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**Publication date**

2017

**Document Version**

Final published version

**Published in**

The astronomer's telegram

**License**

Unspecified

[Link to publication](#)

**Citation for published version (APA):**

Russell, T. D., Miller-Jones, J. C. A., Sivakoff, G. R., Tetarenko, A. J., & JACPOT XRB collaboration (2017). ATCA radio detection of MAXI J1535-571 indicates it is a strong black hole X-ray binary candidate. *The astronomer's telegram*, 10711.  
<http://www.astronomerstelegram.org/?read=10711>

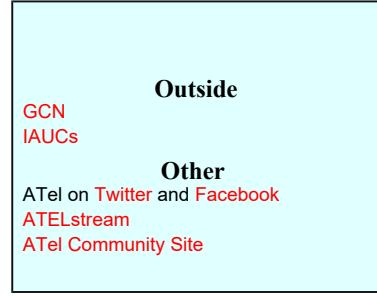
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## ATCA radio detection of MAXI J1535-571 indicates it is a strong black hole X-ray binary candidate

ATel #10711; *T. D. Russell (UvA), J. C. A. Miller-Jones (ICRAR-Curtin), G. R. Sivakoff, A. J. Tetarenko (UAlberta) and the JACPOT XRB collaboration*

on 6 Sep 2017; 04:06 UT

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

Referred to by ATel #: [10714](#), [10716](#), [10745](#), [10761](#), [10768](#), [10816](#), [11020](#), [11611](#)[Tweet](#)

MAXI J1535-571 is a newly discovered Galactic hard X-ray transient (GCN #[21788](#), ATels #[10699](#), 10700). Following its identification as a potential hard-state low-mass X-ray binary (ATel #[10702](#)) and a potential black hole system (ATel #[10708](#)), we conducted target of opportunity observations of this source with the Australia Telescope Compact Array (ATCA).

We observed MAXI J1535-571 with ATCA on 2017 September 05 (scans on source between 10:28-12:24 UT; MJD 58001.48 +/- 0.04). The observations were taken simultaneously at 5.5 and 9.0 GHz, with a bandwidth of 2 GHz at each frequency. The array was in its 1.5 km (1.5A) configuration, providing angular resolutions of 3.3 x 3.9 arcseconds at 5.5 GHz and 2.0 x 2.4 arcseconds at 9 GHz. We used 1934-638 for primary flux calibration and 1511-55 (3.03 degrees away) for phase calibration. The data were reduced using standard routines in Miriad (Sault et al. 1995), before being imaged in CASA (McMullin et al. 2007) using a natural weighting scheme to maximize sensitivity.

We significantly detected a radio source at a position consistent with the X-ray and optical localisations (ATels #[10699](#), 10700, 10704). We measured flux densities of the radio source to be  $7.39 \pm 0.03$  mJy and  $7.74 \pm 0.05$  mJy at 5.5 and 9.0 GHz, respectively (statistical errors only).

The radio spectral index of  $\alpha = 0.09 \pm 0.03$  (where  $S_\nu \propto \nu^\alpha$ ) is consistent with emission from a compact radio jet.

Our best radio position (measured at 9.0 GHz) is:

RA (J2000) = 15:35:19.7141 +/- 0.007 Dec (J2000) = -57:13:47.5826 +/- 0.024,

where the error bars are statistical. A similar position was measured at 5.5 GHz.

We assume the source is as close to the Galactic centre as possible along its  $l = 323.724$  deg line-of-sight. Thus we estimate its distance is about 6.5 kpc. At this lower distance (compared to 8

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kpc) our radio detection provides a 5 GHz radio luminosity of  $(2.053 \pm 0.008) \times 10^{30} \text{ erg/s}$  (d/6.5 kpc) $^2$ . X-ray spectral analyses (ATel #10708) of the source just a few hours before our ATCA radio observations measured the source at an X-ray luminosity of  $5.7 \times 10^{37} \text{ erg/s}$  (d/6.5 kpc) $^2$  (2-10 keV). The observed radio emission at this X-ray luminosity places MAXI J1535-571 firmly above the expected radio luminosities of all known neutron star X-ray binaries (see e.g., Tetarenko et al. 2016, for a recent review), and within the expected range for black hole X-ray binaries, lying near the radio-faint track, at similar X-ray luminosities (see e.g., Gallo et al. 2003, Corbel et al. 2011, for further details). This indicates that this source is a strong black hole X-ray binary candidate.

The JACPOT XRB collaboration are planning to continue monitoring this outburst.

Further multi-wavelength observations of this source are highly encouraged.

We thank ATNF staff for rapidly scheduling these observations.

<b>10708</b>	Further brightening of the X-ray transient MAXI J1535-571, suggesting the presence of a black hole
<b>10704</b>	Erratum to ATel #10702: MAXI J1535-571 optical counterpart coordinates
<b>10702</b>	Discovery of the optical counterpart of MAXI J1535-571
<b>10700</b>	MAXI J1535-571: Swift detection and localization
<b>10699</b>	MAXI/GSC discovery of a new hard X-ray transient MAXI J1535-571

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