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Abstract:

Low-frequency gravitational-wave experiments require the highest timing precision from an array of the most stable millisecond pulsars —pulsar timing array (PTA). Observations for most of PTA pulsars are sensitivity limited and, hence, observing with a larger telescope would improve the precision and accuracy with which pulse arrival times could be determined. However, the timing precision with the large telescope usually limited by the “jitter noise”, which results from intrinsic variability in the shape of individual pulses from the pulsar. As the most sensitive telescope in the world, using FAST to observe MSP is bound to be affected by jitter noise. We propose to perform high-precision observation of ten millisecond pulsars using FAST to study the characteristic of jitter noise, these pulsars belong to IPTA and located in the FAST observable region. The primary science goals are to estimate the jitter noise levels at different integration time, investigate the frequency dependent of jitter noise and obtain its statistic characteristics. Our observation may allow the development of strategies to remove the effect of jitter both for FAST, the SKA and for smaller telescopes, which is very necessary for the detection of low-frequency gravitational waves.