

Characterization of coherent radio emission produced by hot magnetic stars

Abstract

In this proposal, we aim to investigate how the properties of auroral radio emission emitted by hot magnetic stars are related to their stellar parameters. The emission mechanism behind is the electron cyclotron maser emission or ECME, also observed from ultracool dwarfs, brown dwarfs and even planets. Hot magnetic stars have the unique property of having extremely stable and relatively simple magnetic fields compared to stars of other spectral types, which makes them ideal objects for characterizing ECME produced by large-scale magnetospheres. Our strategy is to observe the phenomenon from a sample of hot magnetic stars with varying stellar parameters, and compare their ECME properties. Here we propose to observe two hot magnetic stars with well-characterized magneto-rotational properties, over their complete rotation cycles using the UHF and L bands in subarray mode. These observations will complement recent MeerKAT observation of another hot magnetic star at the same frequency bands. Together, these observations will give important insights about the role of different stellar parameters, such as magnetic fields and the misalignment between stellar rotation and dipole axes, in defining the observed, seemingly anomalous, spectral properties of ECME. The time requested under this proposal is 57 hours including overheads.