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Abstract:

We propose using FAST to search for white dwarf (WD) pulsars. WD pulsars are fast-spinning highly-magnetized WD that emit beamed radiation like a pulsar. The WD binary AR Scorpii is an analog of such a system. Although its emission is technically still incoherent emission. There might be more such systems in the Galaxy, some maybe genuinely emitting like a pulsar. Such as J162759.5-523504.3, a transient source with an 18.18-min period discovered by MWA, it could be a WD pulsar. We propose to search for such pulsar-like WDs from a sample of highly magnetized and/or fast-spinning WD. We select isolated magnetic WDs with magnetic fields in 10^8 - 10^9 G, WD binary systems similar to the AR Scorpii with orbital periods in 1.5-5 hr, and short orbital period double WD systems with an orbital period around 10 min. We would use FAST to detect possible periodic radio pulses from potential WD pulsars, and possible radio bursts from high magnetic field WDs, albeit at a much longer timescale than normal pulsars. Successfully confirming any new WD pulsar would enable us to study the pulsar-like radiation mechanism of these systems in detail, test theories of WD evolution, and possibly perform pulsar timing on these systems.