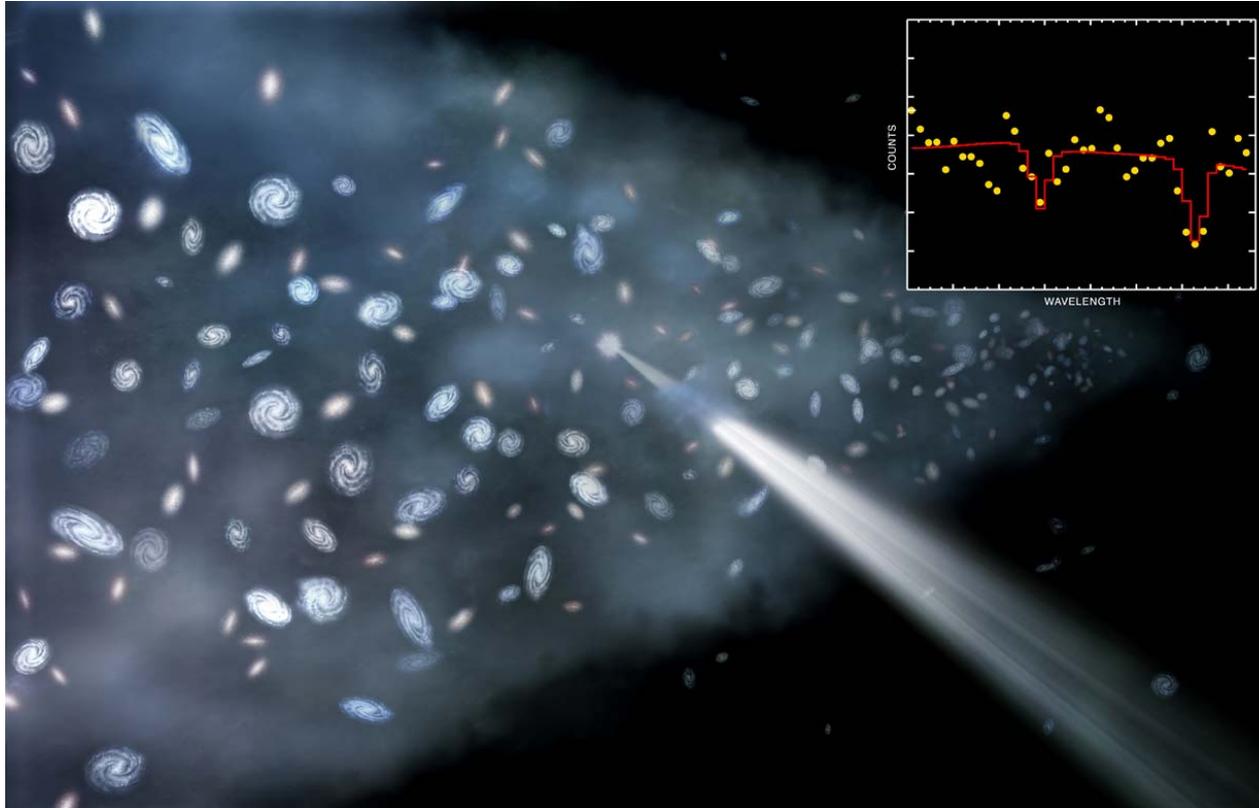




Chandra Science Highlight

H2356-309: X-ray Discovery Points to Location of Missing Matter



Distance Estimate: Sculptor Wall, 400 million light years (redshift $z=0.03$); H2356-309: about 2 billion light years ($z=0.165$)

An artist's illustration (Left) depicts X-ray light from a distant quasar H2356-309 passing through the Sculptor Wall, a huge intergalactic structure comprised of galaxies and a putative warm-hot intergalactic medium (WHIM). The inset shows the observed X-ray spectrum of the quasar with Chandra data (yellow) and the best-fit model (red) that includes both Chandra and XMM data.

Credits: Illustration: NASA/CXC/M.Weiss; Spectrum: NASA/CXC/Univ. of California Irvine/T. Fang et al.

- The absorption feature on the right in the X-ray spectrum of H2356-309, which is a special class of quasar known to lack intrinsic absorption features, is strong evidence (4-sigma) for absorption by OVII ions at the distance of the Sculptor Wall.
- Absorption by OVII ions in the Galaxy was also detected (absorption feature on left).
- The characteristics of the absorption are consistent with the predicted temperature ($T \sim 1\text{MK}$) and density ($n \sim 6 \times 10^{-6} \text{cm}^{-3}$) of the WHIM.
- This result suggests that approximately half the baryons in the universe may reside in an enormous web consisting of filaments of warm-hot matter stretching across tens of millions of light years.

References: Fang, T., et al. 2010, ApJ 714, 1715