ABSTRACT

In this thesis we study some aspects of parametric processes in a plasma with a view to application in thermonuclear fusion devices. The possibility of stabilization of the kink instability, a dangerous mode in the toroidal confinement schemes, by parametric coupling to damped ion acoustic waves has been investigated. We have also investigated the linear saturation of some well known scattering instabilities, namely stimulated Raman and Brillouin scattering due to the presence of background turbulence, multiple ion species and nonresonant contributions in an inhomogeneous plasma. These factors would normally be present in actual experimental conditions for laser fusion. Finally we have studied the evolution of the modulational instability, which is known to significantly modify the corona of an expanding pellet plasma, in the presence of Langmuir Turbulence. The relevance of these studies to practical schemes has been discussed.