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The neutron star transient XTE J1701-407 has returned to quiescence after a 3-year long outburst

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on 29 Aug 2011; 17:24 UT

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

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The neutron star low-mass X-ray binary and long thermonuclear burst source XTE J1701-407 (ATel #1618) has been active ever since its discovery in 2008 June (ATel #1569), displaying a typical 2-10 keV luminosity of $\sim 5E36$ erg/s (assuming a distance $D=5.0$ kpc; ATel #2814). However, routine monitoring of the Galactic bulge with the PCA aboard RXTE (Swank & Markwardt 2001, ASP conference series 251, 94) indicates that the outburst has now ceased: the source intensity has remained below the detection limit of the PCA since 2011 August 9 (see the link provided below).

We have performed follow-up observations with the Swift/XRT to investigate the current state of XTE J1701-407. The source is clearly detected during a 2.0-ks pointing carried out on 2011 August 23, with an average (PC mode) count rate of $\sim 3.9E-2$ c/s. The XRT spectrum can be fit with a simple absorbed powerlaw with a hydrogen column density of $\sim (3+/-2)E22$ cm⁻² and a photon index of $\sim 2.4+/-1.5$. The resulting 0.5-10 keV luminosity is $\sim 4E34$ erg/s (for $D=5$ kpc).

XTE J1701-407 is not detected during our second Swift/XRT observation that was performed on 2011 August 27 for 1.9 ks. Applying the small number prescription of Gehrels 1986 (ApJ 303, 336), we infer a 95% confidence upper limit on the source count rate of $\sim 5.5E-3$ c/s (PC mode). Using pimms with the spectral shape found for the first Swift observation (an absorbed powerlaw with $nH=3E22$ cm⁻² and an index of 2.4), we estimate an upper limit on the 0.5-10 keV luminosity of $\sim 4E33$ erg/s ($D=5$ kpc). This is a factor ~ 10 lower than the 0.5-10 keV luminosity measured with Swift 4 days earlier. If we instead assume a blackbody spectral shape with $kT=0.2-0.3$ keV, the Swift non-detection implies an upper limit on the 0.5-10 keV thermal luminosity of $\sim (0.6-2)E34$ erg/s ($D=5$ kpc).

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Our Swift observations confirm the decrease in intensity seen in the RXTE/PCA bulge scans and strongly suggest that XTE J1701-407 has returned to quiescence after a long outburst that persisted for ~3 years. Further X-ray observations are planned to monitor the source.

RXTE/PCA bulge scan lightcurve of XTE_J1701-407

1726	Renewed optical and X-ray activity in IGR J00291+5934
1662	SAX J1750.8-2900 is returning to quiescence
1635	Discovery of kilohertz QPOs in XTE J1701-407
1630	Search for the infrared counterpart to XTE J1701-407
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1618	The cooling tail of a long X-ray burst from XTE J1701-407
1616	Swift Detects Likely X-ray Burst from XTE J1701-407
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