

Proposal Abstract:

We propose to utilize 48 hours of FAST observations to enhance our measurements of the distance to PSR J0453+1559, which is in a double-neutron-star system, by observing interstellar scintillation (ISS) arcs. Through previous FAST observations, in isotropic scattering case, we obtained key parameters such as the pulsar distance (D), the pulsar-to-screen distance ($s \cdot D$), the longitude of the ascending node (Ω), the proper motion in declination (PM_Dec) and the scattering timescale through ISS analysis. With additional ISS arc observations, we aim to refine these measurements of D , s , Ω and PM_Dec under both isotropic and anisotropic scattering cases, and to explore the impact of scattering timescale on pulsar timing. Accurately measuring the distance to a double-neutron-star system will enable us to derive more precise orbital parameters, age, and velocity, and provide a luminosity reference for detecting the companion.