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Abstract:

Supersonic pulsar wind nebulae (PWNe) are a small group of high-energy nebulae powered by high-velocity pulsars. It is believed that these PWNe were created by highly asymmetric supernova (SN) explosion or the most energetic SNe, and thus they play an important role in studying SN explosion mechanisms and neutron star kick. So far, the sample of supersonic PWNe are still very small. Finding any new members will be important to enlarge the small sample that is of particular values for PWNe and SN studies. Recently, we found a nonthermal radio filament with a cometary shape, which has an angular length of 0.8 degree. It may potentially contain one of the nearest high-velocity pulsars. Herein we propose a FAST observation of this filament to 1) search for pulsars across the nonthermal filament to learn whether it is a supersonic PWN; 2) measure the polarization signals and study the nature of the filament.