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Swift/XRT detects activity of a very-faint X-ray transient, likely the neutron star X-ray binary AX J1745.6-2901, near Sgr A*

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on 27 Oct 2017; 19:16 UT

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Subjects: X-ray, Binary, Neutron Star, Transient

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Our daily monitoring observations of the Galactic center with Swift/XRT (Degenaar et al. 2015, JHEAp, 7, 137) have revealed X-ray activity of a transient source located $\sim 1.5'$ to the south-east of Sgr A*. This object is first detected at a count rate of ~ 0.05 c/s during a ~ 0.9 ks PC-mode observation performed on October 19 (obsID 00092395248) and remained at a steady count rate of ~ 0.1 c/s between October 20 and 22 (obsID 00092395249-51). However, it appears slightly fainter with ~ 0.06 - 0.08 c/s during the next two observations of October 26 and 27 (after having been Moon-constrained for a few days; obsID 00092395252-53).

We obtained the coordinates of the active X-ray transient by using the online XRT data products tool (Evans et al. 2007, A&A 469, 379; 2009, MNRAS 397, 1177) for 6 PC-mode observations performed between October 19 and 27 (obsID 00092395248-53). This yields a standard XRT position of RA = 17:45:36.03, DEC = -29:01:32.3 (J2000) with a 90% confidence error of 3.6", and an "enhanced" position (see Goad et al. 2007, A&A 476, 1401; Evans et al. 2009) of RA = 17:45:35.68, DEC = -29:01:34.8 (J2000) with a 90% confidence error of 2.0". These coordinates are fully consistent with the Chandra localisation of the 8.4-hr eclipsing low-mass X-ray binary (LMXB) and thermonuclear X-ray burster AX J1745.6-2901 (ATel #1513). The very-faint unclassified transient CXOGC J174535.5-290124 (Muno et al. 2005), which displayed two outbursts observed by Swift/XRT in 2006 and 2008 (Degenaar & Wijnands 2009, 2010), is located $\sim 15''$ away from the position of the currently active transient.

Utilizing the online XRT products tools we also extracted an average X-ray spectrum from the same 6 PC-mode observations. This spectrum can be described by an absorbed power-law model with an index of 1.9 ± 1.1 and a hydrogen column density of $(3.4 \pm 1.1) \times 10^{23}$ cm $^{-2}$ (assuming "wilm" abundances and "vern" cross-sections in combination with the absorption model tbabs). The resulting unabsorbed 2-10 keV flux is $\sim 5.1 \times 10^{-11}$ erg/cm 2 /s, which implies a luminosity of

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~4E35 erg/s at a distance of 8 kpc. The outbursts from AX J1745.6-2901 detected through our Swift monitoring program in 2007-2008 and 2013-2016 (e.g. Degenaar et al 2015; ATels #5226, #9196) were both long (years) and bright (peak luminosity of several times ~E36 erg/s), whereas its 2006 and 2010 outbursts were shorter (months) and fainter (peak luminosity of a few times E35 erg/s; Degenaar & Wijnands 2009, 2010). The current outburst seems to be of the latter class.

We note that apart from AX J1745.6-2901, the neutron star LMXB GRS 1741-2853 that started a new outburst on October 11 (ATel #10859) remains active. During the most recent observation of October 27 (obsID 00092395253), the X-ray spectrum extracted with the online XRT tool can be described by an absorbed power-law model with an index of 2.9 +/- 0.7 and a hydrogen column density of (2.3 +/- 0.6) E23 cm-2. The resulting 2-10 keV flux of ~1.6E-9 erg/cm2/s translates into a luminosity of ~1E37 erg/s at 7.2 kpc (Trap et al. 2009).

Daily Swift/XRT monitoring of the Galactic center are ongoing until the start of the Sun-constraint window on 2017 November 2. Our monitoring will then resume again after 2018 February 2. Daily quick-look results can be found at the [Swift Sgr A* Monitoring Campaign Website](#).

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