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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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- 11313 X-ray Flare from Galactic Center Detected by Swift
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- 10859 Swift/XRT detects a new accretion outburst of the Galactic center neutron star transient GRS 1741-2853
- 10671 MAXI/GSC detection of a weak X-ray outburst from RX J1709.5-2639 (XTE J1709-267)
- 10323 Swift/XRT detects renewed activity of the Galactic center transient AX J1745.6-2901
- 10089 Swift resumes X-ray monitoring observations of the Galactic center in 2017
- 9551 Swift/XRT detects renewed activity of the Galactic center transient XMM J174457-2850.3
- 9236 Swift/XRT detects renewed activity of the Galactic center X-ray transient Swift J174535.5-285921
- 9196 Continued Swift/XRT observations of the new Galactic center transients SWIFT J174540.2-290037 and SWIFT J174540.7-290015
- 9152 VVV near-infrared observations of the Swift J174540.2-290037 field
- 9109 Swift/XRT detection of another active X-ray transient close to Sgr A*
- 9000 Hard X-ray activity from the direction to Sgr A* revealed by INTEGRAL
- 8881 Swift/XRT detects renewed activity of the Galactic center transient GRS 1741-2853
- 8793 A Search for a Radio Counterpart to Swift J174540.7-290015
- 8746 Chandra Position of Galactic Center X-ray Transient Swift J174540.7-290015
- 8737 VVV near-infrared observations of the Swift

~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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- Degenaar & Wijnands 2010, A&A 524, 69
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	J174540.7-290015 field
8729	Search for pulsed radio emission from SWIFT J174540.7-290015
8689	Near-IR source content of the error region for SWIFT J174540.7-290015
8684	INTEGRAL observations of Swift J174540.7-290015
8649	New Galactic Center X-ray Transient Detected by Swift: SWIFT J174540.7-290015
7023	Swift resumes X-ray monitoring observations of the Galactic center
5861	Continued Swift/XRT monitoring observations of the Galactic center
5847	Swift/XRT observations of the Galactic center have resumed
5332	Report on (non-)activity in the Galactic bulge region as seen by INTEGRAL
5319	MAXI/GSC detection of a new X-ray outburst from RX J1709.5-2639(=XTE J1709-267)
5301	A new outburst from LMXB 1A 1744-361
5246	Swift/XRT detects activity of the Galactic center transient GRS 1741-2853
5241	MAXI/GSC detection of a renewed outburst from the black hole candidate H 1743-322
5226	New Swift/XRT observations confirm that the active Galactic center transient is AX J1745.6-2901
5222	Swift/XRT monitoring observations detect an active X-ray transient near the Galactic center
5053	Detection by Sardinia Radio Telescope of radio pulses at 7 GHz from the Magnetar PSR J1745-2900 in the Galactic center region
5046	Spin-down Measurement of PSR J1745-2900: a New Magnetar
5037	Swift-BAT monitoring for additional bursts from SGR J1745-29 (Trigger 554491)
5032	Chandra localization of the soft gamma repeater in the Galactic Center region
5020	NuSTAR discovery of a 3.76 second pulsar in the Sgr A* region
5016	Continued Swift Monitoring of the Galactic Center Flare
5009	Swift/BAT detection of an SGR-like flare from near Sgr A*
5008	Ongoing X-ray activity from Sgr A*
5006	Large Flare from Sgr A* Detected by Swift
4840	Transient X-ray burster KS 1741-293 active again
4471	1E 1740.7-2942 (the Great Annihilator) enters a low-intensity state
3632	Swift detects an X-ray burst and renewed activity from KS 1741-293
3525	Chandra Localization of the Galactic Center X-ray

	Transient Swift J174535.5-285921
3472	Swift/XRT discovers a new X-ray transient near the Galactic center: Swift J174535.5-285921
2770	Swift/XRT detects new outbursts of the galactic center X-ray transients GRS 1741-2853 and XMM J174457-2850.3
2690	Swift/XRT detects renewed activity of the galactic center X-ray transient AX J1745.6-2901
1739	INTEGRAL spots renewed activity from H1743-322
1541	Swift/XRT observations of the X-ray transients KS1741-293 and XTE J1719-291
1531	Chandra detects activity from the Galactic X-ray transients KS 1741-293, Swift J174535.5-290135.6 and CXOGC J174535.5-290124
1513	Chandra detects Swift J174535.5-290135.6 in a relatively bright state
1385	INTEGRAL Galactic bulge monitoring observations of GRO J1750-27 (AX J1749.1-2639), H1743-322 and SLX 1746-331
1266	Recent and past activity of the supergiant fast X-ray transient IGR J17544-2619 as seen by INTEGRAL
1185	INTEGRAL detects hard X-rays from SAX J1810.8-2609 during its current outburst
1058	Long duration outbursts from the two X-ray bursters AX J1745.6-2901 and GRS 1741.9-2853 suggested by XMM-Newton observations
1013	Chandra Detection of Three Enigmatic X-ray Transients: GRS 1741.9-2853,
1008	IGR J17453-2853 = Granat 1741.9-2853?
1007	ATCA radio observations of GX 339-4
1006	Renewed activity of the Galactic center transients Swift J174535.5-290135.6 and GRS 1741.9-2853 as observed with Swift/XRT
1005	Two active X-ray transients in the Galactic Center region as seen by INTEGRAL
904	Announcement of the Swift/BAT Hard X-ray Transient Monitor
892	Renewed activity of the very faint X-ray transient CXOGC J174535.5-290124 and continued activity of the neutron-star X-ray transient SAX J1747.0-2853
874	New INTEGRAL source, IGR J17354-3255, and continuation of the INTEGRAL Galactic Bulge monitoring program
756	INTEGRAL detects SWIFT J174535.5-290135.6
753	Swift/XRT detection of a transient source in the Galactic Center
734	Three active neutron star X-ray transients: SAX J1747.0-2853, XTE J1739-285 and GRS 1747-312

642	On the (hard) X-ray activity of SAX J1747.0-2853 as seen with INTEGRAL
641	Swift Observation of SAX J1747.0-2853
638	Further Chandra observations of SAX J1747.0-2853 and the region around Sgr A*
637	Renewed activity of the neutron star X-ray transient SAX J1747.0-2853

[**Telegram Index**]

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