

X-ray observations of nearby spiral galaxies

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ABSTRACT

ROSAT observations of nearby spiral galaxies have revealed a wealth of new results. Of specific importance for the improvements of ROSAT measurements compared to earlier missions was the high collecting area and resolution of the telescope system in combination with the low background characteristics as well as the improved spatial and energy resolution and low energy response of the PSPC detector (compared e.g. to the Einstein IPC) and the resolution of the ROSAT HRI detector.

Though nearby galaxy studies with ASCA and SAX have been limited by the comparatively poor spatial resolution, the broader energy coverage in combination with the better energy resolution of the instruments aboard these satellites gave important additional information mainly of integral emission properties or of the dominant emission component of the galaxies.

Extrapolating from the the experience gained from investigations using the above mentioned missions using the calibrated instrument properties **XMM will allow to attack important new science in the area of nearby galaxies:**

With XMM it will be possible to identify point sources (X-ray binaries, SNRs, SN, ...) and characterize diffuse emission by the X-ray spectra and time variability alone.

Due to the high spatial and spectral resolution and improved collecting power (mainly EPIC detectors), point source and in particular nuclear components will be better separated from diffuse emission components and all components can be investigated separately.

Due to the highly improved spatial resolution and response at low X-ray energies it will be possible to resolve the filamentary structures in million K halo gas indicated in the ROSAT soft band images of several nearby galaxies (e.g. in NGC 253, NGC4631, ...) that are important for selecting the underlying heating mechanisms.