

Evolution of characteristic time scales during the outbursts of the black hole transient GX 339-4

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We report the power density spectral evolution of GX 339-4 during the rising phase of four outbursts in 2002-2010. In order to probe the change in accretion geometry, we study the characteristic frequencies in the power spectra. Our results demonstrate quite uniform evolutionary pattern for low frequency quasi-periodic oscillations, especially with the fact that the four cases differ great in the outburst magnitude. While for band-limited noises, larger scattering exists. Both sorts of power spectral components show significant relative rate-of-change on the timescale of one day, e.g., as much as 50 percent or more in some cases. We think that these phenomena may reflect properties of non-stationary accretion flow, which does not support either the SSD or the ADAF regime.

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