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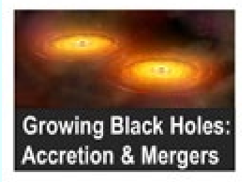

ATCA detects the radio brightening of the X-ray transient MAXI J1348-630

ATel #12456; ***T. Russell (UvA), G. Anderson, J. Miller-Jones (ICRAR/Curtin), N. Degenaar, J. van den Eijnden (UvA), Gregory R. Sivakoff (UAlberta), and A. Tetarenko (EAO)***
*on **30 Jan 2019; 20:28 UT***
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Following the discovery of the X-ray transient MAXI J1348-630 (ATels #12425, #12430, #12434, #12439, #12441, #12447, #12448), we conducted radio observations with the Australia Telescope Compact Array (ATCA) from 2019-01-26 19:55 UT to 2019-01-27 00:33 UT (MJD 58509.9 +/- 0.1), and from 2019-01-27 21:30 UT to 2019-01-28 03:55 UT (MJD 58511.03 +/- 0.15). For both observations, the telescope was in its most compact H75 configuration, with the core of the array having a longest baseline of 75 m, and a single fixed antenna located 6 km from the array core. Observations were taken simultaneously at 5.5 and 9.0 GHz, with a bandwidth of 2 GHz at both frequencies. We used PKS 1934-638 for bandpass and flux calibration, while 1352-63 was used for phase calibration. Data were calibrated and imaged following standard standard procedures within CASA (version 5.1.1; McMullin et al. 2007), where imaging (with the inclusion of the isolated antenna) was carried out with a Briggs robust parameter of -1 at both frequencies.

We detect a radio source consistent with the X-ray position (ATel #12434), with a radio position (at 9 GHz) of:
R.A. (J2000): 13:48:12.79 +/- 0.03
Dec (J2000): -63:16:28.48 +/- 0.04,
where the R.A. errors are from beam centroiding and Declination errors are statistical.

To determine the source flux density, we fit for a point source in the image plane. Due to the compact configuration and single isolated antenna, the flux densities were also checked by fitting a delta function in the uv-plane with UVMULTIFIT (Marti-Vidal et al. 2014) within CASA to ensure the results were consistent. Our first observation (on MJD 58509), detected the source at a flux density of 3.4 +/- 0.2 mJy at 5.5 GHz and 3.5 +/- 0.2 mJy at 9 GHz, implying a radio spectral
α

index of α = 0.0 +/- 0.2 (where $S_\nu \propto \nu$), consistent with a flat radio spectrum from a compact jet. Our second radio observation (on MJD 58511) shows the radio counterpart brightening to 6.2 +/- 0.4 mJy at 5.5 GHz and 6.5 +/- 0.5 at 9 GHz, where α = 0.1 +/- 0.3, also indicating a flat or slightly inverted radio spectrum from a compact jet.

Our initial radio observation translates to a 5 GHz radio luminosity of ~1.3e30 $(D/8kpc)^2$ erg/s. Swift-XRT observations taken close in time to our first radio epoch (ATel #12434), show a 1-10 keV X-ray luminosity of ~3E37 $(D/8kpc)^2$ erg/s. Combining the radio and X-ray luminosities from this date and placing them on the radio/X-ray luminosity plane supports the classification as a black hole X-ray binary from the X-ray timing and spectral properties (ATel #12447).

Radio monitoring will continue.

We thank Jamie Stevens and ATNF staff for scheduling these radio observations.

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