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### **GX 339-4 back in the hard state**

*optical observations reveal the return of the jet*

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## GX 339-4 back in the hard state: optical observations reveal the return of the jet

ATel #3191; *D. M. Russell (University of Amsterdam), F. Lewis (Faulkes Telescope Project, Open Univ., Univ. of Glamorgan)*  
on 25 Feb 2011; 13:54 UT

Credential Certification: David M. Russell (D.M.Russell@uva.nl)

Subjects: Radio, Infra-Red, Optical, X-ray, Binary, Transient

Referred to by ATel #: [3383](#), [10797](#)

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The transient black hole candidate GX 339-4 has been in outburst since January 2010 (ATel #[2380](#), #[2384](#), #[2455](#), #[2459](#), #[2525](#)) and made a transition from the hard state to the soft state during March - May 2010 (ATel #[2523](#), #[2545](#), #[2547](#), #[2556](#), #[2573](#), #[2577](#), #[2593](#)). The source remained in a soft state for ~ eight months before finally hardening in January 2011 (ATel #[3117](#)). We are monitoring GX 339-4 with the Faulkes Telescope South (located at Siding Spring, Australia). The source was only recently visible again from Australia, and we report on observations taken on 23 Feb and 24 Feb 2011 (MJD 55615-6).

The mean measured magnitudes are  $V = 17.1$ ;  $i' = 16.3$  on 23 Feb and  $i' = 16.3$  on 24 Feb, with a range from different observations spanning ~ 0.1 mag in  $i'$ -band. From four  $i'$ -band exposures on 23 Feb and four on 24 Feb, we derive a fractional rms variability of 3 +/- 2 % (the time resolution is 270 sec) on 23 Feb and 5 +/- 1 % (time resolution 140 sec) on 24 Feb. On 24 Feb the variability is significant at the 4-sigma level, and is greater than the fractional rms variability we observed in the soft and intermediate states in  $i'$ -band, which was typically ~ 1 +/- 1 % in April - May 2010. Compared to data taken in the soft state, the change in  $V-i'$  colour and rms variability are consistent with the variable jet component now making a contribution, as is commonly seen for this source in the hard state (see ATel #[2547](#), #[2573](#), Coriat et al. 2009).

The light curves are being updated online [here](#). Multiwavelength monitoring is encouraged as the jet emission evolves in the next few weeks and the source fades in the hard state. The Faulkes Telescope observations are part of an on-going monitoring campaign of ~ 30 low-mass X-ray binaries (Lewis et al. 2008). The Faulkes Telescope

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South is maintained and operated by Las Cumbres Observatory Global Telescope Network. FL acknowledges support from the Dill Faulkes Educational Trust.

*Faulkes Telescope light curves*

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