Chandra Observations of Nearby Spiral Galaxies

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[Invited Review Talk, 30 min.]

Abstract

The first Chandra images of spiral galaxies are spectacular. There is evidence for diffuse emission from hot gas, and a multitude of discrete X-ray sources which dominate the flux. Chandra's superb imaging capability enables us to resolve these two components in unprecedented detail. In this review I will describe some of the very detailed observations now available for local group galaxies (M31 and M33) and then give some preliminary results from a Cycle 2 Large Project survey of 11 nearby face-on spirals.

Observations of local group galaxies (M31 and M33) reveal X-ray sources associated with globular clusters and HII regions. The globular cluster sources in M31 are very luminous compared to globular clusters in the Milky Way, and I will briefly describe possible reasons for this discrepancy. Observations of spiral galaxies outside of the local group also show that many, but not all, of the X-ray sources are coincident with optical sources. Several nearby spirals have been observed more than once; in these galaxies we find that many (most?) of the sources are variable, suggesting that the discrete sources are dominated by binaries.

The discrete source luminosity functions of spiral galaxies are complex, vary from galaxy to galaxy, and there is evidence (e.g. in M81) that the disk and bulge functions may be different. There is also evidence for breaks in the luminosity functions. These observations can be qualitatively understood in terms of binary populations produced in different star formation epochs.

CATEGORY: NORMAL GALAXIES