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X-ray and radio follow-up observations of the X-ray transient Swift J0840.7-3516

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We report on follow-up X-ray and radio observations of the transient source Swift J0840.7-3516, which triggered the Swift BAT on February 5th (GCN 26982).

Swift XRT is monitoring the source on a daily cadence. In the latest observations performed on February 10-11, the source was found at an averaged observed flux of about 1.6×10^{-13} ergs/cm²/s (0.3-10 keV). The spectrum has softened significantly over a time span of a week, and it is well described by an absorbed power law model, with the photon index increasing from about 1.2 soon after the trigger epoch to about 3.7 in the most recent observations. The derived hydrogen column density of 4×10^{21} cm⁻², is compatible with the Galactic density in the source direction (Willingale et al. 2013).

NuSTAR observed the source on February 8-9 for a total exposure time of about 42 ks. We detected emission up to about 20 keV. The light curve shows considerable variability on time scales of hundreds of seconds, and the spectrum, at the time of the observation, was well described by a power law model over the 3-20 keV energy band with photon index of about 1.8.

In the radio band, the field was observed for about 4 hr on February 11, between 14:50 and 19:10 UT, with the Australia Telescope Compact Array (ATCA). The observation was carried out at central frequencies of 5.5 and 9 GHz (recorded simultaneously), with 2 GHz of bandwidth at each frequency. PKS 1934-638 and PKS B0826-373 were used for primary and secondary calibration, respectively. Data editing, calibration, and imaging was completed following standard procedures in the Common Astronomy Software Application (CASA; McMullin et al. 2007). Imaging used a

natural weighting, maximising sensitivity. We did not detect any radio counterpart within the XRT position (GCN 26996) at either frequency band. Stacking the two observing bands together, we determined a 3-sigma upper-limit on the flux density of $18 \mu\text{Jy}/\text{beam}$ at a central frequency of 7.25 GHz.

We thank the NuSTAR and ATCA Directors for promptly accepting our DDT requests.

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