

Proposal Abstract:

Radio pulsars in eccentric orbits with degenerate massive stars represent the final stage of stellar evolution for massive stars in close, interacting binaries. So far in the FAST GPPS survey, 7 double neutron star (DNS) candidates with an orbital eccentricity $e > 0.01$ have been discovered. Among them, J1856-0040g (GPPS0347) is good system for measuring LT precession, which reveal the spin angular momentum of the neutron star. J0653+0443g (GPPS0539) have the longest orbital period and eccentricity among all DNS systems. We propose to use FAST to perform the long-term timing of these newly discovered double neutron star candidates, which will help to reveal the evolution of massive binary stars and, in the long-term, provide tests of gravitational theory. Considering spin-orbit coupling, we will also search for their companions which may be a radio pulsar in the future.