Serendipitous detection of a new outburst of the HMXB IGR J19294+1816 with XMM-Newton


Publication date
2019

Document Version
Final published version

Published in
The astronomer's telegram

License
Unspecified

Citation for published version (APA):
Serendipitous detection of a new outburst of the HMXB IGR J19294+1816 with XMM-Newton

ATel #13215; Vladimir Domcek (University of Amsterdam), Jakob van den Eijnden (University of Amsterdam), Alicia Rouco Escorial (University of Amsterdam), Juan Hernandez Santisteban (University of St Andrews), Nathalie Degenaar (University of Amsterdam), Rudy Wijnands (University of Amsterdam), Aastha Parikh (University of Amsterdam), Ping Zhou (University of Amsterdam)

on 22 Oct 2019; 17:35 UT

Distributed as an Instant Email Notice Transients

Credential Certification: Juan V. Hernandez Santisteban (pantro@gmail.com)

Related

13480 MAXI/GSC observations of X-ray outbursts from Be/X-ray binary pulsars, IGR J19294+1816, GRO J1008-57 and 4U 0115+63

13215 Serendipitous detection of a new outburst of the HMXB IGR J19294+1816 with XMM-Newton

5119 Superorbital Periodicity in the Wind-Accretion HMXB 4U 1909+07 (= X 1908+075)

5104 Swift/XRT follow-up of the periodic activity of the transient pulsar IGR J19294+1816

5079 INTEGRAL Galactic Plane Scans detect enhanced activity from the HMXBs IGR J19294+1816 and 4U 1909+07

4136 Swift follow-up of the renewed activity of IGR J19294+1816

4135 INTEGRAL detects renewed activity from IGR J19294+1816

3917 Outburst of IGR J19294+1816 Detected with Fermi/GBM

3361 Announcement of INTEGRAL Galactic Plane monitoring program and detection of 2 new hard X-ray sources.

2985 Fermi GBM Detects Pulsations from IGR J19294+1816

2983 INTEGRAL detects renewed activity from IGR J19294+1816

2009 Confirmation of CRTS Supernovae in Intrinsically

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

Referred to by ATel #: 13480

IGR J19294+1816 is an accreting pulsar in high-mass X-ray binary that was discovered by Integral on 31st of March 2009 (ATel #1997). Further studies using Swift/XRT data have found pulsation period of ~12.45s (ATel #1998; #2002) and that it falls within the region of pulse period vs. orbital period parameter space expected for a Be X-ray binary system (ATel #2008).

Here we report the serendipitous detection of an X-ray re-brightening of IGR J19294+1816, during XMM-Newton observation carried out on the 13th of October 2019 in which the source was located in the field of view.

Following Tsygankov et al. (2018), we perform a preliminary fit of the EPIC-pn spectrum using XSPEC's model containing Galactic absorption, a thermal disk component, comptonized emission, and a Gaussian iron line: tbabs x (nthcomp + gauss + diskbb). We fit the spectrum between 1 and 10 keV, obtaining a good fit with reduced chi-squared of 0.997 (for 137 degrees of freedom). We find an absorption column density of $N_H \sim (5.09 +/- 0.06) \times 10^{22}$ cm$^{-2}$, power law

index Gamma < 1.05 at 1-sigma upper limit, and disk temperature kT ~ 0.20 +/- 0.01. The iron line has a centroid energy of E ~ 6.374 +/- 0.07 keV and a width of ~ (5.48 +/- 0.01)e-2 keV.

Using the convolution model cflux, we measure an unabsorbed 2-10 keV flux of (2.70 +/- 0.01)e-10 erg/s/cm². Assuming an 11 kpc distance (Tsygankov et al. 2018), this translates to an X-ray luminosity of (3.91 +/- 0.01)e36 erg/s.

The onset of the outburst coincides with periastron passage similar to previously reported outburst (ATel #5104). The current periastron passage was predicted to occur on October 16, 2019 (MJD 58772.8), following the ephemeris reported in Tsygankov et al. (2018). Therefore, this outburst is likely a Type-I outburst. The source is also detected in the Swift/BAT data and since our XMM-Newton observation, the source has continued to brighten in the Swift BAT hard X-ray monitor.

To search for pulsations in the XMM-Newton observation, we extracted a barycentred light curve with a 1-second time resolution and folded it on trial periods between 12.3 and 12.6 seconds. We find a spin period of 12.492 +/- 0.001 seconds, where we calculated the error following the method in Brumback et al. (2018a, ApJ, 852, 132; 2018b ApJL, 861, L7). This period is slightly longer than the last reported measurement from 2013 (e.g. 12.457 +/- 0.002 second; ATel #5104).