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Thermal effects on the electron density fluctuations in ICF plasmas WOJCIECH ROZMUS, University of Alberta, T. CHAPMAN, R. BERGER, LLNL, Livermore, USA, A. BRANTOV, V. BYCHENKOV, Lebedev Physics Institute, Moscow, Russia, M. TZOUFRAS, UCLA, Los Angeles, USA — We have examined modifications of the electron distribution functions (EDF) due to thermal gradients in the ignition-scale ICF plasmas. In particular, given the high background temperatures of such 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. We have found that under these conditions the modifications of the EDF introduce anisotropy in the plasma response that manifests itself in the significant reduction (increase) of the Landau damping of Langmuir waves propagating along (against) the temperature gradient. Similarly there is strong anisotropy in the fluctuation spectra of the electron plasma waves that modifies Thomson scattering cross-section. The EDF have been calculated and compared using the standard Spitzer-Harm theory, numerical solutions to the Fokker-Planck equations and analytical solutions of the kinetic equation. An impact of this theory on the observations of scattering instabilities and Thomson scattering experiments in ICF plasmas will be discussed.

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