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GRB 111123A: Keck-I host detection and VLT/X-shooter redshift

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D. Xu, D. Malesani, T. Kruehler, J. P. U. Fynbo (DARK/NBI), D. A. Perley (Caltech), P. Goldoni (APC/Univ. Paris 7 and SAp/CEA), L. Kaper (U. Amsterdam), A. de Ugarte Postigo (IAA-CSIC and DARK/NBI), N. R. Tanvir (U. Leicester) report on behalf of the X-shooter GTO GRB collaboration:

We observed the field of GRB 111123A (Stamatikos et al., GCN 12587) using the Keck-I telescope equipped with the LRIS instrument. Observations were carried out on 2013 February 10 (~444 days after the burst), simultaneously in the g and I bands, for a total exposure time of 750 and 720 s, respectively.

An extended source with $g=25.83$ (AB) and $I = 23.55$ (Vega) is detected at the position of the optical and NIR afterglow (Xu et al., GCN 12589; Fugazza et al., GCN 12593), where the positional error radius of the optical afterglow has been reduced from $\sim 1.0''$ to $\sim 0.3''$ through a refined analysis. We thus consider the source to be the host galaxy of GRB 111123A.

A spectrum of this source was taken on 2013 March 07 with the ESO VLT equipped with the X-shooter spectrograph, featuring NIR/VIS/UVB three arms and covering the wavelength range 3000-25000 AA. The exposure time was 4x600 s. In the NIR arm, we detect four emission lines, interpreted as [O III] (5007), [NeIII] (3869), [O II] (3727), and Hbeta (a marginal detection), all at a common redshift $z = 3.1516$. In the UVB arm, the host continuum is detected down to ~ 5100 AA, thus corresponds to the onset of the Lyman alpha forest at the proposed redshift.

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