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Swift Confirmation of new transient activity in NGC 6440

ATel #10826; *A. Bahramian (MSU), J. A. Kennea (PSU), D. Altamirano, Aru Beri (Southampton), C. O. Heinke, G. R. Sivakoff, A. J. Tetarenko (UAlberta), Rudy Wijznands, Nathalie Degenaar (Amsterdam)*

on 6 Oct 2017; 07:43 UT

Credential Certification: *Arash Bahramian (bahramian@pa.msu.edu)*

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

Referred to by ATel #: [10827](#), [10832](#), [10843](#), [10891](#)

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Following report of enhanced X-ray brightness from the direction of the globular cluster NGC 6440 (ATel #[10821](#)), we observed this cluster on 2017-10-05 18:52:35 UT for 1.5 ks with Swift/XRT in Photon Counting mode. We detected an X-ray source with localization:

RA (J2000): 17:48:52.34

Dec (J2000): -20:21:32.2

with a radial uncertainty of 3.5 arc-seconds (90% confidence). These coordinates are consistent with a previously known transient X-ray binary in this cluster, SAX J1748.9-2021 (Altamirano et al., 2008, ApJ, 674, 45A), also known as NGC 6440 CX1 (Pooley et al. 2002, ApJ, 573, 184). However this localization is also consistent with NGC 6440 CX3 (Pooley et al. 2002, ApJ, 573, 184), which is a quiescent X-ray binary, thought to harbor a neutron star (Bahramian et al. 2015, MNRAS 452, 3475).

We extracted a spectrum that was corrected for pile up. The spectrum is moderately well-described by an absorbed power-law (reduced χ^2 of 1.3 for 72 degrees of freedom), with a hydrogen column density of $1.2(+/-0.1)e22 \text{ cm}^{-2}$ (TBABS model in Xspec, assuming abundances from Wilms et al. 2000, ApJ 542, 914), a photon index of $1.2(+/-0.1)$ and an unabsorbed flux of $7.1(+/-0.2)e-10 \text{ erg/s/cm}^2$ in the 0.5-10 keV band. Assuming a distance of 8.5 kpc (distance to NGC 6440, Harris catalog), this translates to a luminosity of $6.1e36 \text{ erg/s}$.

Extracting a lightcurve, we also notice a possible type 1 X-ray burst which indicates the compact object in this system is a neutron star.

Further Swift and VLA observations are planned. Other multi-wavelength observations are encouraged.

We thank the Swift team for rapidly scheduling this observation.

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`rrutledge@astronomerstelegram.org`

`dfox@astronomerstelegram.org`

`mansi@astronomerstelegram.org`