RXTE detection of a thermonuclear burst from IGR J17498-2921

distance estimate and burst oscillations

Linares Alegret, M.; Altamirano, D.; Watts, A.; Strohmayer, T.; Chakrabarty, D.; Patruno, A.; van der Klis, M.; Wijnands, R.; Casella, P.; Armas Padilla, M.; Cavecchi, Y.; Degenaar, N.; Kalamkar, M.; Kaur, R.; Yang, Y.; Rea, N.

Publication date
2011

Document Version
Final published version

Published in
The astronomer's telegram

License
Unspecified

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

7 Sep 2022; 09:44 UT

[Previous | Next | ADS]

RXTE detection of a thermonuclear burst from IGR J17498-2921: distance estimate and burst oscillations

ATel #3568; ***M. Linares (MIT), D. Altamirano, A. Watts (Amsterdam), T. Strohmayer (NASA/GSFC), D. Chakrabarty (MIT), A. Patruno, M. van der Klis, R. Wijnands (Amsterdam), P. Casella (Southampton), M. Armas-Padilla, Y. Cavecchi, N. Degenaar, M. Kalamkar, R. Kaur, Y. Yang (Amsterdam), N. Rea (CSIC-IEEC)***
*on **18 Aug 2011; 00:40 UT***
Credential Certification: Manuel Linares (linares@mit.edu)

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

Referred to by ATel #: 3601, 3622, 3634, 3638, 3643, 3646, 3661

Tweet

We report the detection of a type I X-ray burst with burst oscillations during an RXTE-PCA observation of the recently discovered accreting millisecond pulsar (AMP) IGR J17498-2921 (ATels #3551, #3555, #3556, #3558, #3559, #3560, #3561, #3562, #3563). The burst intensity peaked on 2011-08-16 at 15:21:45 UTC. We find a rise time of ~0.4s (time span for burst intensity to go from 25% to 90% of net peak value) and an approximate total duration in the RXTE-PCA bandpass of 30s.

The X-ray (2.5-15 keV) spectrum is well described throughout the burst by an absorbed blackbody model (nH fixed at 3e22 cm^{-2}; ATel #3555), showing a clear cooling tail typical of thermonuclear (type I) X-ray bursts (kT decreasing from ~2.6 to ~1.4 keV along the burst decay). This confirms the source as a thermonuclear burster (ATel #3560), and makes IGR J17498-2921 the 7th out of the 14 currently known AMPs to show thermonuclear bursts.

The burst light curve shows two peaks: a local intensity maximum followed by the global intensity maximum about 2s later. We find evidence for a moderate photospheric radius expansion (PRE) phase during the burst rise and peaks, followed by a temperature increase (from ~1.8 to 2.6 keV) simultaneous with a (factor of 3) radius decrease. After "touchdown" the apparent emitting area remains roughly constant. We measure a maximum burst bolometric net flux of 5.6e-8 erg/cm2/s. Assuming that the maximum luminosity was equal to the value found for PRE bursts (3.8e38 erg/s; Kuulkers et al. 2003, A&A, 399, 663), we estimate a distance to IGR J17498-2921 of 7.6 kpc. The total radiated burst energy at 7.6kpc was ~3.2e39 erg.

Related
5332 Report on (non-)activity in the Galactic bulge region as seen by INTEGRAL
5041 MAXI/GSC detection of an X-ray outburst probably from SAX J1747.0-2853 and Swift followup observation of the Galactic center region
4848 INTEGRAL/JEM-X detects a new outburst of the Rapid Burster (MXB 1730-335)
4840 Transient X-ray burster KS 1741-293 active again
3661 Swift observations of the accreting millisecond pulsar IGR J17498-2921: from outburst to quiescence
3646 INTEGRAL Galactic Bulge monitoring: transient activity from KS 1741-293, MXB 1730-335, and IGR J17498-2921
3643 Thermonuclear burst oscillations from the 401 Hz pulsar IGR J17498-2921
3638 Outburst near-infrared and Chandra observations of the ms-pulsar IGR J17498-2921
3634 Pre-outburst optical/NIR observations of the field around the accreting millisecond X-ray pulsar IGR J17498-2921
3632 Swift detects an X-ray burst and renewed activity from KS 1741-293
3622 The optical counterpart of the accreting millisecond X-ray pulsar IGR J17498-2921
3606 Chandra Localization of the Accretion-Powered Millisecond Pulsar IGR J17498-2921
3601 Refined Orbital Timing Solution for IGR J17498-2921
3568 RXTE detection of a thermonuclear burst from IGR J17498-2921: distance estimate and burst oscillations
3563 A preliminary orbital solution for the newly discovered AMSP, IGRJ17498-2921
3562 Search for the NIR counterpart to IGR J17498-2921 in quiescence
3561 Preliminary Candidate Binary Orbit Solutions for IGR J17498-2921
3560 INTERGAL detects a Type I X-ray burst from IGR J17498-2921
3559 Chandra detection of IGR J17498-2921 in quiescence
3558 IGR J17498-2921: improved Swift/XRT position
3556 RXTE detects a coherent signal at ~ 401 Hz from IGR J17498-2921.

Oscillations at a frequency consistent with the persistent pulsar frequency (~401 Hz; ATel #3556) are detected during a 2-3 second interval in the tail of the burst after the PRE episode. The average pulsed amplitude (measured as the half-amplitude) during this interval corresponds to approximately 240 counts/sec, which is significantly larger than the 9 counts/sec half-amplitude of the persistent pulsations before the burst. This confirms that the burst flux must be modulated at the spin frequency.

3555 Swift localization of the new hard X-ray transient IGR J17498-2921

3551 A new hard X-ray transient discovered by INTEGRAL: IGRJ17498-2921

2465 INTEGRAL reports renewed activity from KS 1741-293

1541 Swift/XRT observations of the X-ray transients KS1741-293 and XTE J1719-291

1531 Chandra detects activity from the Galactic X-ray transients KS 1741-293, Swift J174535.5-290135.6 and CXOGC J174535.5-290124

1398 Recent activity of the Rapid Burster (MXB 1730-335)

1385 INTEGRAL Galactic bulge monitoring observations of GRO J1750-27 (AX J1749.1-2639), H1743-322 and SLX 1746-331

[Telegram Index]

R. E. Rutledge, Editor-in-Chief rrutledge@astronomerstelegram.org

Derek Fox, Editor dfox@astronomerstelegram.org