## PID:PT2022\_0185

## Abstract:

Axion is a leading candidate for particle dark matter. A novel technique called axion gegenschein enables searches for axions over a broad mass range using radio telescopes. The axion can undergo stimulated decay to two photons in the presence of ambient radiation, and one of these two photons is emitted in almost the exact opposite direction of the incoming photon, with energy equal to a half of the rest mass of the axion. We expect an echo of line radiation in the opposite direction of a very strong radio source, with the spatial size and linewidth determined by the DM velocity dispersion. We propose to search for the gegenschein of the Vela supernova remnant, which offers the best gegenschein target in regions of the sky accessible to FAST. The proposed search with 100 hours of total observation time may discover the axion in the 10 ueV mass range where it has not previously been constrained, or may yield the world-leading constraint on the axion-photon coupling. We were given 30 hours in the 2021 cycle, and here we propose an additional 70 hours to complete the observation.