

Abstract Submitted  
for the DPP09 Meeting of  
The American Physical Society

**Studies of HF-induced Strong Langmuir Turbulence at the HAARP Ionospheric Observatory** J.P. SHEERIN, J.M. GERRES, M.R. KEITH, N. ADHAM, A. WITTBRODT, Eastern Michigan U., B.J. WATKINS, W.A. BRISTOW, U. Alaska-Fairbanks, P.A. BERNHARDT, C.A. SELCHER, NRL — High power HF transmitters may induce a number of plasma instabilities in the interaction region of overdense ionospheric plasma. We report results from our recent experiments using over one gigawatt of HF power (ERP) to generate and study strong Langmuir turbulence (SLT) and particle acceleration at the HAARP Observatory, Gakona, Alaska. 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, collapse, cascade and co-existing spectra, control of artificial field-aligned irregularities (FAI), the aspect angle dependence of the plasma line spectra, and suprathermal electrons. Mapping the intensity of SLT versus pointing angle, we have discovered a number of regions of strong interaction displaced from the primary HF interaction region. Experimental results are compared to previous high latitude experiments and predictions from recent modeling efforts.

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Date submitted: 21 Jul 2009

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