

Highly Variable X-ray Sources and Tidal Disruption Events in the XMM-Newton SLEW survey

Friday, 17 June 2022 16:40 (15 minutes)

By comparing with the fluxes (and upper limits) given in RASS, we have constructed a highly variable source sample, comprising 265 sources (2.5 per cent) selected from the XMMSL2 clean catalogue. These source displayed X-ray variability of a factor of more than 10 in 0.2–2 keV compared to the RASS. Of the sample sources, 94.3 per cent are identified. The identification procedure follows a series of cross-matches with astronomical data bases and multiwavelength catalogues to refine the source position and identify counterparts to the X-ray sources. Assignment of source type utilizes a combination of indicators including counterparts offset, parallax measurement, spectral colours, X-ray luminosity, and light-curve behaviour. We identified 40 per cent of the variables with stars, 10 per cent with accreting binaries, and at least 30.4 per cent with active galactic nuclei. The rest of the variables are identified as galaxies. It is found that the mean effective temperatures of the highly variable stars are lower than those of less variable stars. Our sample of highly variable AGN tend to have lower black hole masses, redshifts, and marginally lower soft X-ray luminosities compared to the less variable ones, while no difference was found in the Eddington ratio distributions. Five flaring events are tidal disruption events published previously. This study has significantly increased the number of variable sources in XMMSL2 with identifications and provides greater insight on the nature of many of the sources, enabling further studies of highly variable X-ray sources. We have also found several special variable sources, including highly variable AGNs and TDE candidate, and have conducted a detailed analysis for one of TDE candidate (XMMSL1\J1319+2259). Multiwavelength analysis shows that this TDE belongs to a rare sample with contemporaneous bright emission detected in the X-ray, UV, and optical, which are later echoed by dust-reprocessed light in the mid-infrared. The black hole has a mass of $\sim 5 \times 10^7 M_{\odot}$ residing in a galaxy that is dominated by a middle-aged stellar population of 2.5 Gyr. The XMMSL2 variable source sample have been published in MNRAS, and the TDE paper has been published in ApJ.

Topic

活动星系核与超大质量黑洞

Primary author: 李东悦 (NAOC)

Co-authors: Dr STARLING, Rhaana (University of Leicester); Dr SAXTON, Richard (ESAC); Prof. WEIMIN, Yuan (NAOC)

Presenter: 李东悦 (NAOC)

Session Classification: Session IV