X-ray spectral hardening and radio non-detection of MAXI J1535-571

Russell, T.D.; Altamirano, S. Rapisarda. D.; Altamirano, D.; Miller-Jones, J.C.A.; Plotkin, R.; Tetarenko, A.J.; Sivakoff, G.R.; JACPOT XRB collaboration

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ATel #11611; *T. D. Russell, S. Rapisarda (UvA). D. Altamirano (U. Southampton), J. C. A. Miller-Jones, R. Plotkin (ICRAR-Curtin), A. J. Tetarenko, G. R. Sivakoff (U. Alberta) and the JACPOT XRB collaboration*
*on **5 May 2018; 12:35 UT***
Credential Certification: Thomas Russell (t.d.russell@uva.nl)

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Referred to by ATel #: 11652, 11682

MAXI J1535-571 (ATels #10699, #10700, #10702, #10704, #10708, #10711, #10716) has been in a soft X-ray spectral state since late November (ATel #11020). The source has remained in this soft state down to X-ray luminosities much lower than typically seen (ATel #11568), and is currently below MAXI and BAT sensitivity limits. However, recent Swift-XRT observations (taken on 2018 April 26, April 30 and May 02, MJDs 58232, 58234 and 58240, respectively) show that the X-ray spectrum has now evolved significantly. The observations show a significant decrease in the soft X-ray emission and an increase in the hard X-ray emission.

We measure a (3-7 keV)/(1-3 keV) colour ratio of 0.21+/-0.07, 0.9+/-0.3 and 3.8+/-1.4 on April 26, April 30 and May 02, respectively. We fit these three epochs with a simple absorbed power law with the N_H fixed to 4.4E22 cm^{-2} (determined by joint fitting these epochs with other higher signal-to-noise observations taken in the week preceding these marked spectral changes), to highlight changes in the spectrum. We find that the soft X-ray flux reduced steadily from ~2.7E-12 ergs/cm^2/s to ~5.9E-13 ergs/cm^2/s (absorbed 1-3 keV) over the observations, while the hard X-ray flux increased from ~5.7E-13 ergs/cm^2/s to ~2.2E-12 ergs/cm^2/s (absorbed 3-7 keV). Over these dates, the X-ray photon index evolved from 5+/-1 to 3.7+/-0.8, and then 1.6+/-0.6. We note that while there is an obvious trend in the data, the values of the absorbed fluxes and photon indices are poorly constrained (due to low count rates and a high degeneracy with the line-of-sight absorption, which has errors of 1.1E22 cm^{-2} in our joint fitting). The addition of a disk blackbody component (which is preferred for the April 26 data) does not change the observed trend.

Following this X-ray hardening, we performed ATCA radio observations of the source on 2018 May 03 21:46:09.9 UT to 22:39:09.9 UT (MJD 58241.92 +/- 0.02). These observations were taken simultaneously at 5.5 and 9.0 GHz, with a bandwidth of 2 GHz at each frequency. 1934-638 and 1520-58 were used for primary flux and phase calibration, respectively. The data were reduced and imaged following standard procedures in CASA (v4.7.2; McMullin et al. 2007).

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Imaging was carried out using natural weighting to maximise sensitivity.

The radio counterpart was not detected at either frequency, with 3-sigma upper-limits of 165 uJy/beam at 5.5 GHz and 141 uJy/beam at 9 GHz. Stacking the two frequencies provides a 3-sigma upper-limit of 117 uJy/beam. A radio non-detection does not rule out an accretion state transition, as the compact jet typically switches on a few days later than the X-ray spectral changes, which themselves lag the change in X-ray timing properties by a few days (Kalemci et al. 2013).

We will continue to monitor MAXI J1535-571 at radio frequencies. Further multiwavelength monitoring is strongly encouraged.

We thank Swift and ATCA for scheduling these observations.

presence of a black hole
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R. E. Rutledge, Editor-in-Chief rrutledge@astronomerstelegram.org
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