Abstract Submitted
for the DPP06 Meeting of
The American Physical Society

Studies of strong Langmuir turbulence effects at HAARP J.P. SHEERIN, Eastern Michigan Univ, S.I. OYAMA, B.J. WATKINS, W.A. BRISTOW, U. Alaska-Fairbanks — High power HF transmitters induce a number of plasma instabilities in the interaction region of overdense ionospheric plasma. Radars such as SuperDARN have been used to study artificial field-aligned irregularities (AFAI) created by the high power HF radiowave at the HAARP Ionospheric Observatory, Gakona, AK. A new Modular UHF Ionospheric Radar (MUIR) sited at HAARP may now be used to monitor changes in the Langmuir plasma waves detected in the UHF backscatter. We report the results from recent campaigns using these new facilities in coordinated and comprehensive studies of strong Langmuir turbulence (SLT). Among the effects observed and studied are: SLT spectra including the outshifted plasma line or 'free-mode', appearance of a short timescale ponderomotive overshoot effect, temporal evolution of SLT, dependence of SLT on growth or suppression of AFAI, dependence of AFAI and MUIR backscatter on HAARP pulselength and duty-cycle, aspect angle dependence of the intensity of the plasma line. In particular, we explore the observed 'magnetic-zenith' effect of increased turbulence with the HF wave directed up the field line. Langmuir modes parallel to the geomagnetic field are proposed to explain other features in stimulated electromagnetic emissions (SEE). These plasma waves are theorized to play a key role in certain features of radio-induced aurora. Experimental results are then compared to predictions from recent modeling efforts.

James Sheerin
Eastern Michigan Univ

Date submitted: 24 Jul 2006 Electronic form version 1.4