Chandra Observations of the Spiral Galaxy NGC 3184

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Abstract

Spiral galaxies are complex X-ray sources. There is evidence for diffuse emission from hot gas, but it is a multitude of discrete sources which dominate the total flux. The discrete source population is thought to arise from X-ray luminous supernova remnants and X-ray binaries; however, pre-Chandra observations suffered from poor resolution, making it impossible to distinguish between these possibilities. Here we present X-ray and optical observations of the nearby (8.7 Mpc) face-on spiral galaxy NGC 3184. NGC 3184 does not have any evidence for an AGN; the nuclear region has an HII region spectrum. It was observed twice with Chandra, in Jan and Feb 2000, and the archival data are being analyzed as part of a survey project studying X-ray point sources in spiral and starburst galaxies. We show that about 50% of the discrete sources are variable, suggesting that they are accretion sources. We have analyzed their variability and color to roughly determine the source type. Approximately 30% of the X-ray sources are coincident with an optical source, mostly HII regions. We show that there is no evidence for dramatic variations of the X-ray hardness ratio as a function of distance from the nucleus, perhaps suggesting that the binary production rate is in steady state in this disk galaxy. However, there seem to be preferentially more sources associated with the northern than the southern spiral arm, suggesting the presence of an absorbing material.

CATEGORY: NORMAL GALAXIES