

Abstract Submitted
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Studies of Strong Langmuir Turbulence at the HAARP Ionospheric Observatory J.P. SHEERIN, M.E. BACON, J.M. GERRES, Eastern Michigan U., B.J. WATKINS, W.A. BRISTOW, U. Alaska-Fairbanks, S.I. OYAMA, Nagoya U., C.J. HEINSELMAN, SRI — High power HF transmitters have induced a number of plasma instabilities in the interaction region of overdense ionospheric plasma. We report results from a series of such experiments using over one gigawatt of HF power (ERP) in comprehensive studies of 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 (AFAI), the aspect angle dependence of the plasma line, and suprathermal electrons. We explore the observed magnetic-zenith effect of enhanced turbulence backscatter with the HF pump wave directed up the field line. We have discovered a second region of strong interaction displaced southward of the primary HF interaction region. Experimental results are compared to previous high latitude experiments and predictions from recent modeling efforts.

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