

Proposal Abstract:

Approximately 40% of the H α emission in the ISM is from Diffuse Ionized Gas (DIG). The ionization source of DIG is still under debate. Recent studies attribute the origin of DIG to the leaked ionizing photons from HII regions that propagate through clumpy PDR ('photon leakage'). NGC7538 displays sign of photon leakage in its western part in which compact HII regions reside. To complement the picture of photon leakage, we propose to observe the whole NGC7538 region with FAST. The observed radio continuum from diffuse ionized gas in the vicinity of large HII regions, which are in the eastern part to NGC7538 and attracted less attention than the compact HII regions in west NGC7538, will help us to characterize the photon leakage from more evolved HII regions. The simultaneous observation of HI and radio continuum will help us to trace the ionizing photons that penetrating molecular cloud and finally ionizing the diffusive atomic gas of ISM. Combining with our previously observed RRLs in the same region, such a radio continuum observation of DIG will nail down its origin and characterize its physical properties in a resolvable scale.