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; Schatz, Hendrik

Published in:
The Astronomer's Telegram

Publication date:
2017

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

Link back to DTU Orbit

Citation (APA):

General rights
Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

- Users may download and print one copy of any publication from the public portal for the purpose of private study or research.
- You may not further distribute the material or use it for any profit-making activity or commercial gain
- You may freely distribute the URL identifying the publication in the public portal

If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.
Intermediate-duration burst from AX J1754.2-2754 detected by INTEGRAL

ATel #10195: Jerome Chenevez, Sarah Beeck, SÅren 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)×10⁻⁸ erg/cm²/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/cm²/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 3.8×10³⁸ 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 5.2×10³⁸ 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.
ATel #10195: Intermediate-duration burst from AX J1754.2-2754 detected by INTEGRAL