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Stimulated Brillouin Scattering During Electron Gyro-Harmonic Heating at EISCAT

Abstract:

Observations of secondary radiation, Stimulated Electromagnetic Emission (SEE), produced during ionospheric modification experiments using ground-based high-power high frequency HF radio waves are considered. The High Frequency Active Auroral Research Program (HAARP) facility is capable of generating narrowband SEE in the form of Stimulated Brillouin scatter SBS and Stimulated Ion Bernstein scatter SIBS in the SEE spectrum. Such narrowband SEE spectral lines have not been reported using the European Incoherent scatter (EISCAT) heater facility before. Our work reports the first EISCAT results of narrowband SEE spectra within 1kHz of the pump frequency during electron gyro-harmonic heating. Also, simultaneous measurement of electron temperature by EISCAT/UHF radar and field aligned irregularities by CUTLASS HF radar are discussed. The narrowband SEE features observed at EISCAT are compared to those previously observed at HAARP during electron gyro-harmonic heating for varying heater antenna beam angles as well. The EISCAT narrowband SEE observations have consistencies with Stimulated Brillouin Scatter observed at HAARP.