

Proposal Abstract:

Pulsars which are known to exhibit interpulses (IPs) separated by half a rotation from their main pulses (MPs) are rare among the pulsar population. The presence of an IP is a strong indication that the pulsar's magnetic dipole axis is near-perpendicular to its rotation axis, so we observe successively alternating magnetic polar regions. The IP emission of these pulsars is usually weak, but, surprisingly, the IP emission of five such pulsars has been found to exhibit modulations which strongly correlate with the MP modulations. This presents a major challenge to theories which claim polar modulations are driven by local effects, and cannot easily be explained by simple magnetospheric links. We propose to observe 19 sources, which will form the largest survey of interpulse pulsars. The relative weakness of their IP emission requires highly sensitive single-pulse observations such as can only be achieved using the extraordinary sensitivity of FAST. To achieve our goals we request a 20000 pulse sequence with full polarisation for each pulsar. Correlations between MP and IP behaviours will give strong clues towards understanding interpole links and thereby point us to a full pulsar magnetosphere theory.