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Abstract:

This project aims to detect the companion pulsar from double neutron star (DNS) systems with remarkable spin geodetic precession (a few degrees per year). The spin geodetic precession causes the emission beam of the companion pulsar to rotate and may drift across our line-of-sight in our new observations. We propose to observe three highly relativistic DNS systems with an orbital period of fewer than 10 hours, PSRs J1946+2052, J1906+0746, and J0509+3801, to search for the radio pulse signal from the companion neutron star. Their short orbital period leads to high geodetic precession rates and hence the significant variation of their viewing geometry over different observing epochs. With the unparalleled high sensitivity of FAST, even the non-detection will be able to provide the upper limit of the emission strength and constrain the beam geometry for these systems.