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Rapidly alternating flux states of GX 339–4 during its 2021 outburst captured by Insight–HXMT

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The low mass X-ray binariy GX 339-4 entered a new outburst in 2021. At the end of the hard to soft transition of this outburst, Insight-HXMT found that the source rapidly alternated between low flux and high flux states on a timescale of hours. Two high flux states lasted only for a period comparable to the orbital period of the observatory. Time-resolved spectral analysis shows that the sudden changes of flux are confined in the hard X-ray band (> 4 keV). The variable non-thermal emission, including the power-law continuum from the corona and the reflected emission from the inner accretion disk, is responsible for the observed variability. The strength of the disk thermal emission and the inner radius of the accretion disk are consistent between the two flux states. Assuming the lamppost geometry, our best-fit disk reflection models suggest a very low corona height (within 3 Rg) and there is no evidence of significant variation in the corona geometry either. The observed rapidly alternating flux states suggest that the intrinsic power of the corona must change during the state transition.

Topic

X 射线双星

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