VLA detection of a likely radio counterpart of IGR J17494-3030

van den Eijnden, J.; Degenaar, N.; Wijnands, R.; Russell, T.D.; Stoop, M.; Armas Padilla, M.; Russell, D.M.; Maitra, D.; Heinke, C.O.; Sivakoff, G. R.; Shaw, A.W.; Maccarone, T.J.; Miller-Jones, J.C.A.; Bahramian, A.

Publication date
2020

Document Version
Final published version

Published in
The astronomer's telegram

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

15 Feb 2021; 12:49 UT

[Previous | Next | ADS]

VLA detection of a likely radio counterpart of IGR J17494-3030

ATel #14129; *J. van den Eijnden (Univ. of Oxford), N. Degenaar, R. Wijnands, T. D. Russell, M. Stoop (Univ. of Amsterdam), M. Armas Padilla (Instituto de Astrofisica de Canarias), D. M. Russell (NYU Abu Dhabi), D. Maitra (Wheaton College), C. O. Heinke, G. R. Sivakoff (Univ. of Alberta), A. W. Shaw (Univ. of Nevada, Reno), T. J. Maccarone (Texas Tech Univ.), J. C. A. Miller-Jones, A. Bahramian (ICRAR-Curtin)*
*on **30 Oct 2020; 15:54 UT***
Credential Certification: Jakob Van den Eijnden (a.j.vandeneijnden@uva.nl)

Subjects: Radio, Neutron Star, Transient, Pulsar

Referred to by ATel #: 14146

IGR J17494-3030 is a transient X-ray binary that was recently reported to be in outburst by INTEGRAL (ATel #14119). Follow-up NICER observations have subsequently shown the presence of X-ray pulsations at 376 Hz (ATel #14124), confirming the neutron star nature of the compact object and identifying IGR J17494-3030 as an accreting millisecond X-ray pulsar (AMXP).

The VLA observed IGR J17494-3030 in the BnA configuration on 27 October 2020 from 21:40 to 22:40 UT. As primary and secondary calibrators, we used 3C 286 (1331+3030) and the nearby source 1751-253, respectively. We analysed the observation using the Common Astronomy Software Applications package (CASA) version 5.4.1 (McMullin et al. 2007, ASPC, 376, 127), imaging Stokes I using a Briggs weighting scheme and a robust parameter of 0. We observed with two sub-bands, centred at 4.5 and 7.5 GHz with 1 GHz of bandwidth each. While analysis at 7.5 GHz is still ongoing, we report our results at 4.5 GHz to ensure rapid distribution to the community.

At 4.5 GHz, a radio source is significantly detected at a best fit position of
RA (J2000) = 17h 49m 23.61s +/- 0.01s
Dec (J2000) = -30d 29' 59.1" +/- 0.1"

where the positional accuracy is limited by standard VLA systematics at 10% of the synthesized beam. This radio position is separated 2.2" from the Swift/XRT position of IGR J17494-3030 reported in ATel #3989, which has a 2.2" 90%-confidence region (we note that the position of the

Related
14146 Chandra Localization of IGR J17494-3030
14129 VLA detection of a likely radio counterpart of IGR J17494-3030
14126 Neil Gehrels Swift Observatory monitoring of the X-ray transient IGR 17494-3030
14124 NICER detection of 376 Hz X-ray pulsations from IGR J17494-3030
14119 INTEGRAL detection of hard X-ray emission from the very faint X-ray transient IGR J17494-3030
4886 2012 Chandra Non-Detection of the Fading X-ray Transient IGR J17494-3030
4006 VVV near-infrared observations of the IGR J17494-3030 field
3989 Swift follow-up observation of IGR J17494-3030
3986 Possible quiescent Chandra counterpart to IGRJ17494-3030
3985 Erratum to ATel #3984: "A new hard X-ray transient discovered by INTEGRAL: IGR J17494-3030"
3984 A new hard X-ray transient discovered by INTEGRAL: IGR J17494-3030

possible quiescent Chandra counterpart reported in ATel #3986 is inconsistent with the Swift/XRT, and our VLA, positions, as it is separated by 2').

We used the CASA task imfit to measure the source flux by fitting a 2D elliptical Gaussian in the image plane, using the FWHM and angle of the synthesized beam (1.1" x 1.0", 66.12 degrees E of N). We measured a flux density of 115 +/- 17 μJy at 4.5 GHz, which corresponds to a radio luminosity of $L_R = 4E+28\ (D/8\ kpc)^2$ erg s^{-1}. NICER X-ray observations on the same day measure an average unabsorbed flux between 0.5-10 keV of 1.68E-10 erg cm^{-2} s^{-1} (ATel #14124), corresponding to a luminosity of $L_X = 1.3E36\ (D/8\ kpc)^2$ erg s^{-1}. This combination of X-ray and radio luminosity is consistent with the range seen in other jet-launching AMXPs (e.g. Bahramian et al. 2018; https://github.com/bersavosh/XRB-LrLx_pub).

Based on the positional consistency and expected X-ray and radio luminosity, we deem it likely that we have detected the radio counterpart of IGR J17494-3030. With continued radio monitoring and analysis of the VLA data at 7.5 GHz we will reassess this conclusion.

We thank the VLA operators for allowing and then rapidly performing these observations. Further X-ray and radio monitoring is ongoing, and we encourage multi-wavelength follow-up observations.

[**Telegram Index**]

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