

PID:PT2022\_0084

Abstract:

Ultra-cool dwarfs (UCD; spectral type later than M7) are the bodies between stars and planets. Their properties of magnetic dynamos can bridge stellar dynamos and geodynamos. Unlike hotter stars, their radio fluxes are even several orders of magnitude higher than predicted by the Gudel-Benz relation. Radio observation is the most effective and almost the only probe of UCD magnetism. Because the radio flux density of UCD is usually less than 1 mJy, large telescopes are required. Arecibo, VLA, ATCA, ALMA and other big radio telescopes had explored more than 250 UCDs in 4 - 100GHz bands, and found ~9% (~25) UCDs are radio luminous. However, the nature of UCD radio emission at low frequencies ( $< 1.4$  GHz) remains relatively unexplored. The presence and nature of radio emission at low frequencies is therefore not well known. FAST has an aperture of 300 meters and band of 1.05 - 1.45 GHz, then has an overwhelming advantage in exploring the magnetic fields of UCDs at low frequencies. H $\alpha$  emission is the most effective indicator for radio luminous UCDs, and is used to select out five LAMOST UCD for FAST to follow up. For testing and calibration purposes, another five interesting UCDs are also presented.