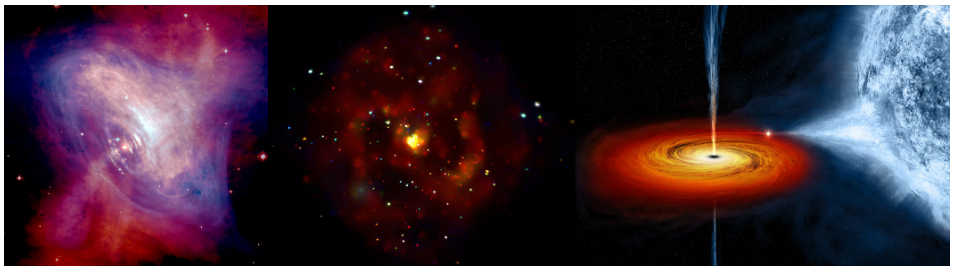

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Exploring accretion disc dynamics in extragalactic stellar mass black hole X-ray binaries

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Extragalactic Black Hole X-ray Binaries (BH-XRBs) are the most intriguing X-ray sources as some of these systems are 'home'to the most massive stellar mass BHs ever found. Most of these sources accrete matter through a stellar wind, making them ideal for studying the dynamics of accretion disks in massive binary systems. In this work, we study the X-ray properties of three massive (MBH = 15-35 M⊙), eclipsing extragalactic BH-XRBs (M33 X-7, IC 10 X-1 and NGC 300 X-1) using observations carried out by *XMM-Newton* and *NuSTAR*. Study of X-ray lightcurves reveal that the eclipses are energy-dependent which confirms that the origin of eclipse is due to the presence of either an obscuring matter at the outer accretion disk or the stellar wind structure. Further, we carry out comprehensive spectral modelling by fitting the eclipse and non-eclipse spectra separately which showed that during the dip, thermal component is completely absorbed meanwhile non-thermal is partially absorbed. During non-eclipse period, we find the total luminosity to be sub-Eddington (< 13 % of LEdd) in all three sources. We find the non-eclipse spectra to be dominated by non-thermal component and characterized by a cooler (Tin = 0.1 - 0.2 keV) standard thermal disk and a 'hot'(Tin = 1 - 2 keV) slim-disc with radial temperature profile T(r) ∝ r^{-0.5}. Such spectral profile is distinct from that of other two extragalactic BH-XRBs i.e., LMC X-1 and LMC X-3 where the spectrum is mostly thermally dominant and consistent with standard disk + corona picture even though their luminosities are comparable to that of sources of our interest. Thus, we carry out a comparative study of all five extragalactic BH-XRBs in an attempt to provide a unified picture of accretion disk dynamics in extragalactic stellar mass BH-XRBs.

Presentation Type

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