Proposal Abstract:

The discovery of three millisecond pulsars (MSPs) in binary systems that swing between an accretion-powered state and a rotation-powered state has provided evidence for the existence of a peculiar evolutionary phase of binary pulsars. These sources are referred to as transitional MSPs (tMSPs). Enlarging the sample of tMSPs is crucial to gain a deeper understanding of the reasons behind their unusual behavior and their evolutionary connection to other pulsar classes. Candidates are efficiently selected as variable X-ray sources that are spatially associated with unidentified gamma-ray sources detected using the Fermi Large Area Telescope (LAT). We propose to conduct 3.5 hours of target-of-opportunity FAST observations of a newly discovered transient X-ray source co-located with an unidentified Fermi LAT source in the Galactic field as it approaches its X-ray quiescent state. The purpose of these observations is twofold: (i) to detect radio pulsations and pinpoint the tMSP nature of the source; (ii) constrain the epoch of the onset of the pulsed radio emission.