

Proposal Abstract:

Magnetars are highly magnetized neutron stars, characterized by X-ray luminosities (L_x) surpassing spin down luminosities (\dot{E}). However, the high-B radio pulsar PSR J1119-6127 displayed magnetar-like X-ray outbursts with $L_x \sim 0.1 \dot{E}$ in 2016, blurring the boundary between magnetars and high-B radio pulsars. PSR J1846-0258 stands out as one of the youngest pulsars, shares similar characteristics with PSR J1119-6127, including a high magnetic field strength of $\sim 10^{13}$ G and magnetar-like X-ray bursts with $L_x \sim 0.02 \dot{E}$. This strongly suggests PSR J1846-0258 as a radio-loud pulsar. Notably, PSR J1846-0258 exhibited a reactivation of the X-ray outburst in 2020. Since the radio pulsations could be detected during X-ray quiescence of radio magnetars, such as PSR J1622-4950. Here we request for a 4-hour FAST observation to search for radio pulsations from PSR J1846-0258. Leveraging FAST's extreme sensitivity, this study can achieve six times more sensitivity than the previous radio observations by GBT and Parkes. This study aims to investigate the radio emission mechanism and wave propagation effects in the magnetosphere, and understand the connection between high-B radio pulsars, radio magnetars and fast radio bursts.