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Current Challenges and New Frontiers in the Next Decade

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Evidence for radiation pressure compression in the X-ray narrow-line region of Seyfert galaxies

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The observed overlap between soft X-ray emission and the NLR in obscured AGN is commonly interpreted as evidence for a constant gas pressure multiphase medium. Radiation pressure compression (RPC) also leads to a density distribution, since a gas pressure (hence density) gradient must arise within each cloud to counteract the ionizing radiation pressure. RPC leads to a well-defined ionization distribution, and a differential emission measure (DEM) distribution with a universal slope of -0.9. In contrast, a multiphase medium does not predict the form of the DEM. The observed DEMs of obscured AGN with XMM-Newton RGS spectra (the CHRESOS sample) are in striking agreement with the predicted RPC DEM, providing a clear signature that RPC is the dominant mechanism in the X-ray NLR. In contrast with the constant gas pressure multiphase medium, RPC further predicts an increasing gas pressure with decreasing ionization, which can be tested with future X-ray missions using density diagnostics.

Topic

Active Galactic Nuclei: accretion physics and evolution across cosmic time

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