

**Proposal Abstract:**

OH megamasers (OHMs) trace regions of extreme star formation in ultraluminous infrared galaxies (ULIRGs). OH is the most sensitive tracer of magnetic fields in molecular regions. Arecibo was used to detect extragalactic magnetic fields via Zeeman splitting of the OHM emission in 15 ULIRGs. Only three of these Zeeman-detected OHMs are redshifted below the 1450 MHz upper edge of the FAST bandpass. The OHM emission from one of these sources has been known for decades to be variable; one spectral component can vary by a few mJy within a week, and that spectral component shows evidence for a line-of-sight magnetic field strength of 18 mG. Variability in both Stokes I and V OHM emission was discovered in another of these ULIRGs using 2019 FAST observations. We propose to use 9 hours of FAST observing time to make full-Stokes OnOff observations of these three FAST-observable OHMs in order to characterize the Stokes I and V variability of the OHM emission in these ULIRGs and to try to understand why the maser spots with the largest detected magnetic fields are also time-variable. Including overhead and polarization calibration, our total request is 13.5 hours of FAST observing time.