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Is there disk truncation in the hard states of Swift J1727.8-1613?

The 2023/24 NICER monitoring campaign of the 7 Crab bright black hole X-ray binary Swift J1727.8-1613 covered the outburst in almost all states. High-quality data are available in the high-Eddington-fraction bright hard state, the soft intermediate state, the soft state decay, and the poorly understood back-transition into the dim hard state, making it an ideal dataset to compare the accretion flow at vastly different accretion rates. We deploy continuum fitting techniques to investigate the evolution of the inner disk radius throughout the outburst. Taking a temperature-dependent color-correction factor into account, we see apparent evolution of the disk inner radius by a factor of a few comparing the hard states to the thermal/soft state; we are investigating to discern whether this trend is real or a modeling artifact, and how it differs between the bright and dim hard state. Large-scale truncation with $r \gg r_{\text{ISCO}}$ is incompatible with our results. In the high-luminosity soft-intermediate state, standard thin-disk models do not fit the data well, which may be an indication of “slim-disk” manifestations. I will discuss model systematics, the impact of these constraints on the hard state disk truncation debate, and the IXPE measurements of this source.

Contribution

Oral talk

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