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INTEGRAL catches a type-I X-ray burst from the unclassified X-ray source 1RXS J180408.9-342058

ATel #4050; [J. Chenevez \(DTU Space, Denmark\)](#), [E. Kuulkers \(ESA/ESAC, Spain\)](#), [S. Brandt \(DTU Space, Denmark\)](#), [R. Wijnands \(UvA, The Netherlands\)](#), [J. Alfonso-García \(CAB/INTA-CSIC, Spain\)](#), [V. Beckmann \(APC, France\)](#), [T. Bird \(Southampton, UK\)](#), [M. Del Santo \(INAF/IASF-Roma, Italy\)](#), [A. Domingo \(CAB/INTA-CSIC, Spain\)](#), [K. Ebisawa \(ISAS, Japan\)](#), [P. Jonker \(SRON, The Netherlands\)](#), [P. Kretschmar \(ESA/ESAC, Spain\)](#), [C. Markwardt \(GSFC, USA\)](#), [T. Oosterbroek \(ESA/ESTEC, The Netherlands\)](#), [A. Paizis \(INAF-IASF, Italy\)](#), [K. Pottschmidt \(UMBC/NASA GSFC, USA\)](#), [C. Sánchez-Fernández \(ESA/ESAC, Spain\)](#)

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Credential Certification: Jerome CHENEVEZ (jerome@space.dtu.dk)

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Referred to by ATel #: [4085](#)



During INTEGRAL Galactic Bulge monitoring (ATel #[438](#); Kuulkers et al. 2007, A&A, 466, 595) observations performed on April 16, 2012, between 5:12 and 8:53 (UTC), the twin X-ray monitor JEM-X detected an X-ray burst starting at UTC 8:37:09 from the position:

RA= 271.020°

DEC=-34.344°

with an error radius of 1.2' (at 95% confidence level).

This position lies only 57" from the unclassified X-ray source 1RXS J180408.9-342058, and we tentatively associate the origin of the burst with this source.

The burst peak flux reaches 3.2 Crab (9.3×10^{-8} erg/cm²/s) in the 3-25 keV band. The burst duration, rise time, and exponential decay measured in the same energy band are about 45 s, 8 s and 35 s, respectively (see Galloway et al., ApJS 179, 360, 2008, for definitions). The hardness evolution shows evidence for hardening during the rising phase and cooling during the decay of the burst.

The source is not detected in the mosaic images of the whole observation excluding the burst time interval (for a remaining combined effective exposure of 1.5 ks), leading to persistent flux upper limits at 3 σ of 6 mCrab (10^{-10} erg/cm²/s) and 3 mCrab (3×10^{-11} erg/cm²/s) between 3-10 keV and 10-25 keV, respectively.

We have performed a follow-up observation with Swift on April 17, between 18:44 and 20:16 UTC for a total exposure time of 1 ks.

A single object is detected in the JEM-X error circle at:

RA= 271.0335°

Dec= -34.3471°

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4050 [INTEGRAL catches a type-I X-ray burst from the unclassified X-ray source 1RXS J180408.9-342058](#)

with an error radius of 3.8" (90% confidence).

This position lies 15.6" from the position of 1RXS J180408.9-342058 with an error of 16" in the ROSAT source catalog (Voges et al., A&A 349, 389, 1999).

The Swift/XRT spectrum fitted by an absorbed power-law model ($nH = 4.6_{-2.8}^{+4.1} \times 10^{21} \text{ cm}^{-2}$ and photon index = $3.6_{-1.2}^{+1.8}$) leads to a 0.3-10 keV flux of $1.11_{-0.33}^{+0.50} \times 10^{-12} \text{ erg/cm}^2/\text{s}$. The 0.3-10 keV unabsorbed flux is $9.1_{-6.6}^{+75.8} \times 10^{-12} \text{ erg/cm}^2/\text{s}$.

We conclude that the observed event is consistent with a type I (thermonuclear) X-ray burst, and 1RXS J180408.9-342058 is thus harboring a neutron star as primary. Assuming the burst reaches the Eddington luminosity limit for helium-rich material of $L_{\text{Edd}} = 3.8 \times 10^{38} \text{ erg/s}$ (Kuulkers et al., A&A 399, 663, 2003), this places the source at an upper limit distance of 5.8 kpc. Hence, the derived unabsorbed flux translates to a persistent 0.3-10 keV upper limit luminosity of only $3.7_{-2.6}^{+31.3} \times 10^{34} \text{ erg/s}$.

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R. E. Rutledge, Editor-in-Chief

`rrutledge@astronomerstelegam.org`

Derek Fox, Editor

`dfox@astronomerstelegam.org`

Mansi M. Kasliwal, Co-Editor

`mansi@astronomerstelegam.org`