sensitivity

Simbol-X

With a few pointings at selected positions

→ Galactic diffuse spectrum 1 - 60 keV