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The possible detection of γ-ray pulsations from J1912-4410 and EUVE J0317-855 using Fermi-LAT observations.

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We report the possible detection of γ-ray pulsations from both the recently discovered ~4.03 hour binary system J1912-4410 which consists of a white dwarf rotating at Pspin=319.34903(8)s (~5.32 minutes, Pelisoli et al. 2023) with an M-dwarf companion and the 725.5(8)s (~12 minutes, Ferarrio et al. 1997) rotating, isolated white dwarf EUVE J0317-855 using ~15 years of observations from the Fermi -LAT telescope. Pulsed emission in the energy range 0.5-10 GeV was found at a period Pspin=319.3491(3)s which corresponds to the spin period of the white dwarf in J1912-4410. No significant pulsations in the γ-rays were found at the beat frequency or other orbital sideband frequencies. The γ-ray light curve of J1912-4410 folded on the detected period is aligned with recent MeerKAT radio light curves using the same spin ephemeris which might suggest that the radio and γ-ray photons are produced at the same regions on the white dwarf. The folded γ-ray light curve of J1912-4410 at energy 0.1-500 GeV are also aligned with the radio light curves but also show a faint peak at phase ~0.5 which we interpret as pulsed γ-ray emission from the second magnetic pole of the white dwarf in J1912-4410. Pulsed γ-ray emission from EUVE J0317-855 were also detected at a spin period Pspin=725.500(4)s and its first harmonic P=362.750(1)s. The first harmonic was found to be more prominent in the 0.5-10 GeV energy band whereas the spin period is more prominent in the 0.1-500 GeV band. These results suggest that fast spinning, highly magnetized white dwarfs that are isolated or in binary systems might mimic the behaviour that is seen from pulsars.

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