

Abstract:

"X-ray Spectra from MHD Simulations of Accreting Black Holes"

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We present new global calculations of X-ray spectra from fully relativistic magneto-hydrodynamic (MHD) simulations of black hole (BH) accretion disks. With a self-consistent radiative transfer code including Compton scattering and returning radiation, we can reproduce the predominant spectral features seen in decades of X-ray observations of stellar-mass BHs: a broad thermal peak around 1 keV, power-law continuum up to  $>100$  keV, and a relativistically broadened iron fluorescent line. By varying the mass accretion rate, different spectral states naturally emerge: thermal-dominant, steep power-law, and low/hard. In addition to the spectral features, we briefly discuss applications to X-ray timing and polarization.