Radio re-brightening of MAXI J1535-571 as it transitions back towards the hard state

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*on **27 Oct 2017; 15:35 UT***
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As part of an ongoing Australia Telescope Compact Array (ATCA) campaign monitoring the current outburst of MAXI J1535-571, we observed the source on 2017 October 25 between 06:09 UT and 09:24 UT (MJD 58051.32 +/- 0.07). The observations were taken at 5.5, 9.0, 17.0, and 19.0 GHz, with a bandwidth of 2 GHz at each frequency. 1934-638 and 1520-58 were used for primary flux and phase calibration, respectively. Following standard procedures, the data were reduced and imaged in CASA version 4.7.2 (McMullin et al. 2007, ASPC, 376, 127). Imaging was carried out using a natural weighting scheme and the flux density determined by fitting a point source to the target in the image plane.

We observed bright radio emission from the target, measuring flux densities of 75.9 +/- 0.4 mJy, 81.5 +/- 0.1 mJy, 85.3 +/- 0.2 mJy and 87.2 +/- 0.1 mJy at 5.5, 9.0, 17.0 and 19.0 GHz, respectively (statistical errors only). The MAXI J1535-571 radio spectrum is consistent with a single power-law (spectral index of alpha = 0.09 +/- 0.01, where S_nu $\propto$ nu^{alpha}), indicative of self-absorbed synchrotron emission from a compact jet. These new radio observations show a significant increase in flux (~6 times higher) from our previous ATCA observations taken on 2017 October 05.

Swift/XRT observed MAXI J1535-571 from 2017 October 24 23:30:02 UT to 2017 October 25 00:00:01 UT (MJD 58050.99 +/- 0.01), approximately 6.5 hours before our radio observation (OBS ID: 00088246001). We extracted the X-ray data using the online XRT pipeline (Evans et al. 2009, MNRAS 397, 1177). Preliminary fits of the X-ray spectrum with a simple absorbed powerlaw show an N_H of (3.79 +/- 0.06)E22 cm^{-2} and a photon index of 2.13 +/- 0.03. The unabsorbed 0.3-10 keV X-ray flux is (1.12 +/- 0.03)E-07 erg/s/cm^2, which is factor of ~4 less than that on 2017 October 11 (close in time to our previous radio observations).

We also extracted power spectra of the Swift/XRT observations from 2017 October 11, 22 and

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24, using all the photons in the 0.5-10 keV range. We do not correct for pile-up or background effects. We possibly detect broad-band noise, but this needs to be carefully studied due to instrumental effects (see, e.g. Kalamkar et al. 2013, ApJ, 766, 89). In addition, we detect clear and strong QPOs at frequencies of approximately 4.00 +/- 0.05 Hz, 3.67 +/- 0.05 Hz and 2.50 +/- 0.02 Hz for the October 11, 22 and 24 observations, respectively. The frequencies and evolution are consistent with the Type-C QPO decreasing in frequency, as expected for the intermediate/hard state.

These latest observations imply that the source is transitioning back towards the hard state.

Follow up multiwavelength observations are encouraged. The JACPOT XRB collaboration are planning to continue monitoring this outburst.

We thank Jamie Stevens and the ATCA staff for scheduling the radio observations.

presence of a black hole
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