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Relevance of the adiabatic approximation to kinetically model the stimulated Raman scatter DIDIER BÉNISTI, Département de Physique Théorique et Appliquée, CEA/DIF, BP 12, 91680 Bruyères-Le-Châtel Cedex — Modeling of the stimulated Raman scatter, at a nonlinear kinetic level, and in a 3D geometry, is investigated theoretically. It is shown that the adiabatic approximation yields a very accurate value of the real part of the plasma susceptibility, Ξ, provided that the longitudinal and transverse gradient scale lengths of the fields are not smaller than the laser wavelength. The plasma wave dispersion relation, derived using the adiabatic approximation, is compared, and found different, to that of other models (*e.g.* H.A. Rose and D.A. Russel, Phys. Plasmas, vol. 11, 4787 (2001)). The adiabatic approximation yields $Im(\Xi) = 0$. This seems to be wrong for small amplitude electrostatic waves which are expected to experience Landau damping. However, it is shown that the electronic distribution function, and hence $Im(\Xi)$, are non local quantities. Their values depend on the maximum amplitude of the electrostatic field experienced by the electrons. This non local property, and the fact the laser light is made of lots of speckles, can be used together to show the reduction of the non collisional dissipation rate of energy for small amplitude waves, once the maximum electrostatic field amplitude is large enough. This renders the adiabatic approximation valid in the whole plasma, even in those regions where the electrostatic field amplitude is small.

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