High Energy Astrophysics and Cosmology in the era of all-sky surveys

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A problem of classification the eROSITA Tidal disruption events among other variable X-ray sources

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The four completed SRG Observatory half-year all-sky surveys have yielded a significant number of variable X-ray sources.

The SRG/eROSITA telescope has discovered a rich population of tidal disruption events (TDE) that exhibit strong X-ray variability.

Searching for TDE in the X-ray band offers certain advantages over a selection in the optical range.

In X-rays, the background flux of the host galaxy is negligible, allowing us to detect X-ray TDEs with lower luminosity and at greater distances, compared to optical TDE sample.

We present a study of a sample of TDEs selected on the basis of the X-ray flux variability factor (R>10) between surveys. This corresponds to TDEs with peak X-ray luminosities above 5e43 erg/s at a typical redshift of z=0.2 of the eROSITA X-ray TDEs.

Unfortunately, a significant number of AGN show similar X-ray flux variability on a half-year scale, thus contaminating the list of TDE candidates. Furthermore, a considerable number of TDE candidates lack spectroscopic redshift and classification.

A constellation of optical telescopes observes variable SRG sources to obtain a complete spectroscopic sample of TDE.

We present the complex method of spectroscopic classification helps to rule out the most AGN. The key relationship between X-ray luminosity and O[III] (5007A) luminosity can be used to confirm the TDE candidate even for an optical spectrum of moderate quality. This makes it possible to classify X-ray TDE archive sources with lower variability factor (R⁻5) and to extend the TDE sample to lower luminosities. Only extremely rare one might even say unique - variable AGN (Sy2 or LINERS) with soft X-ray spectra can be misclassified using to this criterion. Fortunately, with a high quality optical spectrum and considering a full set of the X-ray and optical properties, one can reliably exclude such objects.

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