Proposal Abstract:

FAST is an ideal tool to study the profile variations of millisecond pulsars (MSPs). PSR J0030+0451 is an MSP being monitored by the pulsar timing array. Based on our previous observations with FAST, we found that this pulsar shows evidence of a periodic mode-changing phenomenon, which has never been detected in MSPs before. Therefore, we propose to study this pulsar using FAST further. We will obtain the polarization profile, mode duration, and energy distribution for different modes and compare them to normal pulsars. The jitter noises in different modes for this pulsar will also be measured. Then, we will carry out timing analysis on different modes and study whether the timing precision could be improved by using individual modes.