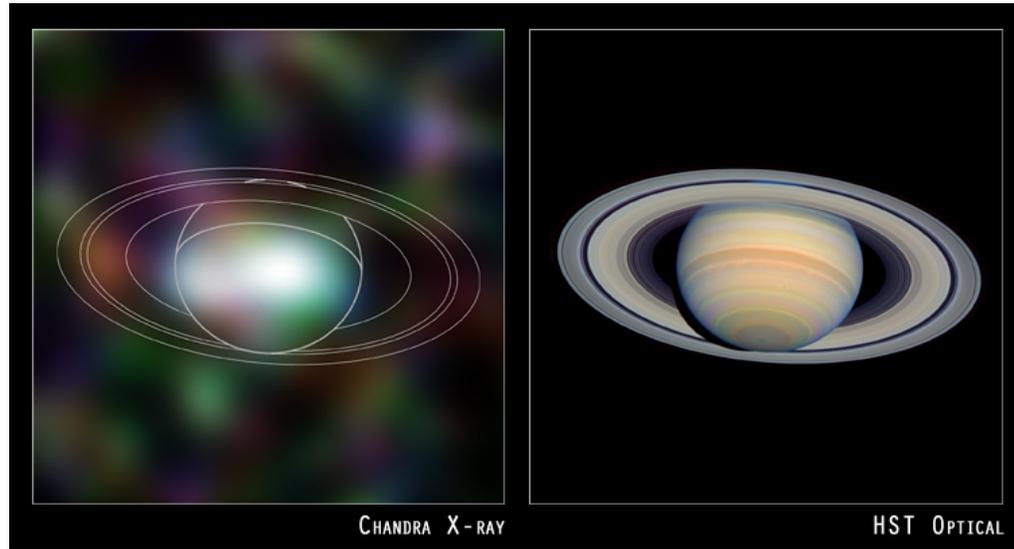




# Chandra Science Highlight

## X-rays from Saturn



Chandra's image of Saturn shows that its X-radiation is concentrated near the equator, unlike Jupiter, where the most intense X-radiation is associated with the strong magnetic field near its poles. The features outside of Saturn's disk in the X-ray image are instrumental artifacts or "noise." Saturn's X-ray spectrum is similar to the solar X-ray spectrum, which indicates that Saturn's X-radiation is due to the reflection of solar X-rays by Saturn's atmosphere. The optical image of Saturn, due to reflected visible light from the Sun, shows much more detail because the Sun emits about a million times more power in visible light than in X-rays, and the albedo of Saturn's atmosphere and rings is much higher at optical than at X-ray wavelengths.

*Chandra X-ray Observatory ACIS image.*

- Although the spectrum of the X-rays is consistent with scattering of solar X-rays, the X-ray intensity implies that the X-ray reflectivity of Saturn's atmosphere is surprisingly large, about 50 times greater than that of the Moon.
- The total X-ray power from Saturn is 90 megawatts, consistent with the power of reflected solar X-rays from Jupiter's atmosphere, assuming similar X-ray albedos for the two planets.
- The weakness of the X-radiation from Saturn's south pole was a surprise (the north pole was obscured by Saturn's rings), since auroras have been observed from its south pole at other wavelengths.

Reference: J. Ness et al. 2004 *Astronomy & Astrophysics* (March 8 issue) also [astro-ph/040127](https://arxiv.org/abs/astro-ph/040127)