NICER Observation of Fast X-ray Flares in GX 339-4


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NICER Observation of Fast X-ray Flares in GX 339-4

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In response to the optical alert reporting the beginning of a new outburst in the black hole binary GX339-4 (D. Russell et al., Atel 10797), a series of NICER observations began on 2017 September 29. The first five observations, conducted through October 1, netted 8.3 ks of exposure. During this time, the source exhibited an average count rate near 20 c/s at 0.3-12 keV, which can be compared to the NICER rate ~11,000 c/s for the Crab Nebula. The average hard color (4-12 / 2-4 keV) is near 0.5 or higher, which is harder than the value for Crab (0.25). These results are consistent with the report that GX339-4 is in a faint black hole hard state (Gandhi et al., Atel 10820). The net spectrum shows a broadened Fe line, but the statistics are not yet sufficient to support detailed analyses. There is no clear trend in source brightness, but the X-ray light curve is punctuated by intense flares that frequently exceed 50 c/s (1 s bins) and reach ~150 c/s on a few occasions. In 0.1 s bins, the same flares reach rates as high as 28 counts per bin (280 c/s), providing clear evidence of sub-second structure (https://heasarc.gsfc.nasa.gov/docs/nicer/results/resources/gx339 pkg lc ts.pdf). These are intense examples of the flaring seen in low-hard states of many black hole binaries, and these X-ray flares very likely correspond with the sub-second optical flares reported by Gandhi et al. on the same day. Such flares are likely related to the jet observed at radio frequencies (T. Russell et al., Atel 10808). We join the effort urging additional observations of GX339-4 to further investigate the jet-accretion connection as well as possible jet contributions to the flaring X-ray emission.

Recommended

11208 Swift XRT observes GX 339-4 in the hard state in Jan 2018
10864 SALT high resolution spectroscopy of GX339-4 in outburst
10825 NuSTAR Observation of GX 339-4 in the early stages of its 2017 outburst
10824 NICER Observation of Fast X-ray Flares in GX 339-4
10820 Sub-second optical flaring in GX 339-4 during the 2017 outburst early rise
10808 Radio detection of GX 339-4 in its latest outburst
10798 X-ray brightening of GX 339-4 in late September 2017
10797 New outburst of GX 339-4 detected by Faulkes Telescope South
7977 SMARTS optical rebrightening of GX 339-4
7962 GX 339-4 in transition back to the hard state after a long outburst
7649 GX 339-4 has entered the intermediate state
7434 GX 339-4 is still in the soft state
7201 GX 339-4 has left the soft state and possibly entered the intermediate state
7009 Soft state of GX 339-4 in its 2014-2015 outburst
6960 Possible ongoing hard-to-soft transition of GX 339-4
6649 Swift/BAT detects of a new X-ray outburst of GX 339-4
4162 GX 339-4 is rising into outburst, and a deep optical quiescent magnitude observed by Faulkes Telescope South
3191 GX 339-4 back in the hard state: optical observations reveal the return of the jet
2547 Optical/IR flux fading rapidly in GX 339-4: OIR jet quenching
2459 Optical Observations of GX 339-4 in Outburst with the Faulkes Telescope South
1962 Optical photometry and polarimetry of GX 339-4 during its outburst rise
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Unusual optical and X-ray flaring activity in GX 339-4

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