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Spectro-timing properties of the black hole X-ray binary MAXI J1348–630 using AstroSat Observations

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We present broadband X-ray spectral and timing analysis of the black hole X-ray binary MAXI J1348–630, performed using five AstroSat observations. The source was in the soft spectral state for the first three observations and in the hard state for the last two. The power density spectra are substantially weak in the soft state compared to the hard state. In addition, we detected quasi-periodic oscillations at ~ 0.9 and ~ 6.9 Hz, belonging to the type-C and type-A classes. The three soft state spectra were modeled using a relativistic thin accretion disk with reflection features and thermal Comptonization. Joint fitting of the soft state spectra constrained the spin parameter of the black hole $a^* > 0.97$ and the disk inclination angle ~ 32.9 degrees. The bright and faint hard states had a bolometric flux of ~ 6 and ~ 10 less than the soft state, respectively. Their spectra were fitted using the same model, except that the inner disk radius was not assumed to be at the last stable orbit. However, the estimated values do not indicate large truncation radii, and the inferred accretion rate in the disk was an order of magnitude lower than that of the soft state. The spectral and temporal analyses with AstroSat data provide a comprehensive picture of the evolution of the source.

Presentation Type

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