Initial NICER observation of the new X-ray transient Swift J1858.6-0814

Ludlam, R.M.; Miller, J.M.; Arzoumanian, Z.; Gendreau, K.C.; Bult, P.M.; Strohmayer, T.E.; Markwardt, C.B.; Homan, J.; Uttley, P.; Cackett, E.M.; Chakrabarty, D.; Altamirano, D.; Steiner, J.F.; Jaisawal, G.K.; Guillot, S.; Wolff, M.T.; Ray, P.S.; Fabian, A.C.; NICER team

Publication date
2018

Document Version
Final published version

Published in
The astronomer's telegram

[Previous | Next | ADS]

Initial NICER observation of the new X-ray transient Swift J1858.6-0814

ATel #12158; ***R. M. Ludlam, J. M. Miller (U of Michigan), Z. Arzoumanian, K. C. Gendreau, P. M. Bult, T. E. Strohmayer, C. B. Markwardt (NASA/GSFC), J. Homan (Eureka Scientific & SRON), P. Uttley (U of Amsterdam), E. M. Cackett (Wayne State University), D. Chakrabarty (MIT), D. Altamirano (U of Southampton), J. F. Steiner (MIT), G. K. Jaisawal (DTU Space), S. Guillot (IRAP/CNES/CNRS), M. T. Wolff, P. S. Ray (NRL), A. C. Fabian (U of Cambridge), on behalf of the NICER team***
*on **2 Nov 2018; 18:20 UT***
Credential Certification: Jeroen Homan (jeroen@space.mit.edu)

Subjects: X-ray, Transient

Referred to by ATel #: 12160, 12163, 12167, 12180, 12184, 12197, 12220, 12499, 12512

We report on initial NICER observations of the new Galactic transient source Swift J1858.6-0814 (ATel #12151). It is unclear if the source is a black hole or a neutron star.

NICER observed Swift J1858.6 on 2018-11-01, beginning at 15:52 UT, for an exposure of ~9 ks. Initial attempts to localize the source within the 3 arcmin error circle (ATel #12151)--by employing pointing coordinates offset by 1 and 2 arcminutes from the nominal position in hopes of "peaking up" the signal--were hampered by large count-rate fluctuations from the source; we nevertheless settled on a pointing direction 1 arcmin to the south (RA, Dec = 284.673 deg, -8.26167 deg) to acquire most of the available exposure. Uncertainty in the source position at this level can result in 5-10% errors in spectral analysis. The light curve showed prominent flaring on time scales of seconds, with one of the flares exhibiting an increase in count rate by a factor of a few hundred over a span of 15 seconds. A figure of the 0.5-10 keV light curve from our observations (1 second time resolution and with data gaps removed) can be found at the link provided below. A preliminary timing analysis did not reveal any quasi-periodic features or pulsations.

Time-averaged energy spectra were extracted for three different intensity intervals, selecting COR_SAX>4, and normalized to the Crab Nebula as per Ludlam et al. 2018. The spectra could be described by the simple phenomenological model of an absorbed thermal disk and power-law component. The spectrum extracted from the highest intensity interval (>100 cts/s) had an exposure time of ~290 seconds at an absorbed 0.5-10 keV flux of ~6.5E-10 ergs/cm2/s. The column density was measured to be nH~3E21 cm^-2, the disk temperature approximately 0.29 keV, and the photon index Gamma was ~1.2. The spectrum extracted at intermediate intensity (20-100 cts/s) had an exposure time of ~714 seconds and an absorbed flux of ~2.2E-10 ergs/cm2/s in the 0.5-10 keV band. We found a column density of nH~2E21 cm^-2, a disk temperature of kT~ 0.17 keV, and a photon index Gamma~1. The lowest intensity interval (<20

Related
12512 NuSTAR shows continued X-ray activity of Swift J1858.6-0814 in an unusual spectral state
12499 ULTRASPEC observations of SWIFT J1858.6-0814
12220 Significant Intrinsic Absorption in Swift J1858.6-0814
12197 Blue Oscillations and Rapid Red Flares in Swift J1858.6-0814 Observed with ULTRACAM/NTT
12186 More optical follow-up of Swift J1858.6-0814
12184 AMI-LA radio observations of the galactic X-ray transient Swift J1858.6-0814
12180 Optical observations of the rapidly varying newly discovered transient Swift J1858.6-0814
12167 INTEGRAL detection of the X-ray transient Swift J1858.6-0814
12164 Swift J1858.6-0814: Localization and variability of the optical counterpart
12163 MAXI/GSC observations of the X-ray transient Swift J1858.6-0814
12160 Swift J1858.6-0814: Swift XRT and UVOT localization
12158 Initial NICER observation of the new X-ray transient Swift J1858.6-0814
12151 Swift reports the detection of a new galactic transient source Swift J1858.6-0814

cts/s) had an exposure time of 5.6 ks, was incredibly hard (Gamma<1), and had an absorbed flux of 2.6E-11 ergs/cm2/s when the absorption column was fixed at 1.5E21 cm^-2. The source exhibits both Fe K and Fe L reflection features.

The large amplitude flaring in the light curve, hard spectrum, and prominent reflection features resemble the behavior of the Galactic microquasars V4641 Sgr and V404 Cyg (see, e.g., Figure 1 in Wijnands & van der Klis 2000 and Rodriguez et. al. 2015, respectively).

Further NICER observations of this source are underway--see the observation schedule link below. Additional multiwavelength follow-up is strongly encouraged.

NICER is a 0.2-12 keV X-ray telescope operating on the International Space Station. The NICER mission and portions of the NICER science team activities are funded by NASA.

References:
Ludlam et al. 2018, ApJL, 858, L5
Rodriguez et. al. 2015, A&A, 581, 9
Wijnands & van der Klis 2000, ApJ, 528, 93

Light curve and NICER observing schedule

[**Telegram Index**]

R. E. Rutledge, Editor-in-Chief rrutledge@astronomerstelegram.org
Derek Fox, Editor dfox@astronomerstelegram.org
Mansi M. Kasliwal, Co-Editor mansi@astronomerstelegram.org