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

Russell, T.; Anderson, G.; Miller-Jones, J.; Degenaar, N.; Eijnden, J. van den; Sivakoff, G.R.; Tetarenko, A.

Published in:
The astronomer's telegram

Link to publication

License
Unspecified

Citation for published version (APA):

General rights
It is not permitted to download or to forward/distribute the text or part of it without the consent of the author(s) and/or copyright holder(s), other than for strictly personal, individual use, unless the work is under an open content license (like Creative Commons).

Disclaimer/Complaints regulations
If you believe that digital publication of certain material infringes any of your rights or (privacy) interests, please let the Library know, stating your reasons. In case of a legitimate complaint, the Library will make the material inaccessible and/or remove it from the website. Please Ask the Library: https://uba.uva.nl/en/contact, or a letter to: Library of the University of Amsterdam, Secretariat, Singel 425, 1012 WP Amsterdam, The Netherlands. You will be contacted as soon as possible.

UvA-DARE is a service provided by the library of the University of Amsterdam (http://dare.uva.nl)
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

Credential Certification: Thomas Russell (t.d.russell@uva.nl)

Subjects: Radio, X-ray, Black Hole, Transient

Referred to by ATel #: 12470, 12477, 12480, 12491, 12497, 12520, 13459, 13465, 13539

Following the discovery of the X-ray transient MAXI J1348-630 (ATels #12425, #12430, #12434, #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

Related
13539 X-ray and near-infrared observation of rebrightening of MAXI J1348-630
13467 MeerKAT and Swift/XRT detection of MAXI J1348-630
13465 Re-brightening and decaying of MAXI J1348-630 as observed with NICER
13459 MAXI J1348-630: MAXI/GSC detection
13454 XB-NEWS detects a new optical rise during the current outburst of MAXI J0637-430
13451 XB-NEWS detection of a new outburst of MAXI J1348-630
13188 Rebrightening of MAXI J1348-630
12838 MAXI/GSC detection of X-ray rebrightening of MAXI J1348-630
12829 Optical re-brightening of MAXI J1348-630
12520 Low-frequency radio detection of MAXI J1348-630 with the MWA
12506 Preliminary Result on MAXI J1348-630 using Swift data: Detection of 0.56 Hz QPO and Mass Estimation
12497 MeerKAT follow-up observations of MAXI J1348-630 reveal bright radio flare at state transition
12491 Optical fade in MAXI J1348-630 during transition towards the soft state
12489 MAXI J1348-630: SALT optical spectroscopy during outburst
12477 Monitoring the transient MAXI J1348-630 with the Neil Gehrels Swift observatory
12471 INTEGRAL sees the ongoing spectral transition of the black hole candidate MAXI J1348-630
12470 Insight-HXMT observations of MAXI J1348-630

http://www.astronomerstelegram.org/?read=12456[2-4-2020 17:40:52]
ATel #12456: ATCA detects the radio brightening of the X-ray transient MAXI J1348-630

index of $\alpha = 0.0 \pm 0.2$ (where $S_\nu \propto \nu^\alpha$), consistent with a flat radio spectrum from a compact jet. Our second radio observation (on MJD 58511) shows the radio counterpart brightening to $6.2 \pm 0.4$ mJy at 5.5 GHz and $6.5 \pm 0.5$ at 9 GHz, where $\alpha = 0.1 \pm 0.3$, 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 $\sim 1.3 \times 10^{30} \, (D/8\,\text{kpc})^2 \, \text{erg/s}$. Swift-XRT observations taken close in time to our first radio epoch (ATel #12434), show a 1-10 keV X-ray luminosity of $\sim 3 \times 10^{37} \, (D/8\,\text{kpc})^2 \, \text{erg/s}$. 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.