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Abstract:

Pulsar timing is a powerful tool in studying pulsar physics. Discovering more exotic pulsar systems or timing pulsars with higher precision is an essential part of pulsar astronomy. As a recently discovered millisecond pulsar, PSR J1402+13 is an interesting source for follow-up timing observations. First, its spin-down rate is the highest among known millisecond pulsars according to initial data. This spin-down rate, if confirmed, will place stringent constraints on the spin-up process predicted by pulsar recycling theories. Second, and more importantly, J1402+13 is a very promising candidate for pulsar timing arrays, with an achievable precision at the level of nanoseconds for 20 minutes observation. We thus apply for 15.2 hours to conduct dedicated timing observations of J1402+13 over the period of a year. This project will derive an ephemeris of the system, which is valuable to understand its formation and evolution history. Furthermore, the observations will allow us to evaluate the timing performance of J1402+13 and its suitability to be included in the Chinese Pulsar Timing Array.