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CONSTRUCTION OF THE ENSEMBLE X-RAY PULSAR TIME BASED ON THE DATA FROM THE
NICER MISSION

Abstract

The construction of space-based time-scale through X-ray millisecond pulsar observation is of great practical significance to enhance the autonomous operation ability of spacecrafts. In this paper, an ensemble pulsar time is constructed based on the observation data of millisecond pulsars PSR B1821-24 and PSR B1937+21 from the NICER mission. A method of spin frequency estimation and pulse profile recovery based on the Fourier series is proposed. The timing results show that the proposed method is superior to the traditional method. So far, we are achieving stability $\sigma_z \approx 6 \times 10^{-14}$ for the ensemble pulsar time, which fully proves the feasibility of building space-based time scale through X-ray millisecond pulsar observation.