Proposal Abstract:

Periodic variations in scintillation parameters are a fascinating tool that can help to constrain the three-dimensional geometry of binary star systems. In 2021, we discovered that a heavy pulsar J1012+5307 (M~1.8Msun) exhibited a clear variation in the scintillation time scale resulting from the pulsar's orbital motion using uGMRT. However, the understanding of J1012+5307 we derived is limited due to larger uncertainties in the scintillation parameters. Thus, in this proposal to use FAST, we aim to conduct high-cadence observations of pulsar J1012+5307 to search for periodic variations in scintillation arcs. With the combined observation of the FAST and uGMRT, we can obtain a more accurate pulsar mass and better understand this system's evolution.