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NGC 7314: X-Ray Study of the Evolving Accretion Properties

We present an in-depth analysis of the timing and spectral properties of NGC 7314, a Seyfert 1.9 galaxy, using data from XMM-Newton, NuSTAR, and RXTE/PCA. Our timing analysis reveals significant variability across multiple energy bands, with fractional variability (Fvar). We observe that soft X-ray photons exhibit greater variability compared to harder photons, suggesting distinct emission origins: soft photons likely arise from a hot corona near the central region, while high-energy photons are generated through inverse Compton scattering in a more distant hot plasma. Spectral modeling confirms the presence of a soft excess, Fe Kα line emission, and a notable reflection component. Long-term RXTE/PCA data reveal evolving emission properties, including variability in the photon index (Γ) and power-law flux. The detection of both broad and narrow Fe Kα line features points to a variable broad component originating in the accretion disk (at ~ 10-5 pc) and an unconstrained narrow line. An absorption feature hints at a highly ionized region, possibly near the broad-line region (BLR). The evolving inner accretion properties of NGC 7314 suggest it may be a candidate for a changing-state active galactic nucleus (AGN).

Section

High Energy

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