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A spectral and timing study of the LMXRB Maxi J1820+070 during it's outburst

Contributed Talk //

X-ray and Gamma-Ray Binaries (XRBs)

Kyle Solomons //

South African Astronomical Observatory (SAAO)

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Black Hole X-Ray Binaries (BHXRBs) host stellar mass black holes that accrete matter from donor stars in the form of an accretion disk. The transfer of matter can occur through a continuous supply from the donor or by capturing material from stellar winds. In both types of systems, an increased influx of material into the disk, along with subsequent disk instabilities and interactions with other systems, can lead to sudden enhancements in the observed X-ray flux, commonly referred to as outbursts. During these outbursts, BHXRBs exhibit state transitions, with manifestations such as jets during the transition from the Soft to Hard state and equatorial outflows associated with the soft state.

In this study, we present a comprehensive analysis of Maxi J1820+070, a Low-Mass BHXRB, utilizing archival data from the NuSTAR and XMM-Newton X-ray observatories. Our investigation primarily focuses on the system's spectral properties and timing characteristics. We examine the spectral evolution and the transitions between the hard and soft states, extracting key parameters that define these states. To gain further insight, we explore temporal variability using Fourier power spectra and time-lag analysis. Additionally, we investigate the presence and evolution of quasi-periodic oscillations (QPOs), which provide valuable information about the system's inner regions and compact object properties.

Through our findings, we gain valuable insights into the accretion processes within BHXRBs, revealing intriguing state transitions and shedding light on the underlying mechanisms at work.

ADDITIONAL AUTHORS

Initials	Surname	Affiliation
S.C.	Chandra	SAAO
I.M.	Monageng	SAAO

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