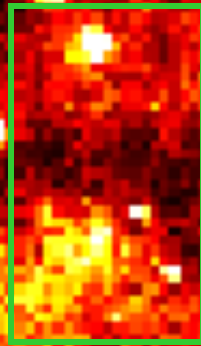


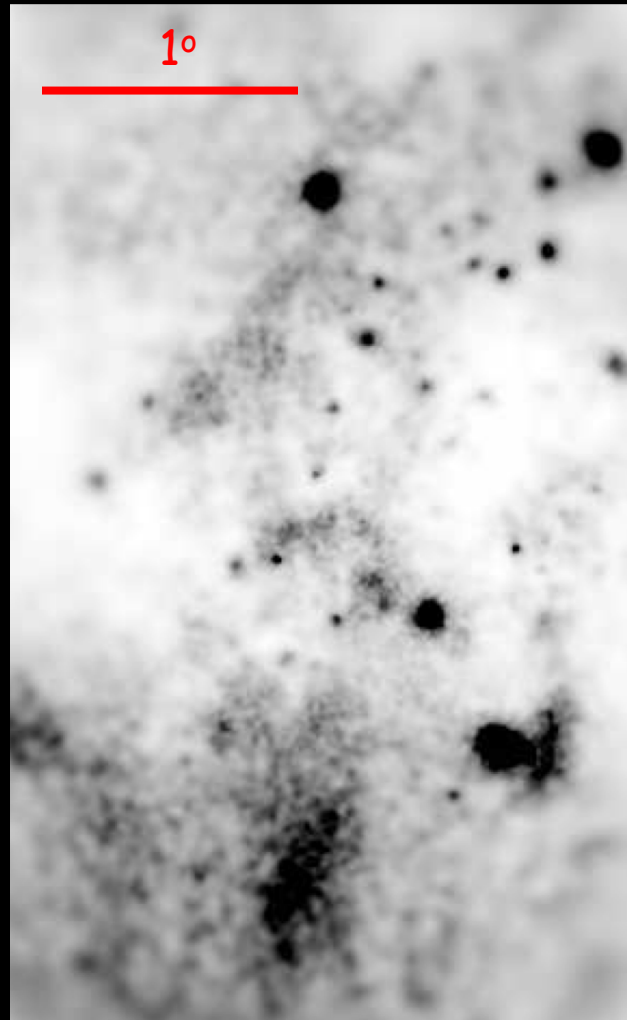
Large-scale Chandra Survey of the Galactic Central Region



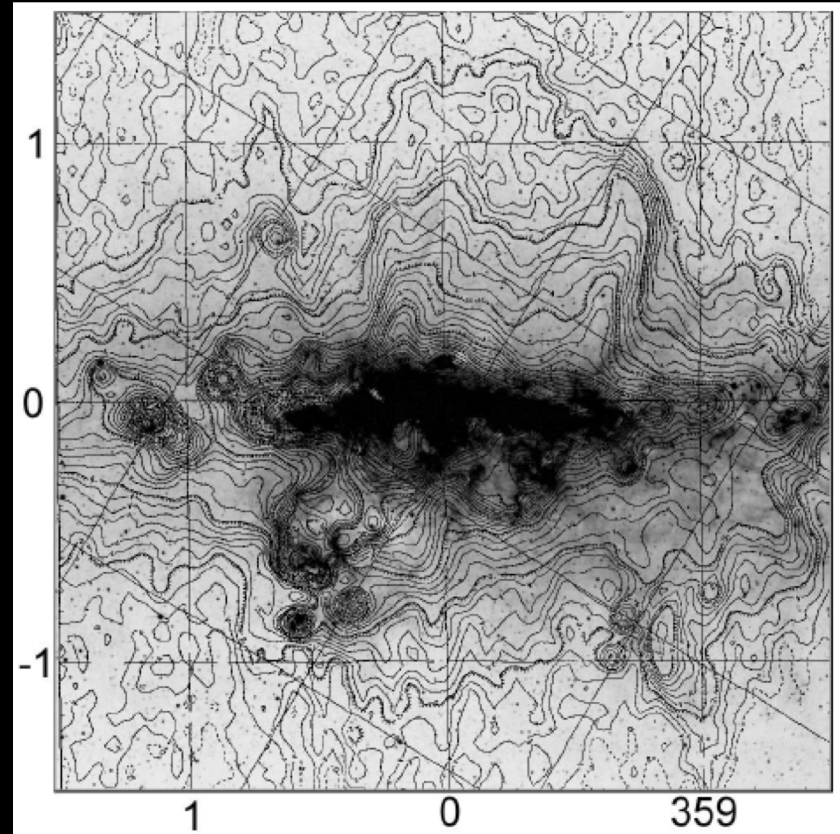
Q. Daniel Wang

University of Massachusetts

Early X-ray and radio views

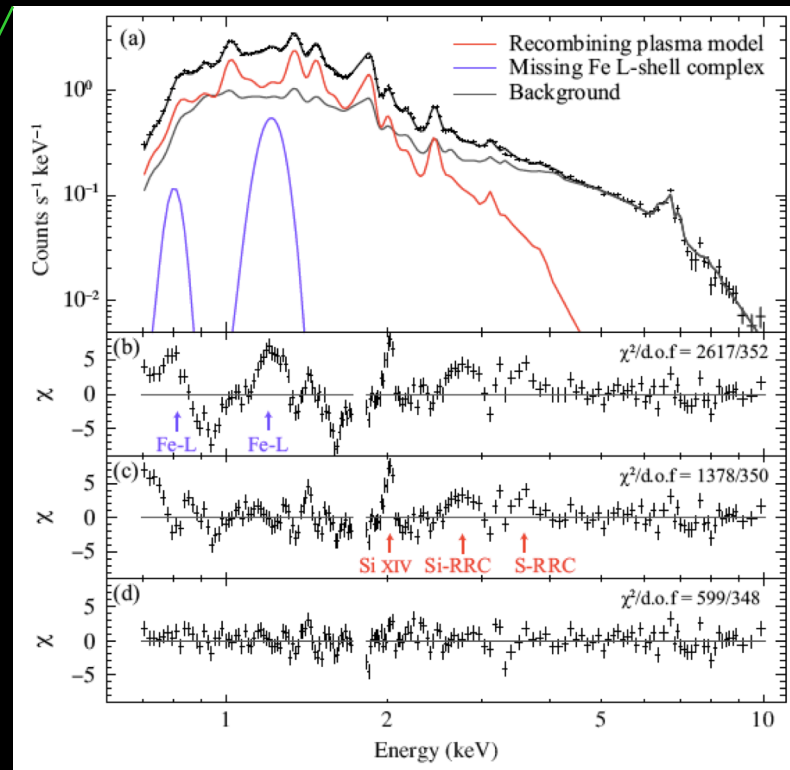
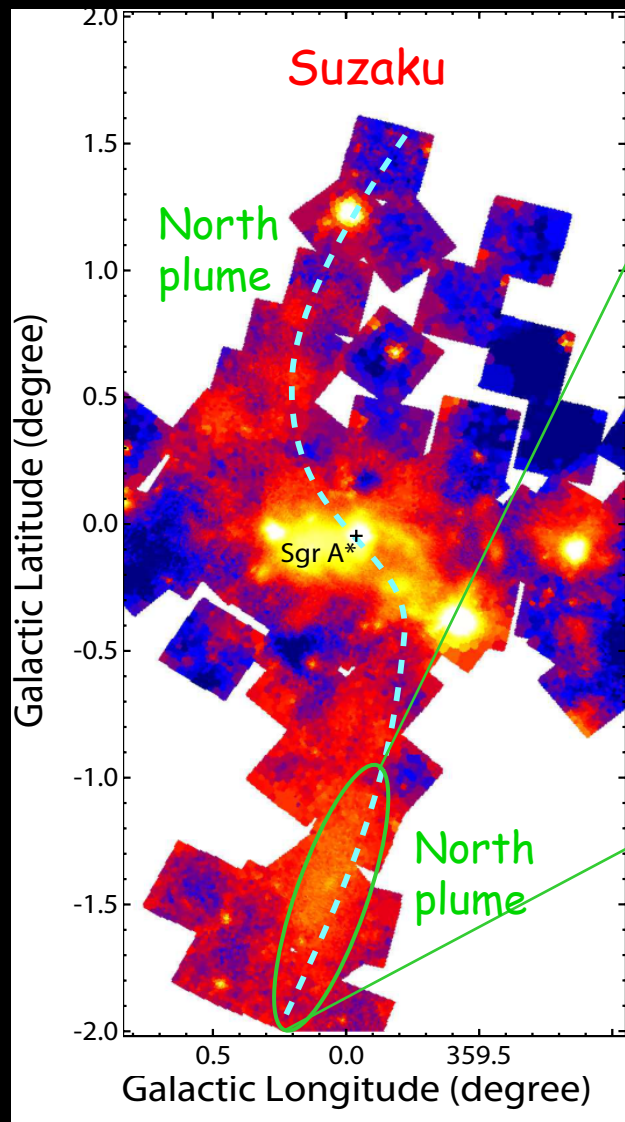


ROSAT PSPC 1.5-2.4 keV mosaic
(Wang et al. 2002)

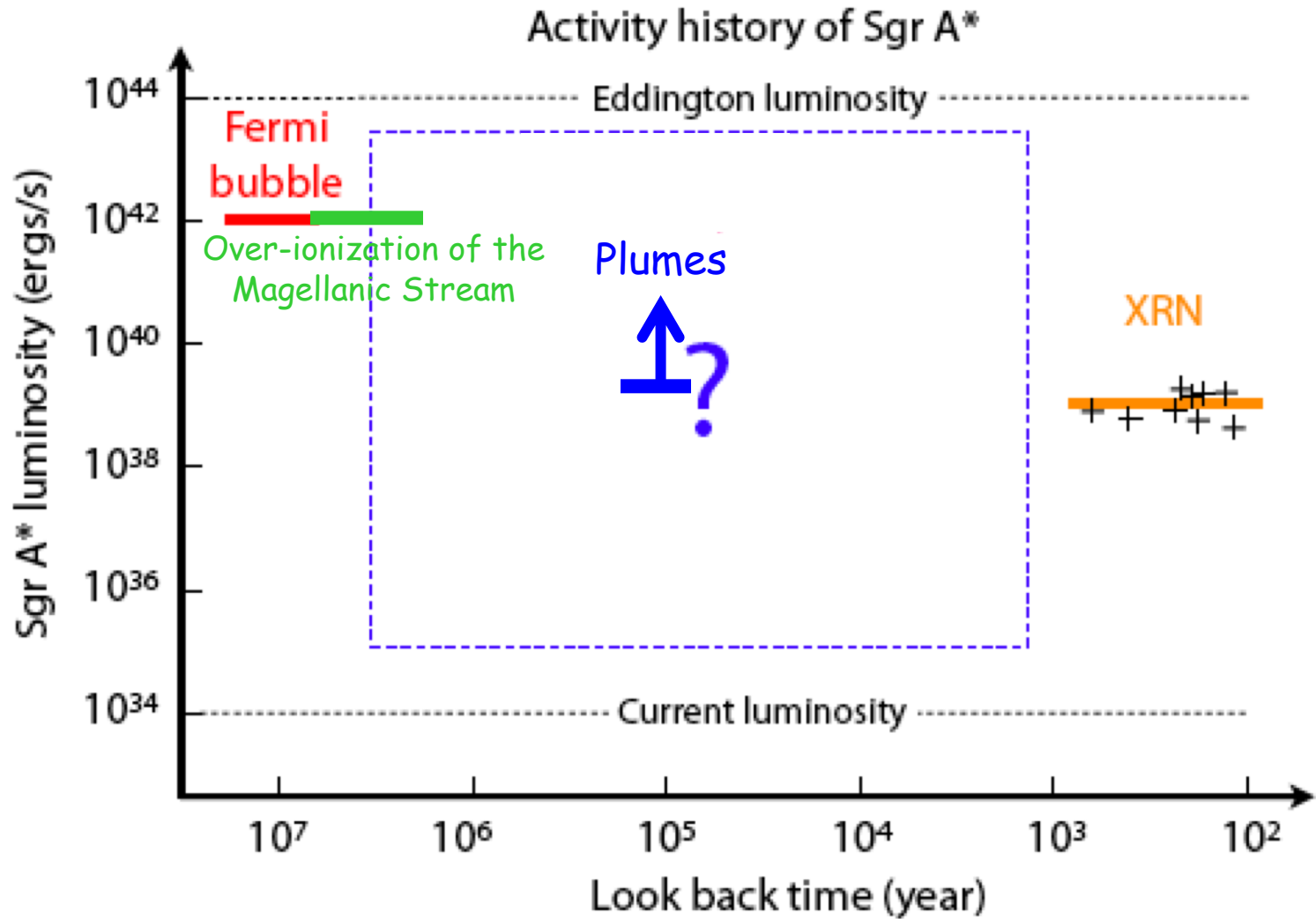


3-cm radio contours on a mid-IR Image
(Bland-Hawthorn & Cohen 2003)

Detection of recombining hot plasma



North and South X-ray plumes:
each ~ 100 pc, $n_e \sim 0.1-0.2$ cm⁻³,
 $E_T \sim 0.7-2 \times 10^{51}$ erg, $T_e \sim 0.5-0.7$ keV.
Higher $T_{ion} \sim 1.6$ keV for South plume

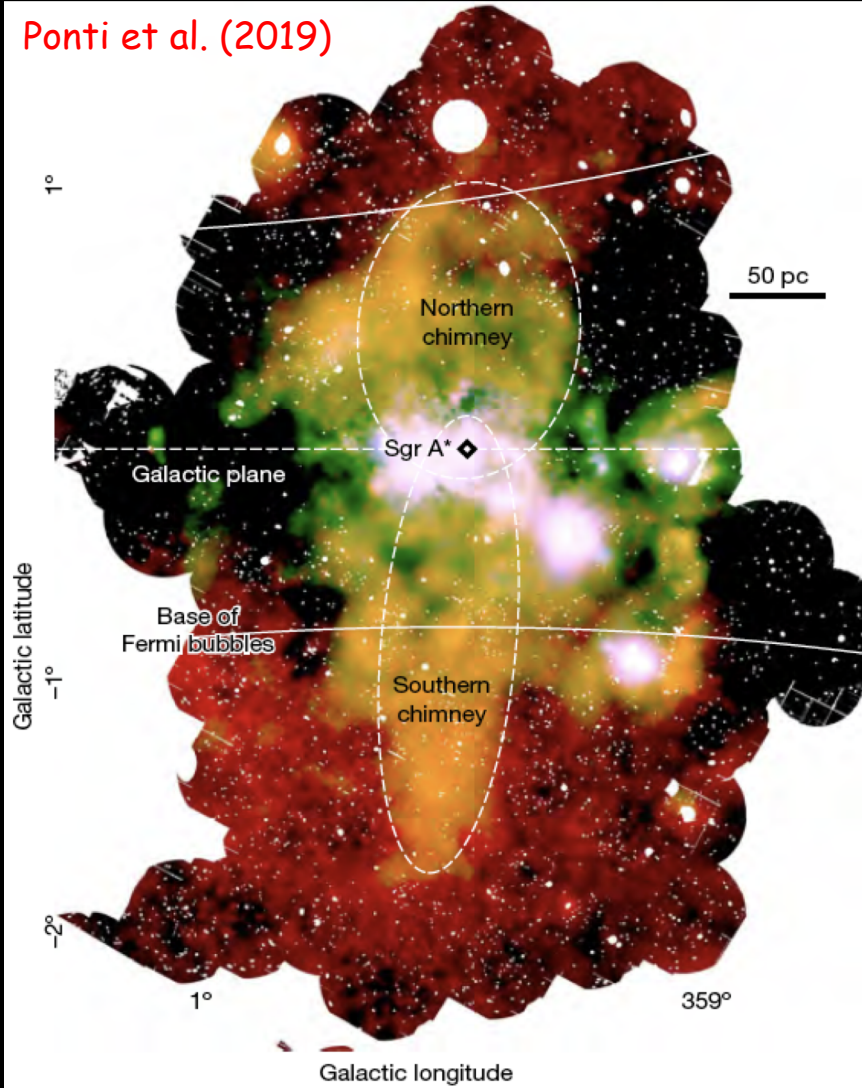


Su et al. (2010)

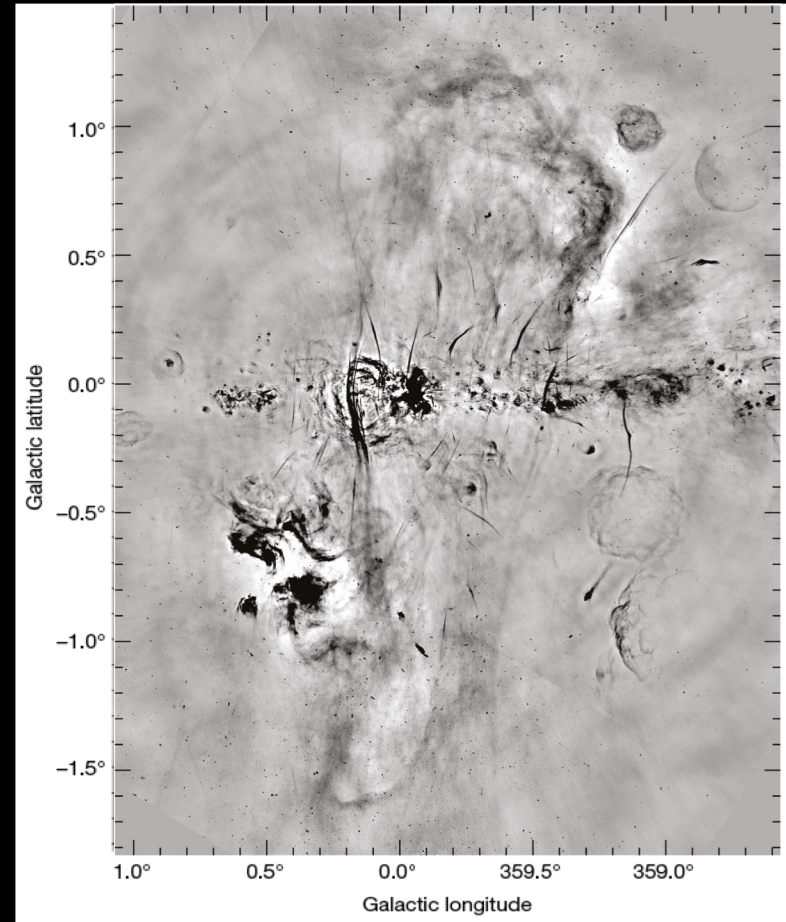
Bland-Hawthorn et al. (2013, 2019)

XMM-Newton and MeerKAT Views

Ponti et al. (2019)

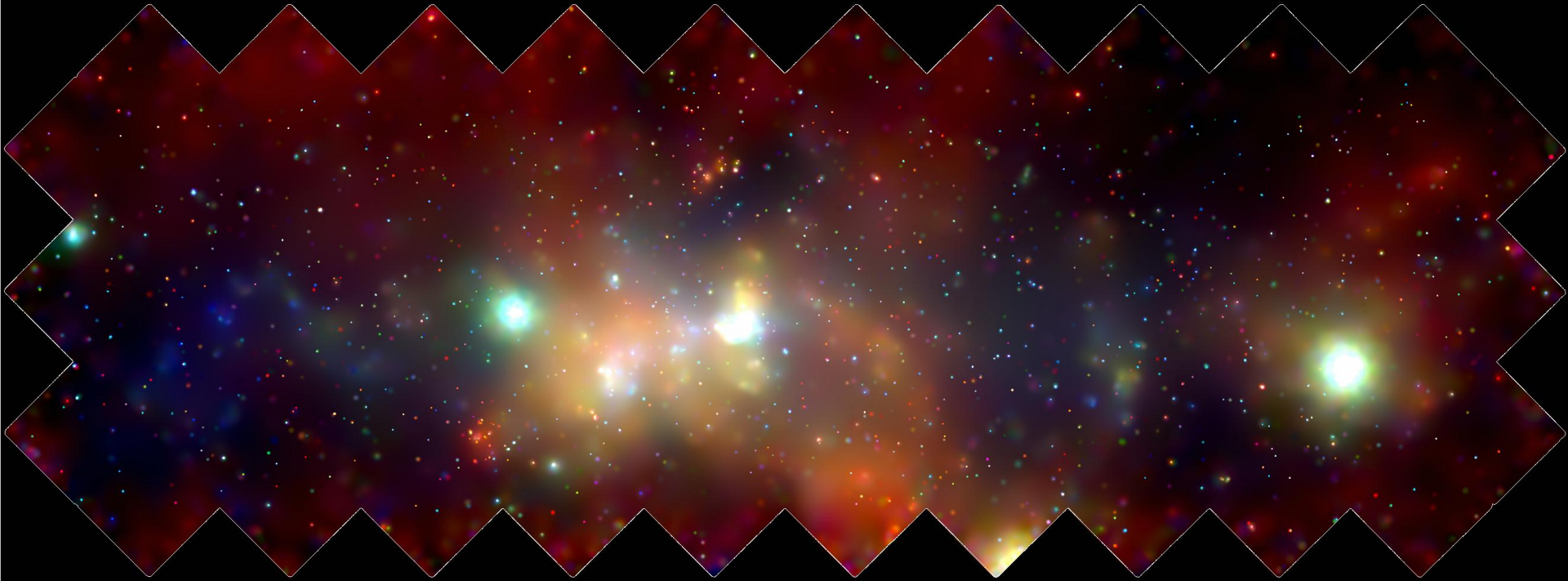


Radio emission from the Galactic Centre from the MeerKAT radio telescope



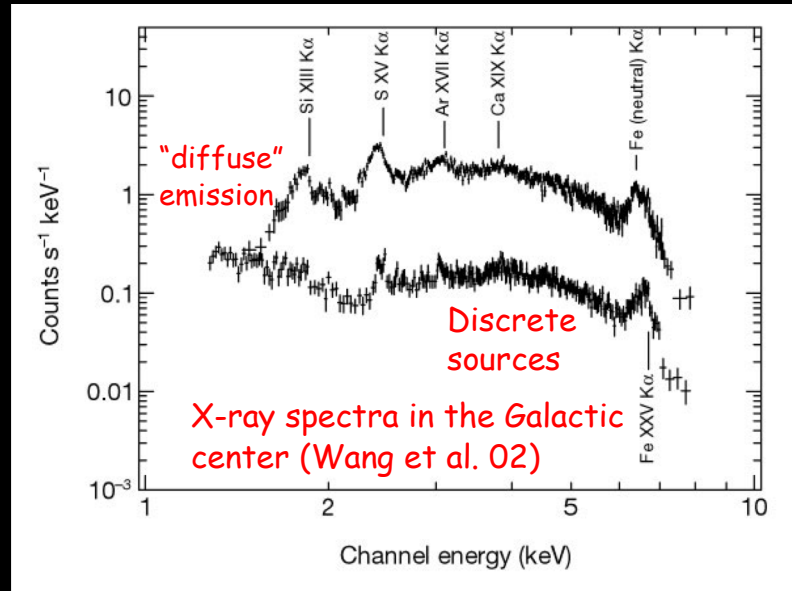
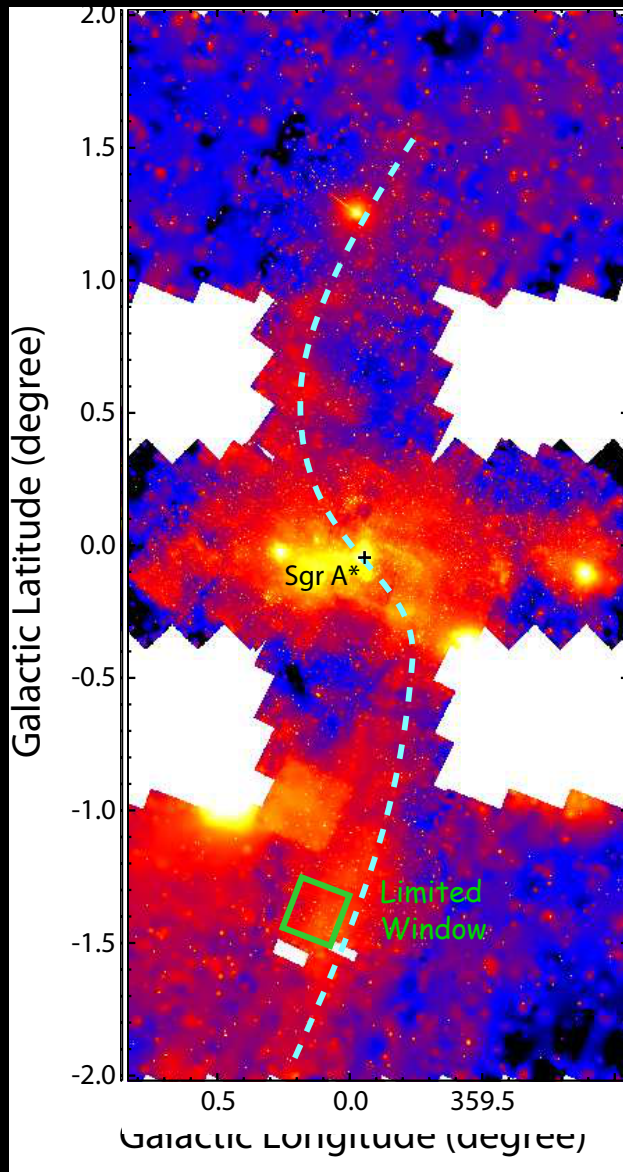
(Heywood et al. 2019)

Early Chandra view



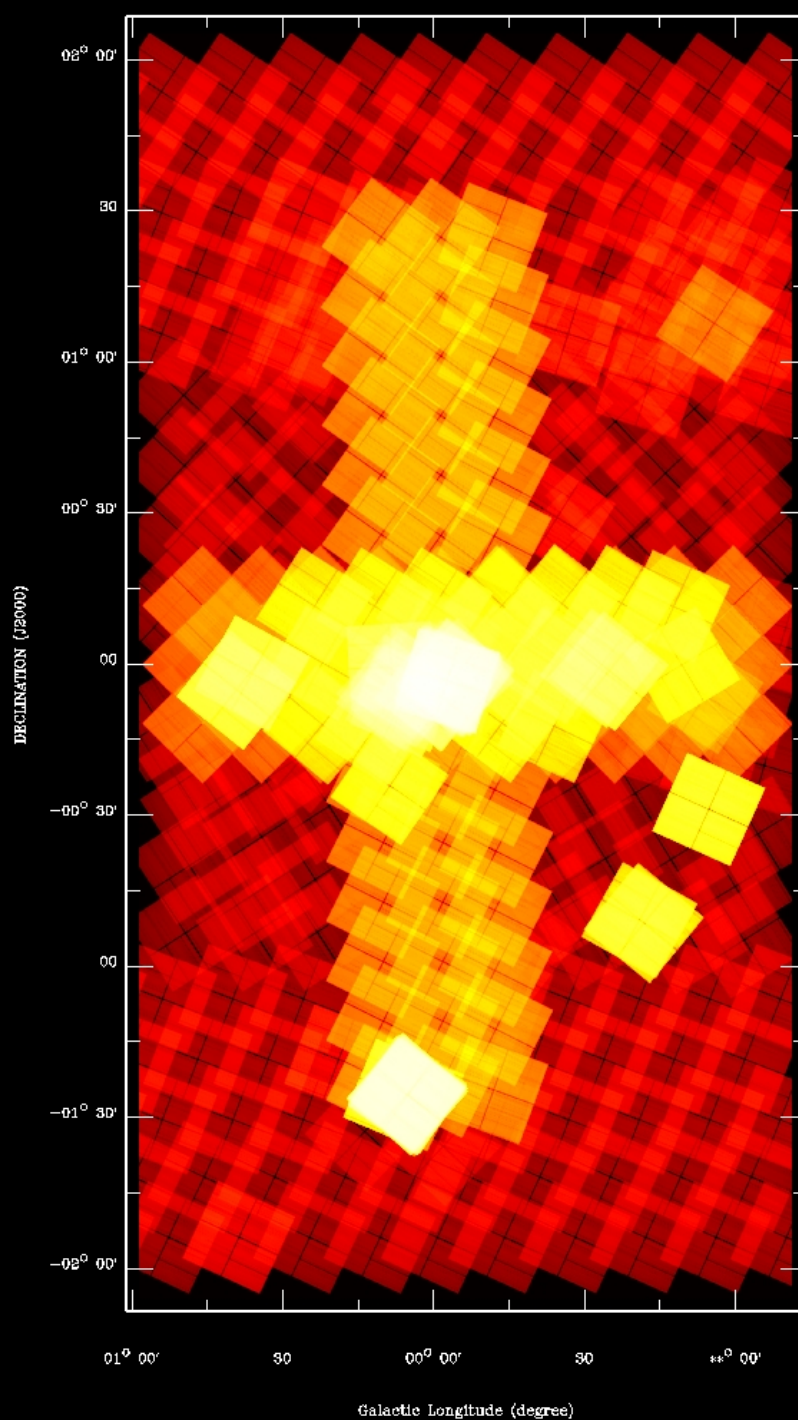
Red: 1-3 keV Green: 3-5 keV Blue: 5-8 keV

Early Chandra view



- Similar Fe XXV He- α line intensities in the resolved source and unresolved spectra \rightarrow origin in CVs.
- Up to $\sim 80\%$ of the line intensity is resolved in the Limited window.
- The flux ratio of Fe XXVI Ly- α /Fe XXV He- α increases toward the Galactic center.
- But the specific flux of Fe XXV He- α also increases.
- The origin of the X-ray emission remains very uncertain!

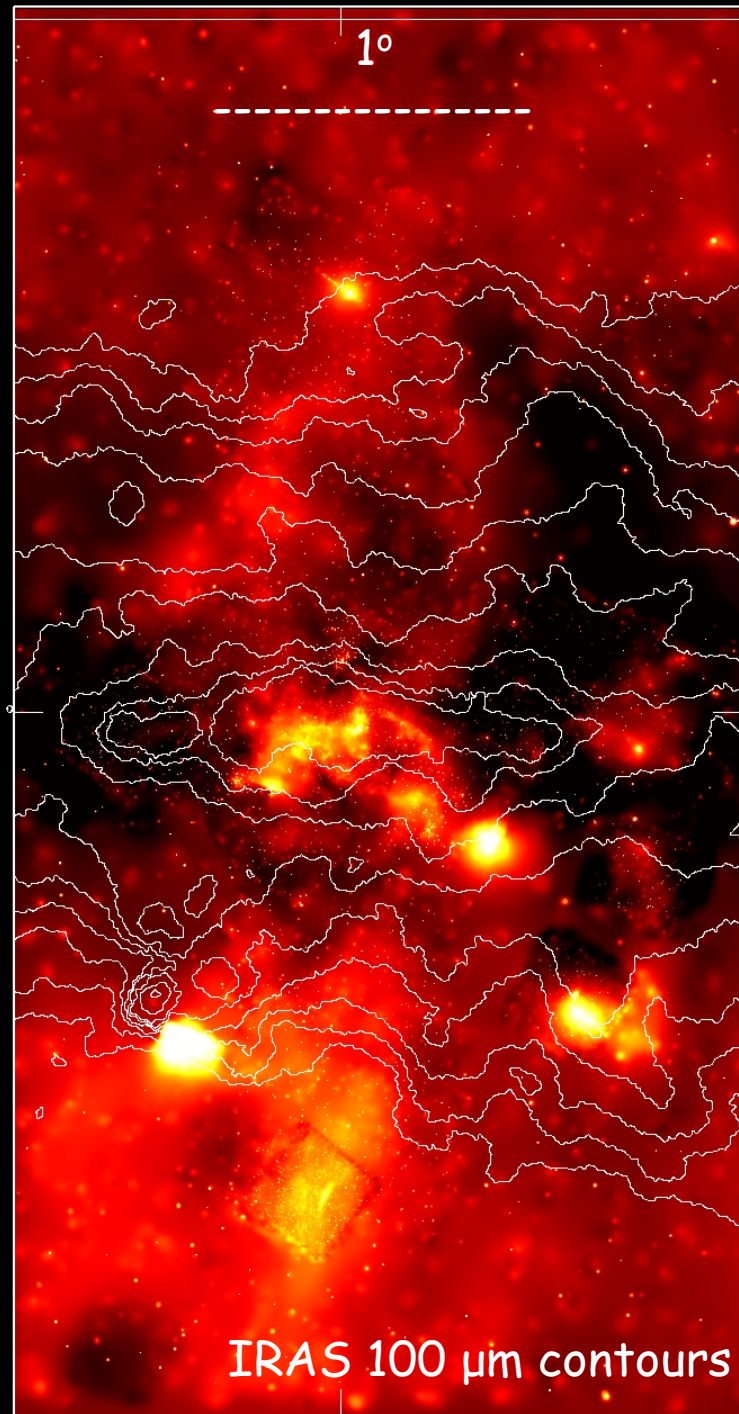
Latest Chandra view



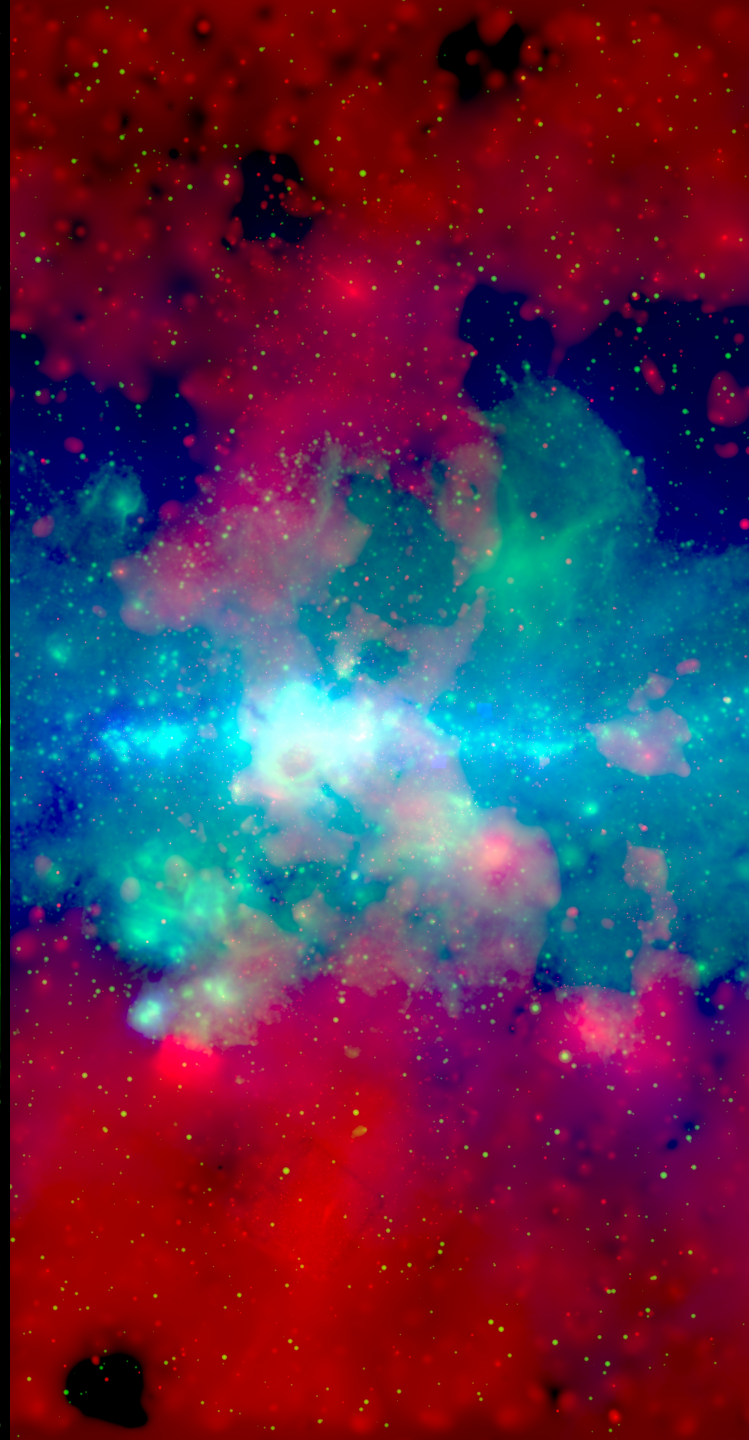
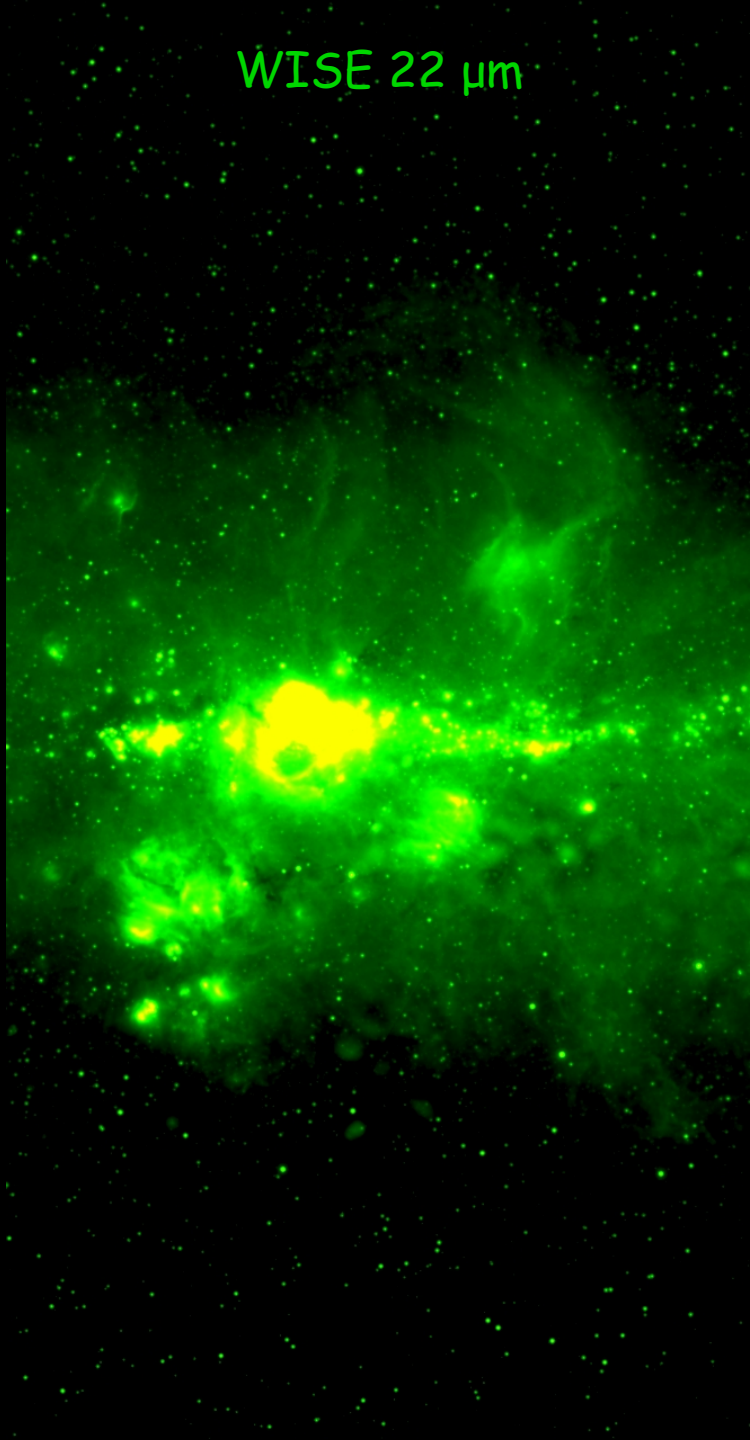
- Filling gaps and holes
- > 300 ACIS-I observations.
- Full coverage over $\sim 2^\circ \times 4^\circ$ field around Sgr A*

Chandra ACIS-I 1-2.5 keV

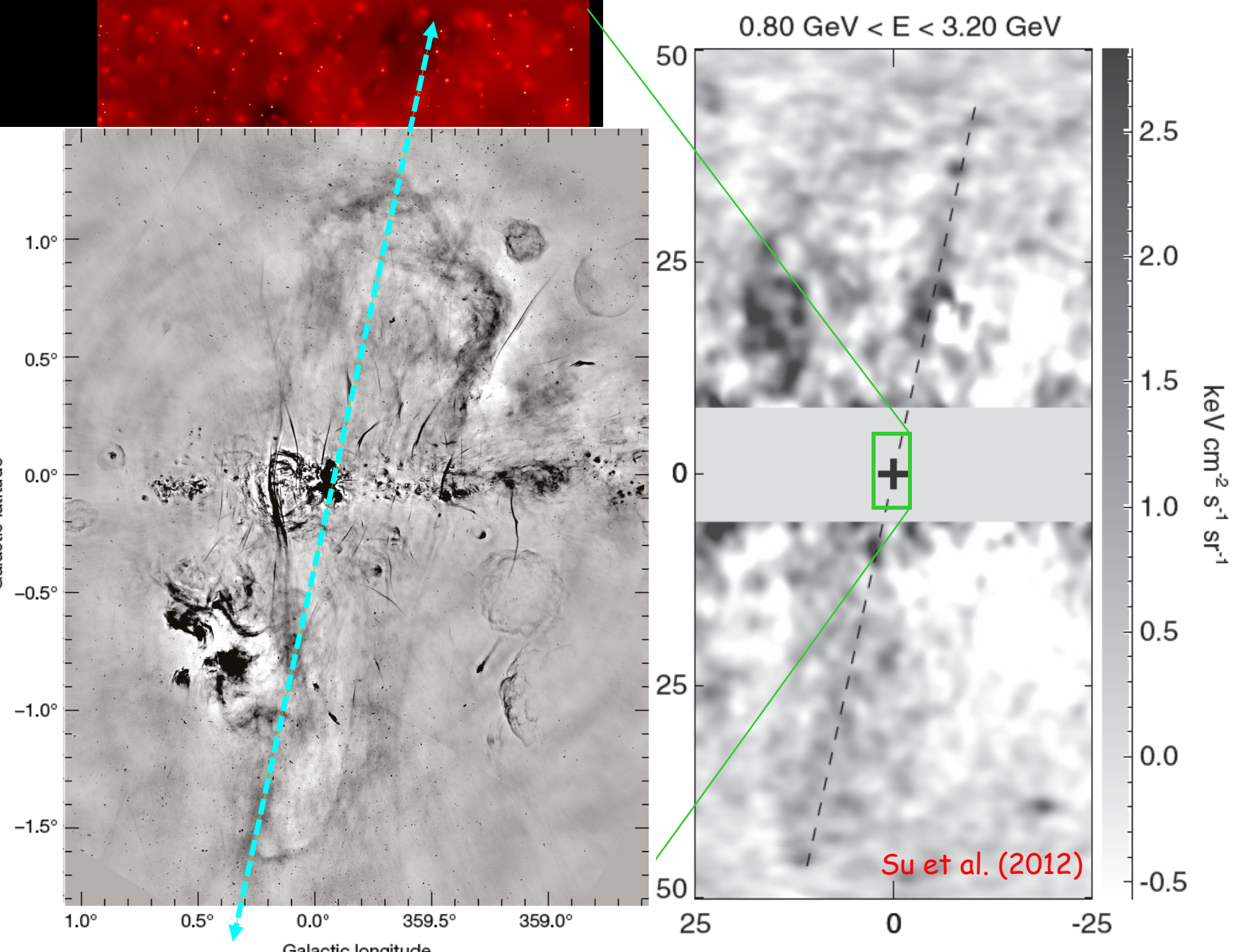
Discrete sources are NOT excised



WISE 22 μm



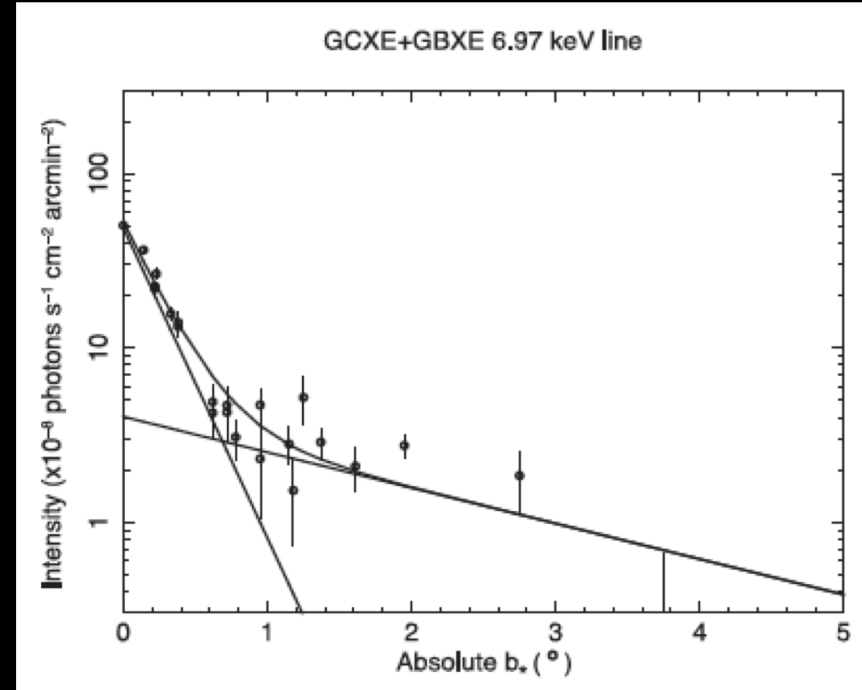
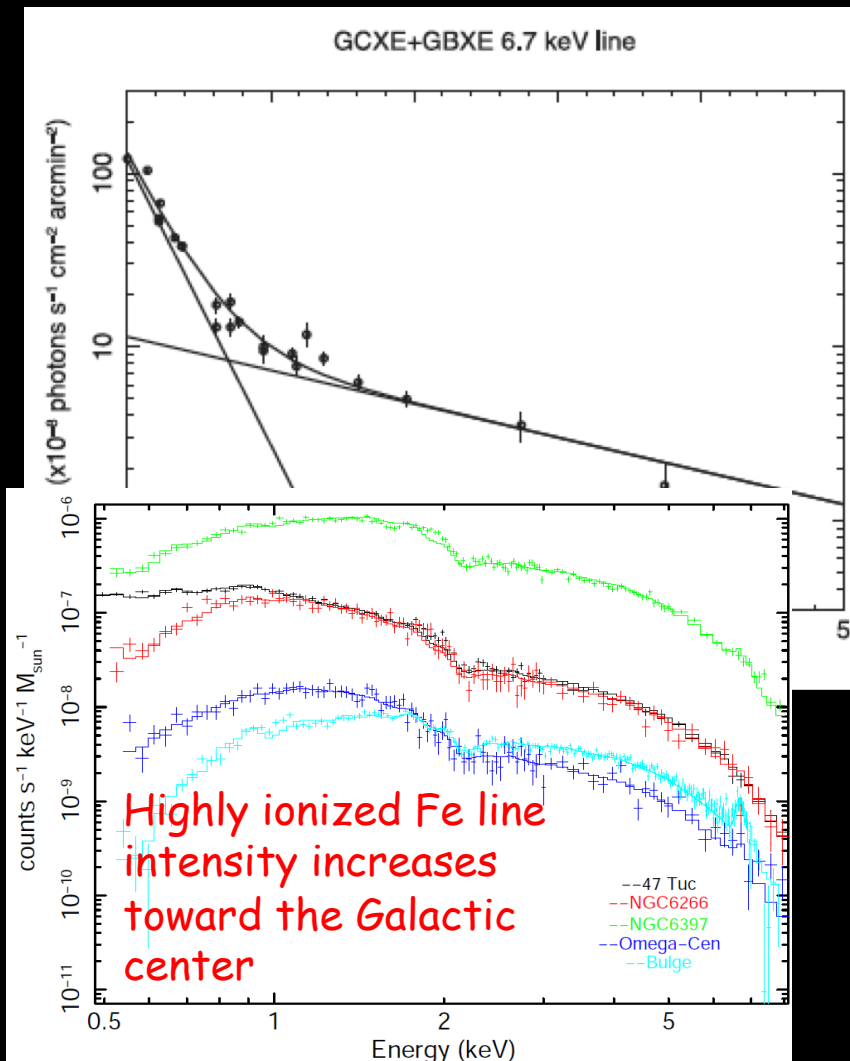
1-2.5 keV
22 μm
100 μm



Summary

- The Galactic center provides an excellent lab for energetic processes in an extreme nuclear environment.
- Chandra has made a $2^\circ \times 4^\circ$ FoV around Sgr A*, allowing
 - Detection of faint discrete X-ray sources and study of their population, distribution, and properties;
 - Mapping of diffuse hot gas with minimal confusion with discrete sources;
 - Detailed X-correlation with multi-wavelength objects and features.
- Joint analysis with the Suzaku data will be carried out.

Suzaku Fe line distribution



Koyama (2018)