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Half-harmonic radiation from turbulence driven by the two-plasmon decay instability D.F. DUBOIS, D.A. RUSSELL, Lodestar Research Corporation, H.X. VU, University of California, San Diego, CA., J.A. MYATT, W. SEKA, Laboratory for Laser Energetics, University of Rochester, Rochester, NY. — It is shown, using theory and reduced model simulations, that the dominant current source for $\omega_0/2$ radiation from a plasma excited by the laser-driven two plasmon decay (TPD) instability is proportional to the transverse component of -eδn$\underline{E}_1$ where $\underline{E}_1$ is the envelope Langmuir wave (LW) electric field (relative to the reference electron plasma frequency $\omega_{pe} \cong \omega_0/2$, where $\omega_0/2$ is the laser frequency) and δn is the low frequency electron density fluctuation comprised of ion acoustic waves resulting from the nonlinear saturation of TPD via the Langmuir decay instability of the primary LWs of the TPD instability. This process differs fundamentally from the physics usually invoked to explain the experiments, such as Thomson down-scatter of the laser, that involves the LWs predicted by linearized theory. The new physics avoids inconsistencies of the latter theory and compares well with observations.

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