Radio Non-Detection of the Currently Outbursting Transient Source in NGC 6440

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on ***12 Oct 2017; 08:55 UT***
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Subjects: Radio, X-ray, Binary, Neutron Star, Transient

We report follow-up VLA radio observations of NGC 6440, which has recently shown evidence of transient X-ray activity (ATel #10821, #10826). Our VLA observations occurred on 2017 Oct 11, with scans on source between 01:07:09 - 02:48:18 UTC (MJD = 58037.0466 - 58037.1169), in X band (8 - 12 GHz). The array was in the B configuration during our observations.

We do not significantly detect a radio source (in the combined 4 GHz bandwidth centered on 10 GHz) within the X-ray error circle reported in ATel #10826; we estimate a 3 sigma upper limit on the source flux density of ~11 microJy/bm.

To make a preliminary classification of the source, we place this object on the L_r-L_x plane (e.g., Tetarenko et al., 2016, MNRAS, 460, 345; Tudor et al. 2017, MNRAS, 470, 324), assuming a flat radio spectrum to derive the radio luminosity (L_r=nu L_nu) at 5 GHz, 1.0-10 keV X-ray luminosity (from the closest Swift observation on 2017 Oct 9, from 23:18:12 to 23:36:51 UT), and a distance of 8.5 kpc (Harris W.E. 1996, AJ, 112, 1487 - 2010 Edition). We estimate a 5 GHz (upper limit) radio luminosity of 4.5e27 erg/s, and 1.0-10 keV X-ray luminosity of 2.1e36 erg/s. Based on these measurements, this transient is inconsistent with typical black hole X-ray binaries (see figure here). It also appears to be weaker in the radio than most neutron star systems; however, we note that this transient is not the only radio-quiet neutron star source, where for example both EXO 1745-248 (Tetarenko et al., 2016) and another AMXP source, IGR J17511-3057 (Tudor et al. 2017), both show a radio luminosity near our radio upper limit at similar X-ray luminosities as this source.

While the X-ray position of this transient is consistent with one of the known transient sources in NGC 6440 (SAX J1748.9-2021; in 't Zand et al., 2001, ApJ, 563, L41), this cluster contains numerous XRBs (Pooley et al. 2002 ApJ, 573, 184), and thus we cannot rule out a new transient source.

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	Radio follow-up of the

Additional radio observations are planned, and X-ray observations will continue.

We thank the NRAO staff for rapidly scheduling our observations.

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