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Damping of Langmuir waves in ICF plasmas with thermal transport effects A.V. BRANTOV, V. YU. BYCHENKOV, P.N. Lebedev Physics Institute, RAS, Moscow, Russia, W. ROZMUS, Department of Physics, University of Alberta, Edmonton, Alberta, Canada — The ignition-scale hohlraum plasmas consist of regions with strong temperature gradients giving rise to thermal fluxes that are often in the weakly collisional, nonlocal regime of the transport theory. Given the high background temperatures of the hohlraum plasmas the heat-carrying electrons have energies (20 – 40 keV) that are close to kinetic energies of the electrons that are resonant with Langmuir waves produced by parametric instabilities, such as stimulated Raman scattering. The impact of the modified, by the strong heat flux, electron distribution function (EDF) on the Langmuir wave damping and dispersion is examined. We have employed the formalism of the transport theory to obtain solution to the Fokker-Planck equation for the EDF in a plasma with the temperature gradient in the background local equilibrium state. We used an approximation involving expansion of the EDF velocity dependence in the first three angular harmonics. This solution is used in the evaluation of the plasma dispersion function and in the calculation of the Langmuir wave frequency and damping. We have found that the thermal transport can dramatically alter the Landau damping of plasma waves propagating along or oppositely to the temperature gradient. Our calculations have exposed an important role of the second order correction in the mean free path to gradient scale length ratio to the zero order harmonic of the EDF.

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