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## MAXI J1659-152 fading in optical

ATel #3517; *D. M. Russell (University of Amsterdam), F. Lewis, (Univ. of Glamorgan, Faulkes Telescope Project, Open Univ.), L. Schreuder, Y. J. Yang, R. Wijnands (University of Amsterdam), A. Tripp (Faulkes Telescope Project)*

on 28 Jul 2011; 15:37 UT

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Subjects: Optical, X-ray, Binary, Black Hole, Transient

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It was recently reported that the black hole candidate X-ray binary MAXI J1659-152 has faded to an X-ray flux (0.5-10 keV) of  $< 3.0e-13$  ergs cm<sup>-2</sup> s<sup>-1</sup> (ATel #[3506](#)). This implies the source may be in quiescence after an outburst that lasted almost one year (GCN #[11296](#), ATel #[2873](#)) including a late re-brightening in the last three months (ATels #[3298](#), #[3339](#), #[3358](#), #[3379](#)). Here we report on recent optical observations with the two 2-m Faulkes Telescopes North and South (see ATel #[2884](#)).

MAXI J1659-152 has faded in optical but is still detected in V, R and i'-bands as of 2011-07-27 (MJD 55769.4). The magnitudes on this date were V = 20.8 +/- 0.1, R ~ 20.1. Flux calibration in V-band was achieved using field star magnitudes measured from Swift UVOT images. In R-band, the magnitudes of field stars in the GSC 2.2 digital sky survey were used to calibrate the data, and there may be systematic errors of several tenths of a magnitude. Flux calibration in i'-band is not available.

Soon after the outburst began in September 2010, the optical flux peaked at V ~ 16.5 mag (ATel #[2884](#); Kennea et al. 2011, *ApJ*, 736, 22). In 2011 our Faulkes Telescope monitoring shows that by 2011-05-21 (MJD 55702.8) it had faded by only 2.5 mag to V = 19.0 +/- 0.1. During the next 15 days the source remained at a fairly steady flux level; V ~ 18.9 - 19.0. This was during the period of X-ray re-brightenings. At a magnitude of V =

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20.8 +/- 0.1 on 2011-07-27, MAXI J1659-152 is now ~4.3 mag fainter than its brightest outburst magnitude. This is a fade of a factor of 50 in optical flux; for comparison the X-ray flux of  $< 3.0e-13$  ergs cm<sup>-2</sup> s<sup>-1</sup> (ATel #3506) is  $> 10^5$  times fainter than the peak 0.5-10 keV X-ray flux (Kennea et al. 2011). The optical colour has also changed; V - i' is 0.5 mag redder on 2011-07-27 compared to 2011-05-21. A link to the light curves is provided below.

The upper limit on the quiescent magnitude of MAXI J1659-152 is V > 21 mag from its non-detection in the USNO B1 catalogue (Kennea et al. 2011). The source is now almost as faint as this upper limit; we aim to continue monitoring the optical counterpart to test whether the source continues to fade or remains at this magnitude. A wide range of quiescent magnitudes for MAXI J1659-152 have been predicted; from r ~ 22.4 (ATel #2976) to V ~ 28 (Kuulkers et al. 2011, arXiv:1102.2102).

The Faulkes Telescope observations are part of an on-going monitoring campaign of ~ 30 low-mass X-ray binaries (Lewis et al. 2008, arXiv:0712.2751). The Faulkes Telescope South is maintained and operated by Las Cumbres Observatory Global Telescope Network. FL acknowledges support from the Dill Faulkes Educational Trust.

*MAXI J1659-152 optical light curves and finding charts*

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