

Fermi-LAT Observations of fast rotating, magnetic white dwarfs J191213.72-441045.1 and EUVE J0317-85.5

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We report the possible detection of pulsed γ -ray emission from one confirmed white dwarf pulsar J191213.72-441045.1 and a candidate white dwarf pulsar EUVE J0317-85.5 using ~ 15 years of data from the Fermi-LAT observatory. Pulsed γ -ray emission in the 0.5-10 GeV energy range from J191213.72-441045.1 were found at a period of $P=319.99\pm 0.35$ s with a $-\log(\text{Pr})=6.76$ which corresponds to a significance of $\sim 5.74\sigma$. The phase-folded γ -ray light curve on this period is remarkably in phase with the recent optical observations (Pelisoli et al. (2023a), Pelisoli et al. (2023b)) of J191213.72-441045.1 signifying that the pulsed γ -rays and optical photons might be emanating from the same region in J191213.72-441045.1. Pulsed γ -ray emission in the 0.5-10 GeV energy range were also found from the isolated, highly magnetic white dwarf EUVE J0317-85.5 at the period of $P=724.65\pm 0.54$ s with a $-\log(\text{Pr})=5.02$ which corresponds to significance of $\sim 4.01\sigma$. The phase-folded γ -ray light curve on this period is also in phase with recent optical observations of EUVE J0317-85.5 using the BOOTES-6 robotic telescope. We propose that the pulsed γ -ray emission in the 0.5-10 GeV energy range from both of these fast spinning, magnetic white dwarfs is likely produced by the curvature radiation mechanism based on a recent study done by Meintjes et al. (2023) suggesting that fast spinning, magnetic white dwarfs to be possible low-level γ -ray emitters.

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