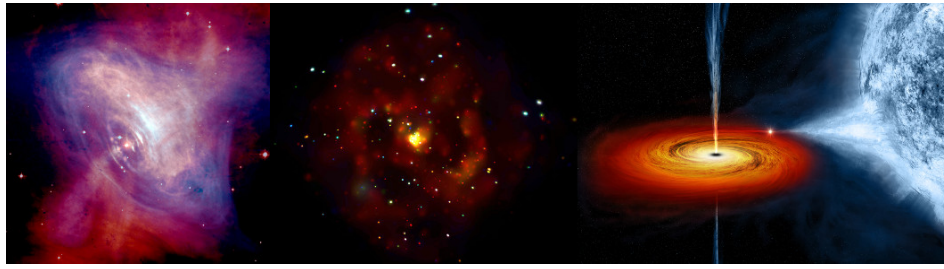


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Spectral and temporal analysis of the BHC MAXI J1348-630 during two major outbursts of 2019

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The Galactic BHC MAXI J1348-630 was discovered by MAXI/GSC and Swift/BAT satellites in 2019. The source had undergone two major outbursts in 2019, shortly after its discovery. Using archival data from multiple satellites (including Swift, MAXI, NICER, NuSTAR, and AstroSat) we have performed a detailed spectral and temporal analysis of both the outbursts. The first outburst lasted for four months. The two component advective flow (TCAF) model is used to investigate the combined 1-150 keV Swift/XRT, Swift/BAT, and MAXI/GSC spectra. Using the spectral fits the dynamics of accretion flow were investigated. We have analysed the flux variation in soft and hard X-ray ranges, the hardness ratio, TCAF model fitted accretion rates and accretion rate ratio (ARR). We have studied the evolution of the four spectral states (hard, hard-intermediate, soft-intermediate and soft states) in rising and declining phases of the outburst. During the first outburst the source evolved through all the four spectral states and was complete in nature. Low-frequency quasi-periodic oscillations (QPO) were found in two observations during the rising phase. From the spectral analysis, the mass of the black hole is estimated to be 7.9 - 10.7 solar mass and from state transition luminosity the distance of the source is estimated as 5-10 kpc. The second outburst lasted approximately two and a half months. We have analysed the spectral properties from the Swift/XRT, MAXI/GSC, NICER and NuSTAR spectra. We have studied the evolution of the photon index from power-law model and the flow parameters from the physical model, TCAF. From the detailed spectral analysis we conclude that unlike the first outburst there was no transition to soft or intermediate spectral states during the second outburst. The second outburst is failed in nature. Throughout the second outburst, the source was in hard state with high dominance of non-thermal photons. Also there was a presence of weak reflection in the NuSTAR spectrum. To account for the reflection, we have also used PEXRAV model. The inclination of the source was estimated to be varied in between 30°-46°. We have done the timing analysis with the archived data from AstroSat. Low frequency quasi-periodic oscillations were detected in two successive dates 2019 June 14 and 2019 June 15.

Presentation Type

Oral

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