Radio detection of GX 339-4 in its latest outburst

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Radio detection of GX 339-4 in its latest outburst

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*on **2 Oct 2017; 21:22 UT***
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Following the recent detection of a new outburst from the Galactic black hole X-ray transient GX 339-4 (ATel #10797, #10798), we triggered target of opportunity radio observations of the source with the Australia Telescope Compact Array (ATCA).

We observed GX 339-4 between 03:59 and 08:22 UT on 2017 September 30 (MJD 58026.26 +/- 0.09). Observations were taken at 5.5, 9.0, 17.0 and 19.0 GHz, with a bandwidth of 2 GHz at each frequency. The array was in its compact H168 configuration, providing angular resolutions of 48"x35", 29"x22", 16"x13" and 14"x12" at 5.5, 9.0, 17.0 and 19.0 GHz, respectively. Flux and bandpass calibration was done with 1934-638, while 1646-50 was used as the phase calibrator. The data were reduced and imaged (with a natural weighting) following standard procedures in CASA (McMullin et al., 2007). We fit a point source in the image plane to measure the target's flux density.

We significantly detect a radio source at the position of GX 339-4 with flux densities of 1.14 +/- 0.06 mJy at 5.5GHz, 1.24 +/- 0.04 mJy at 9GHz, 1.53 +/- 0.04 at 17 mJy, and 1.51 +/- 0.05 mJy at 19GHz (statistical errors only). The radio spectral index of alpha = 0.26 +/- 0.05 (where S_nu $\propto$ nu^{alpha}) is consistent with emission from a compact radio jet.

Assuming a distance of 8 kpc, our radio detection provides a 5.5GHz radio luminosity of (4.8 +/- 0.3)e29*(d/8 kpc)^2 erg/s. Roughly fitting an absorbed powerlaw model to Swift/XRT observations of GX 339-4 taken ~24 hours before and ~24 hours after our ATCA observations, we determine an X-ray luminosity of between 4.6e35 and 1.0e36 erg/s (d/8 kpc)^2 erg/s (0.3-10 keV). We fit absorption column densities of about N_H= 7(+4,-3)e21 and 6(+3,-2)e21 cm^{-2}, as well as photon indices of Gamma = 1.6(+0.4,-0.3) and 1.3(+0.3,-0.2), for the September 29 and October 1 X-ray observations. These radio and X-ray measurements are consistent with the standard radio/X-ray correlation of this source in the hard state (Corbel et al. 2013, MNRAS, 428, 2500).

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The JACPOT XRB collaboration are planning further observations of this source. Further multiwavelength observations are encouraged.

We thank Jamie Stevens and the ATNF staff for rapid scheduling of these observations.

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