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e-EVN radio detection of Aql X-1 in outburst

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*on **24 Jun 2013; 12:49 UT***
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Subjects: Radio, Binary, Neutron Star, Transient

The neutron star X-ray binary Aql X-1 is currently in outburst (ATel #5114, #5117, #5129, #5136, #5148).

Using the European VLBI Network (e-EVN) we observed Aql X-1 at 5 GHz in two time-slots: 2013 June 18 between 19:48 - 20:36 UT (MJD 56461.825 - 56461.858), and 2013 June 19 between 02:53 - 05:54 UT (MJD 56462.120 - 56462.246). The two datasets were combined together and then calibrated. The participating radio telescopes were: Effelsberg (Germany), Jodrell Bank Mk2 (UK), Medicina (Italy), Noto (Italy), Onsala 25m (Sweden), Torun (Poland), Yebes (Spain), Westerbork Synthesis Radio Telescope (Netherlands), Shanghai (China), Hartebeesthoek (South Africa).

The naturally weighted radio map had a beam of 6.1 x 2.4 mas^2 at PA=73.5 deg. We detected the target at a peak brightness of 259±40 µJy/beam. Both image-plane and uv-plane fitting show the major axis of the fitted Gaussian component to be oriented within 15 deg of the beam's PA thus rendering uncertain any inference with respect to the presence and orientation of extended radio emission. The position of Aql X-1 as measured via image-plane fitting is:

RA: 19h 11m 16.0245341s

DEC: 00deg 35' 05.879384"

The position error due to phase referencing is estimated to be about 0.5 mas. This is about 10 mas away from the VLBI positions reported in ATel #2317 and Miller-Jones et al. 2010, ApJ, 716, L109. This discrepancy is likely mainly due to the proper motion of Aql X-1.

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