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Swift/XRT follow-up observation on IGR J17177-3656 at soft X-rays

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on 18 Mar 2011; 14:08 UT

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Subjects: X-ray, Transient

Referred to by ATel #: [3236](#), [3241](#), [3275](#)

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Following the discovery of IGR J17177-3656 (Frankowski et al. 2011, ATel #[3223](#)) on 2011-03-15, we requested a Swift ToO, which was executed on 2011-03-16 from 18:39:24 to 20:41:01 UT with a total exposure of ~3.9 ks.

2266 photons have been extracted from the source region between 0.2 and 10 keV, corresponding to a net count rate of ~0.59 cts/s. Using the online Swift tool we find an enhanced position of RA = 259.428 (17h17m43s), Dec = -36.934 deg (-36:56:03s) (J2000), with a 90% confidence level error of 2.1 arcsec, consistent with the position measurements made by IBIS/ISGRI and JEM-X (ATel #[3223](#)). The angular separation of the proposed optical counterpart by Malizia et al. (ATel #[3224](#)) from the XRT position is 2 arcmin, and the association is therefore ruled out.

The XRT spectrum can be reasonably well fitted (reduced $\chi^2=1.37$ for 68 dof) with an absorbed power-law model. The spectral parameters we derive in the 0.2-9 keV energy band are: $N_H = 3.7 \pm 0.5 \times 10^{22}$ atoms/cm² and photon index = 1.45 ± 0.20 . The 1-10 keV unabsorbed flux is 1.0×10^{-10} erg/cm²/s. Splitting this observation into two parts shows

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consistent spectral parameters within 1 sigma errors, indicative of a lack of significant variability on time scales of two hours.

A combined Swift/XRT and INTEGRAL/IBIS/ISGRI (latter obtained the previous day, see ATel #3223) spectral fit with an absorbed power-law model yielded: $N_H = (3.9 \pm 0.5 - 0.4) \times 10^{22}$ atoms/cm² and photon index = 1.5 ± 0.2 , with a reduced chi² of 1.30 for 76 dof. The 1-200 keV unabsorbed flux is 7.8×10^{-10} erg/cm²/s. We notice that the absorption is larger than the Galactic column density (1.3×10^{22} atoms/cm² as estimated at the source position by using the tool available at the HEASARC website, Kalberla et al. 2005), and hence indicates additional absorption intrinsic to the source.

We performed a search through the VizieR database and there is only one match within the 2.1 arcsec 90% confidence level: 2MASS J17174269-3656039. This star has J, H and K magnitudes of 15.2, 13.9 and 12.9, respectively, and is located at about 1.3 arcsec from the Swift position. The 2MASS source is also present in the NOMAD and GLIMPSE catalogs, with very similar magnitudes. Although this is the only source in the Swift error circle it is by no means certain that this is the counterpart; uncertainties in the N_H make the determined intrinsic near-infra-red colours inaccurate.

There is also a radio source from the 1.4 GHz NRAO VLA Sky Survey (catalog version: 2004) with a position consistent with our Swift determined one: NVSS J171743-365606. Its nominal position is about 7 arcsec away from our Swift position, with an error radius of 12 arcsec, and it is extended with a width of about 100 arcsec (beam width of the survey is 45 arcsec). Its measured flux density is 24 ± 5 mJy.

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