Detection of spectral hardening in IGR J17451-3022; evidence for a LMXB

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Referred to by ATel #: 6501, 6533, 7028

IGR J17451-3022 is a new transient discovered by INTEGRAL JEM-X (ATel #6451). Follow-up Swift/XRT observations found this transient to have a highly absorbed blackbody-like spectrum (ATel #6459). Searches for pulsations using XRT in WT mode found no pulsations in the the 0.01-280 Hz range, with upper limits on the pulsed fraction of roughly 10% (ATel #6469).

We are continuing to monitor this source using Swift/XRT. It has shown a soft thermal spectrum - consistent with ATel #6459 - in observations performed on Sep. 15 and Sep. 19. However, the spectrum has become harder in the observation performed on Sep. 21.

The observation was done in WT mode and the source is clearly detected. We excluded photons with energies below 1.4 keV due to the expected low energy spectral residuals which appear in the windowed timing mode observations of heavily absorbed sources (see XRT Calibration Status at Leicester XRT digest). We performed spectral fitting and compared a blackbody, a disk blackbody and a power-law model. In contrast with previous observations, we found a power-law with a photon-index of 2.2±0.5 gives a better fit in this observation (reduced chi-squared of 1.2 compared to 1.6 and 1.4 for blackbody and disk blackbody respectively, for 12 degrees of freedom).

There is a 40" offset between the known position of the source and the edge of the active part of the detector, therefore we only observe a portion of the point spread function of the source. This causes significant uncertainty in estimations of the flux, thus we can just infer a lower-limit of 1.1e-10 erg/s/cm^2 (0.5-10 keV) on the unabsorbed flux.

The spectral hardening detected in this observation, along with the previous behaviour of this transient, is similar to outbursts of transient LMXBs, suggesting this source is a transient LMXB (with a distance >~ 8 kpc) switching from a high-soft state to a low-hard state.

We thank the Swift team for quickly arranging our observations.

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