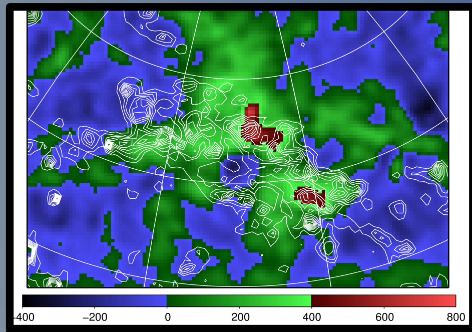
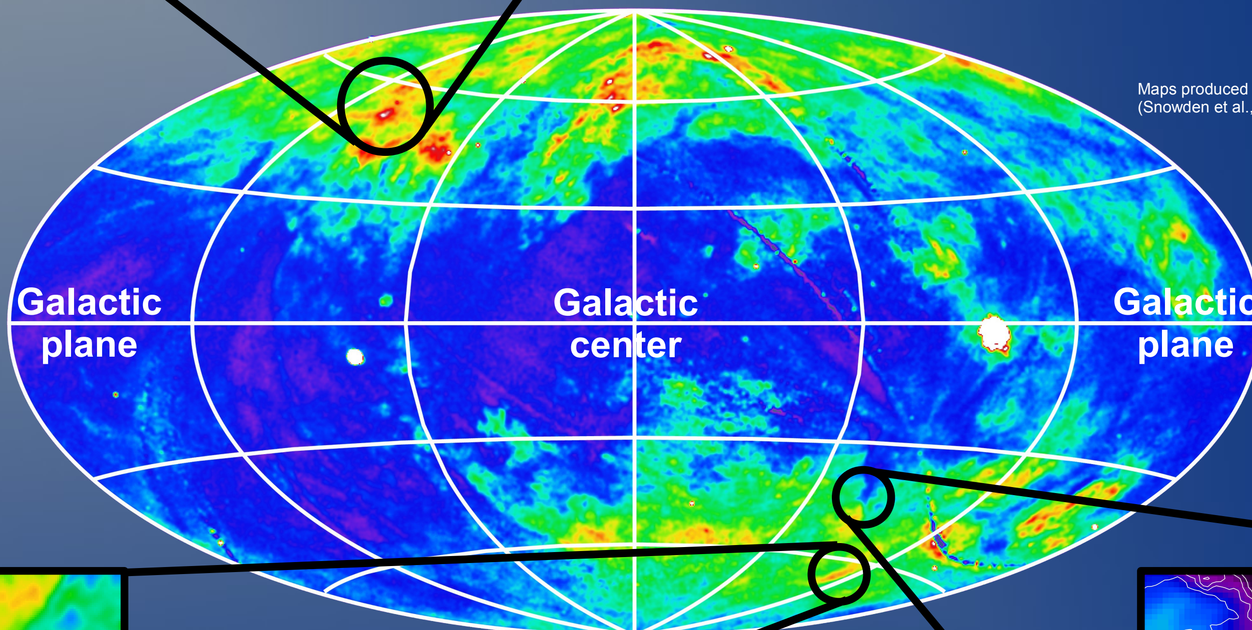
The Soft X-ray Background

David Henley, Shijun Lei, Kyujin Kwak & Robin Shelton
Dept. of Physics & Astronomy, University of Georgia

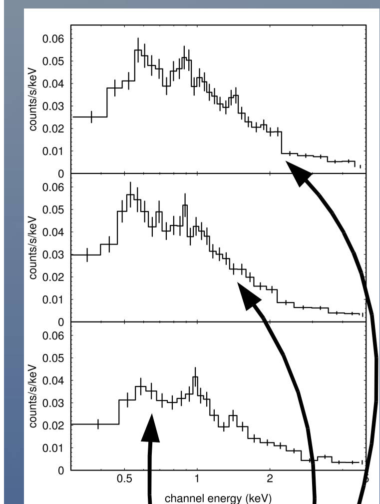
The main image shows a map of the entire sky in soft X-rays. The data are from the *ROSAT* All-Sky Survey, which was carried out in the early 1990s. This soft X-ray emission is mainly from hot gas in our Galaxy, at temperatures of ~1-3 million degrees. We are using a combination of observations from the *XMM-Newton* and *Suzaku* satellites and sophisticated hydrodynamical simulations in order to better understand the origin and evolution of this hot gas. This work is funded by NASA.

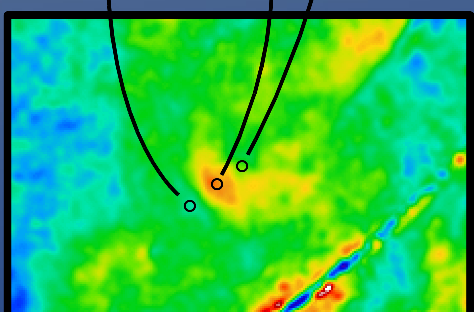


Right: The white contours outline cold gas falling into the Galaxy, while the color scale show excess or deficient X-ray emission, relative to a smooth model of the soft X-ray background. The brightest excess emission (in red) is coincident with the infalling gas. This suggests that the interaction between the infalling gas and the Galaxy may be contributing to the heating of the million-degree gas.

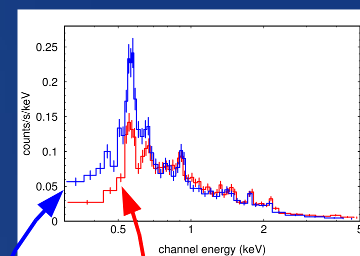


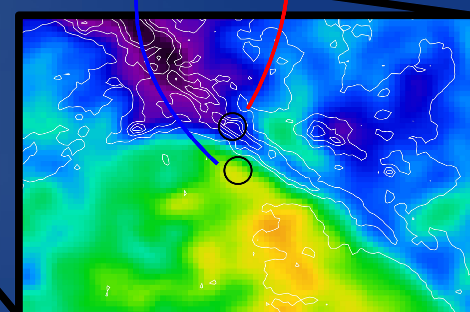
Maps produced from data from the *ROSAT* All-Sky Survey (Snowden et al., 1997, ApJ, 485,125)





Above: This arc-like feature appears in the soft X-ray background. We have used the *Suzaku* satellite to obtain X-ray spectra of the arc and its surroundings (shown above). Our analysis shows that the arc may be the edge of supernova remnant, blown by a star exploding 100,000 years ago some 3000 light years above the Galactic disk. This result supports the idea that some of the hot gas above the disk is heated *in situ* by supernova explosions.





Above: The white contours outline cool, X-ray—absorbing material, and show a nearby filament (distance ≈ 750 light-years) which casts a shadow in the soft X-ray background. We use the differences between the on- and off-filament X-ray spectra (shown above) to separate the emission from the various components along the line of sight. Our analysis suggests that the hot gas above the Galactic disk was heated by a mixture of supernova explosions and extragalactic material falling on to our Galaxy.