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Abstract:

Pulsars are believed to be produced by supernova explosions, and how planets have survived or formed around pulsars is still not solved. We propose both short-term long tracking observations and long-term monitoring to the planet pulsar system PSR B1257+12 (J1300+1240, which is also a millisecond pulsar, MSP) using FAST. The 10 times better timing precision obtained with FAST than Wolszczan et al.,(2003) will enable us to: (1) search for planets whose orbital period are from hours to days timescale or give the most stringent constraints, (2) search for long orbit period planet with long timespan data, (3) measure planetary interaction with extremely high precision,(4) constrain the inclination angle of the former 3 planets with high precision. (5) study timing noise due to the hypothetical asteroid belt. These possible discoveries will increase our knowledge of this planet pulsar system, and help explain how such system forms. This pulsar is unique for understanding the origins of red noise in MSPs, which is the key point for applications of MSPs, such as gravitational waves detection and establishing pulsar-based time standard.