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Swift Bulge Survey: Discovery of a new X-ray transient, Swift J174038.1-273712

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Swift Bulge Survey: Discovery of a new X-ray transient, Swift J174038.1-273712

ATel #14536; *Bahramian, A. (Curtin U.), Heinke, C. O. (U. Alberta), Maccarone, T. J. (Texas Tech), Shaw, A. W. (U. Nevada, Reno), Wijnands, R. (U. Amsterdam)*
on 9 Apr 2021; 12:15 UT

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Subjects: X-ray, Request for Observations, Binary, Transient

Referred to by ATel #: [14545](#), [14550](#), [14552](#), [14626](#)

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The Swift Bulge Survey performs biweekly mapping of 16 square degrees of the Galactic Bulge with short (~120 s) X-ray observations (Shaw et al. 2020, MNRAS, 492, 4344; Bahramian et al. 2021, MNRAS, 501, 2790).

The most recent epoch of this survey, performed on April 9th, 2021, reveals a new X-ray transient, Swift J174038.1-273712 with a Swift/XRT countrate of 0.25 ct/s (31 counts in 117 s, 0.5-10 keV). Using the online Swift/XRT products tool (Evans et al. 2009, MNRAS, 2009, 397, 1177) yields enhanced coordinates of the source as:

RA: 17h 40m 38.11s Dec: -27d 37m 12.1s

with a radial uncertainty of 3.4 arcsec (90% confidence). We found no previously cataloged X-ray sources consistent with these coordinates.

Fitting the X-ray spectrum of the source with an absorbed power-law and Galactic N_H of $5.5e^{21} \text{ cm}^{-2}$, and using W-statistics (Cash 1979, ApJ 228, 939), indicates a power-law photon index of 1.2 ± 0.6 , and an unabsorbed flux of $3.2(-1.1/+2.3)e^{-11} \text{ erg/s/cm}^2$ in the 0.5-10 keV band. Assuming a $d=8 \text{ kpc}$, the X-ray luminosity would be $\sim 2e^{35} \text{ erg/s}$ (in the 0.5-10 keV band). A substantially larger N_H and softer spectrum are found when N_H is allowed to float freely, which may be due to the low total number of counts, but hints at a quasi-thermal spectrum.

The source is in the region of the Chandra Galactic Bulge Survey (Jonker et al. 2011, ApJS, 194, 18), but was not detected by that survey, which has limits of $8e^{-14} \text{ erg/s/cm}^2$ for $N_H=10^{22}$ and $\Gamma=2$ power law models.

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VVV reveals a moderately bright star (J=14.3, K=12.8) within the error circle, also detected by VPHAS+ with r=19.5. VLASS shows no source in the error circle.

Further Swift follow up observations have been requested. Multi-wavelength follow ups are encouraged. We thank the Swift team for their support of these observations, which are ongoing.

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