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Spectro-polarimetric modelling of XrB observations in the JED-SAD/MONK framework

Swift J1727.8–1613 is a recently discovered X-ray binary system entered in outburst in August 2023 and observed by SWIFT, IXPE, NiCER, NuSTAR and INTEGRAL. In this work, we analyze the source within the framework of the Jet Emitting Disk–Standard Accretion Disc (JED-SAD) model, which provides a self-consistent description of accretion and ejection processes in X-ray binaries. We focus on the bright (at the end of the rising phase) and the dim (in the decaying phase) hard state of the source. We deduce from the JED-SAD spectral fits the thermal structure of the accretion flow. The dominant radiative process appears to be Bremsstrahlung Self Compton and Synchrotron Self Compton in the bright and dim state respectively. The JED-SAD thermal structure is then used as input in the monte-carlo code MONK to compute the associated polarisation and compare it to the IXPE observations. Our simulated polarisation degree and angle are not consistent with the observations in the bright state but are consistent in the dim state. These results highlight the diagnostic power of joint spectral and polarimetric observations with physically motivated models. We will discuss our results and their implication for our understanding of the close environment of black holes in X-ray binaries.

Contribution

Oral talk

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