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A sub-luminous outburst of a transient in the Galactic globular cluster Terzan 5, possibly due to EXO 1745-248 (aka Terzan 5 X-1)

ATel #8982; *R. Wijnands (U. Amsterdam), A. Bahramian (U. Alberta), D. Altamirano (Southampton U.), G. Sivakoff, C. Heinke (U. Alberta), N. Degenaar (Cambridge U.)*
on 24 Apr 2016; 05:00 UT

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

Referred to by ATel #: [8996](#)

Using Swift/XRT, the Galactic globular cluster Terzan 5 was observed on 17 April 2016. During this observation, we found that the X-ray flux originating from this cluster was significantly above the normal cluster background, indicating that a possible X-ray transient was active during this XRT observation. To confirm this transient and follow its outburst evolution, we obtained two additional XRT observations on 21 April and 23 April. Also during those observations, the X-ray flux was significantly above the cluster background confirming activity from an X-ray transient. Combining all data, we obtained the following position for this transient (UVOT enhanced):

RA (J2000) : 17h 48m 05.22s (267.02175)

Dec (J2000): -24d 46' 48.6" (-24.78017)

with a 90% error radius of 2.1". This position is fully consistent with the known neutron-star transient EXO 1745-248 (aka Terzan 5 X-1), but inconsistent with the other two known transients. Therefore, it is likely that EXO 1745-248 is in outburst again, although the presence of a new transient close to this source cannot be excluded.

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[8996](#) **Swift-XRT globular cluster monitor: April 2016 Terzan 5 observations**

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We fitted the obtained X-ray spectra using an absorbed power-law model, which could adequately fit the data. We found that the photon index stayed roughly constant at 1.7-1.8. The 0.5-10 keV unabsorbed flux was approximately the same on 17 and 21 April ($\sim 8\text{-}9\text{e-}12$ erg/s/cm²) but declined to $4.8\text{e-}12$ erg/s/cm² on April 23 (possibly indicating a rapid decline of the source). This corresponds to 0.5-10 keV luminosities ranging from $\sim 4\text{e}34$ erg/s to $\sim 2\text{e}34$ erg/s. The outburst of this source is very sub-luminous compared to the normal outbursts of EXO 1745-248 that can reach luminosities of $\sim 1\text{e}38$ erg/s. Therefore, either EXO 1745-248 also can exhibit very faint outbursts or indeed a new source is active close to EXO 1745-248.

Additional Swift/XRT observations are scheduled to follow this transient to further study this source.

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