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Cohn, H.N.; Lugger, P.M.; Bogdanov, S.; Heinke, C.O.; van den Berg, M.; Sivakoff, G.

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## HST search of the region around IGR J18245-2452

ATel #5031; *H. N. Cohn, P. M. Lugger (Indiana U.), S. Bogdanov (Columbia U.), C. O. Heinke (U. Alberta), M. van den Berg (U. Amsterdam), G. Sivakoff (U. Alberta)*  
on 30 Apr 2013; 16:40 UTCredential Certification: *Craig Heinke (cheinke@virginia.edu)*

Subjects: Radio, Optical, X-ray, Globular Cluster, Transient

Referred to by ATel #: [5069](#), [5086](#)

We searched the region around the new INTEGRAL transient source IGR J18245-2452 (ATel #[4925](#) #[4927](#) #[4929](#) #[4934](#) #[4959](#) #[4960](#) #[4961](#) #[4964](#) #[4981](#) #[5003](#)) using HST WFC3 and ACS/WFC imaging to characterize possible optical counterparts. The ATCA position of the transient source is R.A. 18h24m32.51s Dec.  $-24^{\circ} 52' 07.9''$  (with a 90% confidence error of  $0.5''$ ; ATel #[4981](#)). Comparing the ATCA 8.5 GHz flux to the Swift/XRT measured 2-10 keV flux at the time ( $0.5-1E-10$  erg/cm<sup>2</sup>/s), we find that the radio/X-ray flux ratio is similar to that seen in e.g. the neutron star source SAX J1808.4-3658 during outbursts of similar flux levels (Migliari & Fender 2006, MNRAS, 366, 79), strongly supporting the identification of the ATCA radio transient with IGR J18245-2452. As noted by Pallanca et al. (ATel #[5003](#)) this error circle contains X-ray source 23 from Becker, et al. (2003, ApJ, 594, 798). Our redetermined position for source 23 puts it close to the center of the ATCA error circle at R.A. 18h24m32.50s Dec.  $-24^{\circ} 52' 07.9''$  (with a 90% confidence error of  $0.3''$ ).

We used WFC3 imaging from 2009 Aug 08 and ACS/WFC imaging from 2010 Apr 26 to carry out a DAOPHOT/ALLSTAR analysis of the region around the source 23 error circle. The former dataset includes the F390W, F606W, F656N, and F814W filters. The latter dataset includes the F435W, F625W, and F656N filters. These filter sets allow us to search for counterparts based on broadband colors and H-alpha excess. We constructed color-magnitude diagrams from the photometry and looked for objects that deviated from the fiducial sequences. The most striking object is the star noted by Pallanca et al. (ATel #[5003](#)), which they report to be about 1.5 - 2 mag brighter in 2009 than in 2010. Our coordinates for this star are R.A. 18h24m32.51s Dec.  $-24^{\circ} 52' 08.0''$ . Our photometry indicates that this object lies on the main sequence and has a normal H-alpha flux in 2010. The magnitudes are: F435W =  $22.60 \pm 0.06$ , F625W =  $21.00 \pm 0.11$ , and F656N =  $20.75 \pm 0.08$ . However, in 2009 it is significantly bluer than the main sequence and has a 1.6 mag H-alpha excess. The magnitudes are: F390W =  $20.37 \pm 0.06$ , F606W =  $19.51 \pm 0.04$ , and F656N =  $17.26 \pm 0.04$ . Comparing the F606W mag of 2009 with the F625W mag of 2010, we find that the object is 1.5 mag brighter in 2009. Based on its previously noted variability and our finding of a strikingly blue color and H-alpha excess that it displays in outburst in 2009, this object appears to be the likely counterpart to both source 23 from Becker et al. (2003) and INTEGRAL transient source IGR J18245-2452.

*Finding Charts and Color-Magnitude Diagrams*

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`rrutledge@astronomerstelegam.org`

`dfox@astronomerstelegam.org`

`mansi@astronomerstelegam.org`