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Swift observations of the ongoing outburst of IGR J17451-3022

ATel #6469; ***D. Altamirano (Southampton), R. Wijnands (Amsterdam), C. O. Heinke, A. Bahramian (Alberta)***
*on **15 Sep 2014; 09:25 UT***
Credential Certification: Diego Altamirano (d.altamirano@soton.ac.uk)

Subjects: X-ray, Transient

Referred to by ATel #: 6486, 6501, 6533, 7028

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We report Swift/XRT followup observations of the new transient IGR J17451-3022 recently discovered in JEM-X observations and followed up by three Swift/XRT observations (ATEL #6451, #6459). The new Swift/XRT observations were performed in Windowed Timing Mode on September 10th and 11th (starting at UT 18:30:28 and UT 16:47:33, respectively). We clearly detected the source in our observations.

We extracted source spectra following Evans et al. (2009, MNRAS, 397, 1177) and model them in the 1.0 - 10.0 keV range. We note that we had to exclude photons with energies below 1 keV due to the expected low energy spectral residuals which appear in the windowed timing mode observations of heavily absorbed sources (e.g., see XRT Calibration Status at Leicester XRT digest). To compare with the results reported in ATEL #6459, we fitted the spectra in XSPEC with an absorbed (TBABS, using the abundances of Wilms et al., 2000, ApJ, 542, 914) blackbody (bbodyrad) model. Allowing the absorption, temperature, and radius to vary provided a good fit in both cases (reduced chi-squared of 1.10 for 100 dof and 0.98 for 155 dof for Sep 10th and 11th, respectively). Our best fit parameters are

N_H = (4.0\pm0.5)e22 cm^-2, kT=(0.94\pm0.05) keV, BB_norm = 19\pm5 and 2-10 keV unabsorbed flux of (1.2\pm0.1)e-10 erg/sec/cm^2

and

N_H = (4.5\pm0.3)e22 cm^-2, kT=(0.85\pm0.03) keV, BB_norm = 45\pm10 and 2-10 keV unabsorbed flux of (1.9\pm0.2)e-10 erg/sec/cm^2

for Sep 10th and Sep 11th observations, respectively. These results are broadly consistent with those reported in ATEL #6459.

These observations were taken in windowed timing mode to allow for pulsation searches. We produced standard 1.0-10.0 keV power spectra and found no evidence for coherent pulsations. The 3 sigma upper limits on pulsations in the frequency range 0.01-280 Hz are typically 10% (1.0-10.0 keV energy range). One of the suggestions about the nature of this source was that it could be a magnetar in outburst. Although our upper limits are lower than the usual 15%-30% amplitude reported in the literature (and therefore this would argue against a magnetar

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interpretation), we cannot conclusively rule out that the source is indeed a magnetar. Observations with higher sensitivity are needed to confirm the absence of pulsations.

We also do not find evidence for quasi-periodic oscillations nor timing noise in the 0.01-280 Hz range, with a 60% (3 sigma) upper limit in the fractional rms amplitude of the 0.04-5.0 Hz broad band noise.

The nature of IGR J17451-3022 remains unclear and therefore multi-wavelength follow-up observations are encouraged to help identify its nature. Higher statistic X-ray data (e.g., from XMM-Newton observations) are needed to detect (or better constrain the upper limits on) coherent pulsations or aperiodic variability.

We thank the Swift team for their rapid scheduling of these observations.

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