

Proposal Abstract:

Magnetic fields are commonly found in the interstellar medium (ISM), including extended objects such as supernova remnants (SNR) and star-forming regions. The turbulence characteristics of these fields play a leading role in governing the scattering/diffusion and acceleration of cosmic rays in different phases of the ISM and star-forming regions. The recently detected excess gamma rays in the GeV to PeV energy range in the 6x6 degree Cygnus X region provide an opportunity to investigate the interplay between magneto-hydrodynamic (MHD) turbulence and cosmic ray scattering. In this proposal, we aim to propose for 17.7 hours observing time conduct polarization observations of the 6x6 degrees Cygnus X region in the L-band using the On-The-Fly (OTF) mode of the Five hundred meter Aperture Spherical radio Telescope (FAST). These observations will enable us to investigate the magnetic fields and MHD turbulence in the region using recently developed statistical recipes and determine their association with the sources of diffuse cosmic rays at different energy ranges.