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NIR follow-up observations of the IGR J17445-2747 field

ATel #10305; *A. W. Shaw, C. O. Heinke, G. R. Sivakoff (U. Alberta), A. Bahramian, J. Strader (Michigan State), T. J. Maccarone (Texas Tech), J. A. Kennea (Penn State), E. Kuulkers (ESA), J. J. M. in 't Zand (SRON), R. Wijnands, N. Degenaar (U. Amsterdam)*
on 21 Apr 2017; 22:58 UT

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Referred to by ATel #: [10355](#), [10395](#), [12751](#)

We have recently initiated the Swift Bulge Survey, a wide and shallow Swift/XRT imaging survey of 16 square degrees of the Galactic Bulge around the Galactic Center, to be performed every other week for 15 epochs when the Galactic Bulge is visible. Each Swift exposure is 60 seconds long, reaching a 0.5-10 keV limiting depth of $1e35$ erg/s at the Galactic Center, enabling detection of fainter transients than in previous surveys. We previously reported the detection of the known X-ray burster IGR J17445-2747 (ATel #10265) during the first epoch of this survey. The properties of the X-ray burst suggest that the source lies close to the Galactic Center (ATel #10256). Here we report on NIR follow-up of the region, using observations with the Near InfraRed Imager and spectrograph (NIRI) on the 8.1m Gemini North telescope at Mauna Kea, Hawaii.

The IGR J17445-2747 field was observed on April 18 from 14:37-15:02 UTC. We obtained 10 25s exposures in J, H and K, with each co-added exposure consisting of 25, 1s dithered exposures. The Swift observation that took place two days prior to the NIRI observations measured a flux of $4.2E-11$ erg/cm²/s in the 0.5-10 keV band (ATel #10272), suggesting that the source was still active. Inside the 2.2" Swift error circle (ATel #10273) we find two sources, both of which are previously known. The first, and brightest is 2MASS J17443041-2746004, which we measure at J=12.58+/-0.04, H=10.80+/-0.04, K=9.55+/-0.03, consistent (within uncertainties) with 2MASS.

The second source is consistent with the UKIDSS Galactic Plane Survey (GPS) source UGPS J174430.20-274601.2. We measure magnitudes of H=14.87+/-0.05, K=14.32+/-0.04, which are broadly consistent with the UKIDSS GPS catalogue magnitudes (H=15.00+/-0.02, K=14.16+/-0.02). It is important to note that the region is extremely crowded, and the Swift error circle is dominated by the bright 2MASS star, so discrepancies in our reported magnitudes with respect to the catalogue magnitudes are likely due to contamination from 2MASS J17443041-2746004.

The 2MASS source was recently reported to be the NIR counterpart to IGR J17445-2747 (ATel #10284). However, though the source is consistent with the Swift error circle, we do not have

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definitive evidence that it is the NIR counterpart. The detection of Type I X-ray bursts from the system (ATel #10256) indicate that the source is likely a low-mass X-ray binary, and the high extinction in the direction of 2MASS J17443041-2746004 ($E(J-K) \sim 2.0$, suggesting $A_V \sim 11$) suggest a Galactic Center origin. A low-mass X-ray binary close to the Galactic Center as bright as 2MASS J17443041-2746004 would likely be a symbiotic star, but these are not known to show X-ray bursts. We cannot associate either of the sources that we detected with NIRI as the NIR counterpart of IGR J17445-2747, as neither star shows any increase in flux coincident with the renewed activity of the X-ray source. We cannot rule out the possibility that the bright star is outshining the true counterpart.

We thank the Gemini North Head of Science Operations, Sandy Leggett, for scheduling the observations.

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