Intermediate-duration burst from AX J1754.2-2754 detected by INTEGRAL

Chenevez, Jérôme; Beeck, Sarah ; Brandt, Søren; Kliving, Pernille; Lund, Niels; Kuulkers, Erik; Falanga, Maurizio; K. Galloway, Duncan ; Goldwurm, Andrea; Cumming, Andrew

Total number of authors:
11

Publication date:
2017

Document Version
Publisher's PDF, also known as Version of record

The Astronomer's Telegram
Post | Search | Policies
Credential | Feeds | Email

12 Jan 2018; 12:57 UT

[Previous | Next | ADS]

Intermediate-duration burst from AX J1754.2-2754 detected by INTEGRAL

ATel #10195; *Jerome Chenevez, Sarah Beeck, SÃ¸ren Brandt, Pernille Kliving, Niels Lund (DTU Space, Denmark), Erik Kuulkers (ESA/ESTEC, The Netherlands), Maurizio Falanga (ISSI, Switzerland), Duncan K. Galloway (Monash, Australia), Andrea Goldwurm (CEA, France), Andrew Cumming (Mc Gill, Canada), Hendrik Schatz (MSU, USA)*
*on **22 Mar 2017; 18:15 UT***
Credential Certification: Jerome CHENEVEZ (jerome@space.dtu.dk)

Subjects: X-ray, Binary, Neutron Star, Transient

The JEM-X instrument on-board INTEGRAL has detected a 15-minute long burst from the source AX J1754.2-2754 during an observation of the Galactic Center (PI J. Wilms) on March 12, 2017. This finding has been achieved in the framework of the INTEGRAL monitoring of long X-ray bursts (Chenevez et al. 2008, arXiv:0811.0904) and is only the second burst registered from this source (Chelovekov & Grebenev, ATel #1094; AstL 33, 807, 2007).

The 3-25 keV light curve shows that the burst started on MJD 57824.16535 (UT 12 March 2017 03:58:06) with a 30-s rise followed by a 2-minute long plateau at about 70% of the peak level. After the peak, the intensity slowly decreased back to the pre-burst level, which is below our detection threshold, about 15 minutes after the burst start. The burst is shorter in the hard energy band (10-25 keV) with respect to the soft energy band (3-10 keV), lasting only 200 sec. The start of the burst in the hard energy band has a delay of 30 seconds with respect to that of the soft energy band. This coincides with the peak of the burst in the 3-25 keV energy band, at a flux corresponding to 3.3 Crab.
A preliminary time-resolved spectral analysis reveals an anti-correlation between the inferred black-body temperature and radius, in the first part of the burst. This is characteristic of a strong photospheric radius expansion phase. The highest flux is reached during the rise of the 3-25 keV light curve at an unabsorbed bolometric value of 7.3 (+/-0.2)$\times 10^{-8}$ erg/cm^2/s.

The source is not detected outside the burst interval, with a 3-σ upper limit of 4 mCrab in the JEM-X range, and the burst is only marginally detected by the IBIS/ISGRI instrument in the 20-40 keV energy band. Previous observations regularly taken since February 13, when the region became visible by INTEGRAL, do not reveal any emission from the source, and we infer a 3-σ upper limit on the persistent flux of 10^{-10} erg/cm^2/s between 3-40 keV.

We tentatively interpret this as an intermediate-duration burst (see, e.g., Cumming et al., ApJ 646, 429, 2006) with a superexpansion phase (see in 't Zand & Weinberg, A&A 520, 81, 2010). This is consistent with the system being an ultra-compact X-ray binary, accreting pure helium at low rate (Bassa et al. 2008, ATel #1575). Assuming the Eddington luminosity at the burst peak equals 3.8×10^{38} erg/s (Kuulkers et al., A&A 399, 663, 2003) we derive a source distance of 6.6 +/-0.4 kpc. At this distance, the upper-limit on the persistent emission translates to a 3-40 keV luminosity of 5.2×10^{35} erg/s, which is consistent with previous values measured when the source was observed in outburst with Chandra (Jonker & Keek 2008, ATel #1643) and Swift (Maccarone et al. 2012, ATel #4109).

INTEGRAL will continue to monitor the region around AX J 1754.2-2754 1-2 times per week until mid-April, which makes it possible to further follow the behavior of this very-faint neutron star X-ray binary.

Related
10195 Intermediate-duration burst from AX J1754.2-2754 detected by INTEGRAL
4354 A new outburst of XTE J1739-285
4111 Detection of a new Galactic Center X-ray source: Swift J174444.9-295042
4109 A Swift detection of AX J1754.2-2754: renewed activity, or evidence of persistent accretion?
1643 AX J1754.2-2754: back in outburst
1575 The faint neutron star and probable ultra-compact transient AX J1754.2-2754: quiescent after a (long) outburst
1143 Refined position of AX J1754.2-2754 with Swift/XRT
1094 First detection of a type I X-ray burst from AX J1754.2-2754

[**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