VLA radio detection of the very-faint X-ray transient IGR J17285-2922

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ATel #12669; *J. van den Eijnden, N. Degenaar, T. Russell, R. Wijnands (University of Amsterdam), J. V. Hernandez Santisteban (University of St. Andrews), D. M. Russell (NYU Abu Dhabi), D. Maitra (Wheaton College), C. O. Heinke, G. R. Sivakoff, A. W. Shaw (University of Alberta), T. J. Maccarone (Texas Tech University), J. C. A. Miller-Jones, A. Bahramian (ICRAR-Curtin), M. Armas Padilla (Instituto de Astrofisica de Canarias)*
*on **18 Apr 2019; 15:54 UT***
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IGR J17285-2922 is a very-faint X-ray transient that was reported to be in outburst by INTEGRAL/IBIS-ISGRI (ATel #12646). We triggered a joint X-ray and radio monitoring campaign of this X-ray binary with the Neil Gehrels Swift Observatory (Swift) and the Karl G. Jansky Very Large Array (VLA).

We observed IGR J17285-2922 on 13 April 2019 from 09:44 to 11:43 UTC (MJD 58586.45 +/- 0.04) while the VLA was in B configuration. These observations were taken simultaneously at central frequencies of 4.5 and 7.5 GHz, each with a bandwidth of 1 GHz. 3C286 and J1743-3058 were used for primary and secondary calibration, respectively. We used the Common Astronomy Software Applications package (CASA v4.7.2; McMullin et al. 2007, ASPC, 376, 127) to calibrate and image the data, following standard procedures. Imaging was carried out using Briggs weighting with a robustness of zero to balance sensitivity and resolution.

To measure the flux density, we fitted a point source in the image plane by forcing an elliptical Gaussian with a FWHM equal to the synthesized beam (2.99" x 0.97" with a -4.5 degree position angle east of north at 4.5 GHz; 1.67" x 0.59" with a -4.75 degree position angle at 7.5 GHz). We measure flux densities of 109 +/- 7 μJy at 4.5 GHz and 126 +/- 7 μJy at 7.5 GHz. These values yield a spectral index measurement of $\alpha = 0.3 +/- 0.2$ (where the flux density $S_\nu \propto \nu^\alpha$), consistent with a self-absorbed compact jet.

The best fit source position, determined at 7.5 GHz, is:
RA (J2000) = 17h 28m 38.853s +/- 0.01s
Dec (J2000) = -29d 21' 43.181" +/- 0.06",

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where the errors are calculated using the standard VLA astrometric accuracy of 10% of the synthesized beam. This position is separated by 0.5" from the Chandra position reported in ATel #2869 during a 2010 outburst of this transient, which has a 0.6" 90%-confidence radius.

While no simultaneous X-ray observations were performed, the closest Swift/XRT observation taken on 10 April 2019 was reported in ATel #12651. A preliminary analysis of later Swift observations shows that the source remains at relatively constant X-ray flux. Therefore, we assume that the X-ray luminosity did not change significantly between the closest X-ray observation and our radio epoch, to place the source on the X-ray/radio luminosity plane. Adopting the assumed 8 kpc source distance from ATel #12651, we estimate a 4.2E+28 erg s^{-1} radio luminosity at 5 GHz. Combined with the 1.7E+36 $(D/8\ kpc)^2$ erg s^{-1} X-ray luminosity (ATel #12651), this makes IGR J17285-2922 consistent with both the sample of neutron star X-ray binaries and the radio-faint black hole X-ray binaries (see e.g., Bahramian et al. 2018). For significantly smaller distances, the source appears most similar to the accreting neutron stars instead.

Continued Swift and VLA monitoring of IGR J17285-2922 is planned. Further multiwavelength observations are encouraged. We thank the Swift and VLA teams for rapidly performing the observations.

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