Abstract Submitted
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Measurements of Plasma Wave Decay to Longer Wavelengths[1] F. ANDEREGG, M. AFFOLTER, C.F. DRISCOLL, UCSD — We measure the decay of plasma waves to longer wavelengths, for both "standard" Langmuir waves with $v_{phase} \gg \overline{v}$, and for the lower phase velocity "EAW" modes with $v_{phase} \sim \overline{v}$. These are θ-symmetric standing modes on pure ion or pure electron plasma columns with discrete wavenumbers $k_z = m_z(\pi/L_p)$. A large amplitude $m_z = 2$ Langmuir wave causes phase-locked exponential growth of the $m_z = 1$ wave when they are near resonant, at growth rates $\Gamma_e \propto \delta n_2/n_0$ consistent with cold fluid theory. For larger detuning $\Delta\omega \equiv 2\omega_1 - \omega_2$, mode amplitude A_1 is observed to "bounce" at rate $\Delta\omega$, with amplitude excursions $\Delta A_1 \propto \delta n_2/n_0$ also consistent with cold fluid theory; but A_1 often exhibits a slower overall *growth*, as yet unexplained by theory. In contrast, a large amplitude $m_z = 2$ EAW mode generally causes either strong phase-locked $m_z = 1$ growth or no growth at all, apparently because the EAW "frequency fungibility" enables $\Delta\omega = 0$, and EAW mode damping is strong until the velocity distribution $F(v_{phase})$ is "flattened."

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Francois Anderegg
UCSD

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