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Abstract:

Accreting Millisecond X-ray Pulsars (AMXPs) and transitional Millisecond Pulsars (tMSPs) are widely accepted as the progenitors of "recycled" radio Millisecond Pulsars. In tMSPs, when the active X-ray state ends and the system enters quiescence, these systems evolve from being accretion-powered X-ray pulsars to becoming rotation-powered radio pulsars. Despite several attempts in the past, no such switch has so far been observed in AMXPs. The non-detection of radio pulsations is puzzling, also because the modulation of the optical emission at the system orbital period due to strong irradiation of the companion star observed in several AMXPs would indicate radio pulsar awakening in quiescence. However, it is noteworthy that only in about one fourth of the known AMXPs, proper searches for radio pulsations have been reported. We propose a FAST observation of the AMXP IGR J00291+5934, the fastest accreting pulsar known (spin period of 1.6 ms). The system has been in quiescence for 7 years now and, as far as we know, has never been observed in radio to search for pulses. With its unparalleled sensitivity, FAST can give the unique opportunity to perform the deepest search for pulsations in a quiescent AMXP ever attempted.