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Radio pulsations from LS I 61 303

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LS I +61 303 303 is one of the rare gamma-ray binaries, emitting most of their luminosity in photons with energies beyond 100 MeV. The ~26.5 d orbital period is clearly detected at many wavelengths. Additional aspects of its multi-frequency behavior make it the most interesting example of the class. The morphology of high-resolution radio images changes with orbital phase displaying a cometary tail pointing away from the high-mass star. LS I +61 303 303 also shows superorbital variability. A couple of energetic (~ 10^37 erg/s), short, magnetar-like bursts have been plausibly ascribed to it. LS I +61 303 303's phenomenology has been put under theoretical scrutiny for decades, but the lack of certainty regarding the nature of the compact object in the binary has prevented advancing our understanding of the source. Here, using observations done with the Five-hundred-meter Aperture Spherical radio Telescope (FAST), we report on the existence of transient radio pulsations from the direction of LS I +61 303 303. We find a period P=269.15508 (\pm) 0.00016 ms at a significance of > 20 sigma. This is the first evidence for pulsations from this source at any frequency, and strongly argues for the existence of a rotating neutron star in LS I +61 303 303. We try to put this measurement in the context of models of the source, analyzing the possible state such pulsar could be in, and what kind of magnetospheric gamma-ray emission could be expect from it, if any.

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