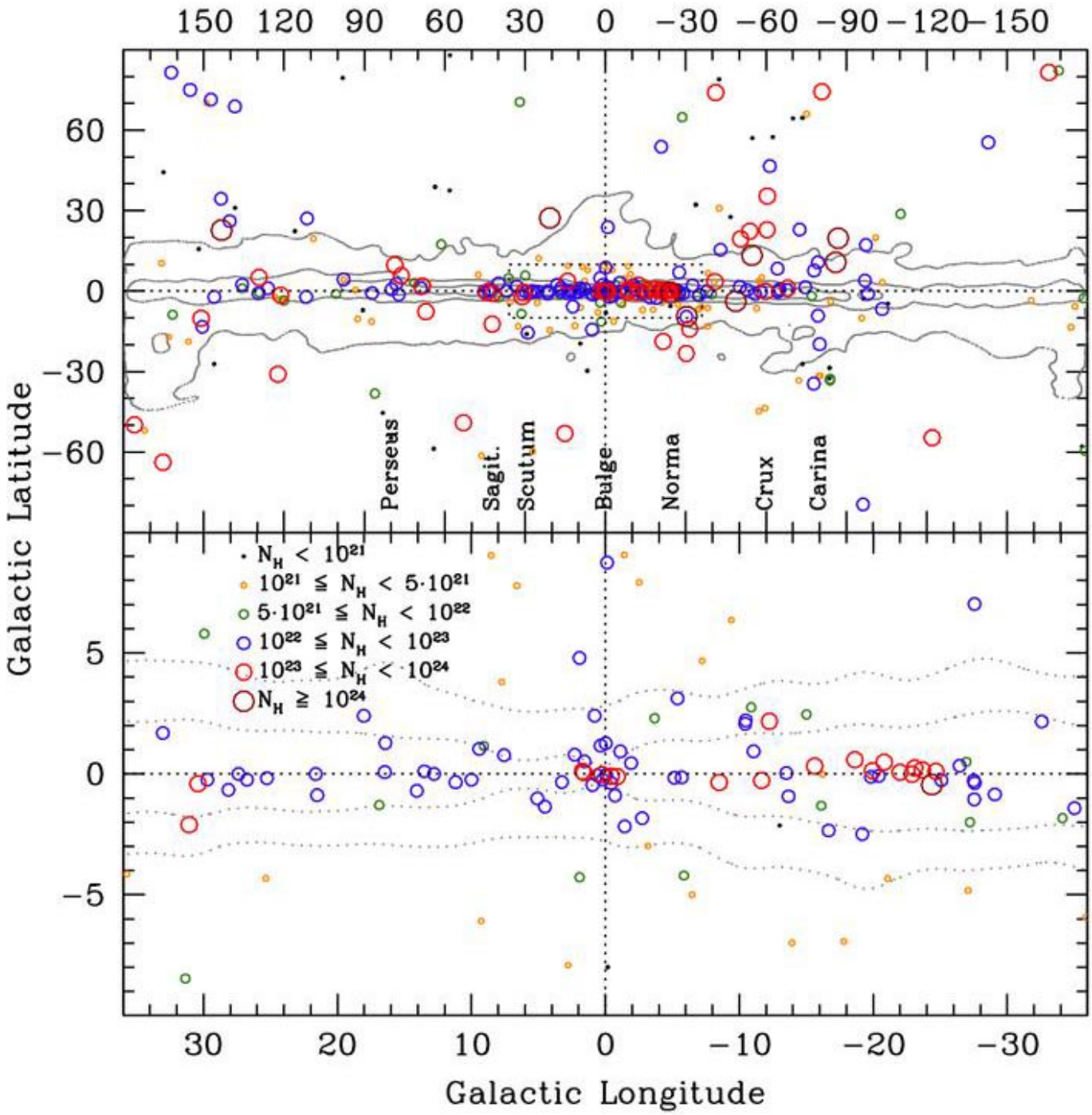
INTEGRAL

Picture of the Month

May 2007



INTEGRAL unveils the obscured sky

X and gamma-ray sources are often enshrouded in material that can suppress soft X-ray photons (typically 1-5 keV) but allow more energetic photons to permeate through. Because its soft gamma-ray imager ISGRI operates above 20 keV, INTEGRAL is unhindered by photoelectric absorption (nH). Therefore, INTEGRAL is discovering many new heavily-absorbed sources that were missed by previous X-ray surveys.

This figure presents the spatial distribution, in Galactic coordinates, of all ~500 sources detected by ISGRI (until Dec. 1, 2006) for which a photoelectric absorption has been reported. The symbol size is proportional to the published column density as derived from a fit to an X-ray spectrum. The figure at the top shows the whole sky and includes extragalactic sources, while the figure at the bottom focuses on the Galactic Bulge (boxed area in the figure at the top) and excludes extragalactic sources. Contours denote expected interstellar absorption levels of 10^{21}, $5x10^{21}$, and 10^{22} cm^{-2} (Dickey & Lockman, 1990).

Among the benefits of this absorption map is that it highlights potential clustering or asymmetry in the spatial distribution of absorbed sources. While the Galactic absorption is expected to be symmetrical, the lower figure shows that the Norma Arm harbors a disproportionate share of obscured sources (nH >= 10^{23}) compared with the Galactic Center region or the Scutum/Sagittarius Arms. Bronfmann et al. (1996) and Russeil (2003) have noted that the Norma Arm is the region of the Galaxy that features the highest formation rate of OB supergiant stars. These are the precursor stars to the growing class of heavily-absorbed HMXBs that INTEGRAL is well suited to finding.

References: A. Bodaghee et al., A&A in press, astro-ph/0703043, ISDC, University of Geneva Observatory