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Unveiling the spectral evolution of GX 17+2 using AstroSat and NICER observations

We performed a long-term study of the Z-track X-ray binary source GX 17+2, using AstroSat and NICER observations from the year 2016 to 2020. The source spectra is well defined by combination of disk emission, blackbody emisison component and a Comptonized component. Since the factor responsible for such spectral evolution in Z-track sources remain uncertain, we investigated the variation of the source's spectral properties with the different intensity levels along its track to explore it. We find that the factors like covering fraction and the inner-disk radius causes the source to move in NB. On the other hand, in the FB, we observe a significant variation in luminosity from ~ 4.0 to $\sim 7.0 \times 10^{38}$ ergs s^{-1}, accompanied by a corresponding change in the mass accretion rate, suggesting its contribution in driving the source's evolution along the FB. Despite the notable variation in luminosity and in the inner disk radii, the accretion efficiency, defined as $\eta = L_{\rm T}/\dot{M}c^2$, remains nearly constant at ~ 0.18 throughout the evolution of the source, as expected for a neutron star system.

Contribution

Flash talk

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