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Swift observations confirm renewed activity of the transient neutron star X-ray binary Aql X-1

ATel #5117; *N. Degenaar (University of Michigan) and R. Wijnands (University of Amsterdam)*

on 9 Jun 2013; 07:48 UT

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Subjects: Optical, Ultra-Violet, X-ray, Neutron Star, Transient

Referred to by ATel #: [5129](#), [5136](#), [5148](#), [5158](#)

Following reports of the brightening of the optical counterpart of the transient neutron star X-ray binary Aql X-1 between June 3 and 5 (ATel #[5114](#)), we observed the source with Swift on June 8.

The XRT was on target for ~0.8 ks in the photon counting mode and for ~0.1 ks in the windowed timing mode. Aql X-1 is clearly detected in these observations. The X-ray spectrum can be described by an absorbed power-law model with a hydrogen column density of $N_H = (6.1 \pm 1.2) \times 10^{21} \text{ cm}^{-2}$ and a photon index of 2.0 ± 0.2 . The inferred 0.5-10 keV unabsorbed flux is $F_x \sim 4.9 \times 10^{-10} \text{ erg/cm}^2/\text{s}$, which translates into a luminosity of $L_x \sim 1.5 \times 10^{36} \text{ erg/s}$ for a distance of 5 kpc. This is about three orders of magnitude higher than the quiescent level of the source.

The UVOT images also reveal a faint object at the source position. During a 0.2 ks exposure using the B filter, Aql X-1 is detected at $B = 18.91 \pm 0.13 \text{ mag}$. During an exposure of similar length taken with the U filter the source is detected at $U = 19.51 \pm 0.27 \text{ mag}$ (Vega system). The source is not detected in the UVW1 and UVW2 images, with limits of $>19.88 \text{ mag}$ and $>18.78 \text{ mag}$, respectively.

The Swift observations confirm that Aql X-1 has entered a new accretion outburst.

We thank Neil Gehrels and the Swift science team for making these observations possible. Analysis of the XRT data was performed utilizing the methods described by Evans et al. (2009, MNRAS, 397, 1177) and Evans et al. (2007, A&A, 469, 379).

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