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Current Challenges and New Frontiers in the Next Decade

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Investigating Supergiant Fast X-ray Transients within the XMM-Newton EXTraS project

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The sub-class of high mass X-ray binaries called Supergiant Fast X-ray Transients (SFXTs) shows flaring activity even outside outbursts, across more than four orders of magnitude in X-ray luminosity. We investigated these X-ray flares exploiting the XMM-Newton archival observations, taking advantage of the EPIC (0.2-12 keV) products made publicly available by the EXTraS project. Adopting the Bayesian block decomposition of the EPIC X-ray light curves of a sample of SFXTs, we picked out 144 X-ray flares covering an ample range of luminosities, from quiescence to outbursts. Their aperiodic temporal properties, like the rise time to and the decay time from the peak of the flares, their duration and the time interval between adjacent flares, as well as their peak luminosity and emitted energy, show a behavior consistent with the onset of Rayleigh-Taylor instability in accreting plasma near the neutron star magnetosphere.

Topic

Compact and diffuse sources in galaxies and in the Galactic Center

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