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Quasilinear theory of saturation of Landau damping in parametric interactions[1] NIKOLAI YAMPOLSKY, NATHANIEL FISCH, Princeton Plasma Physics Laboratory — In a 3-wave interaction in plasma, in which one of the plasma waves is Landau damped in a plasma, the quasilinear saturation of the Landau damping can increase the parametric interaction between the waves. For short interaction times, effects on the bounce-frequency time scale are not important, and a simplified hydrodynamic model of quasilinear theory can describe saturation of Landau damping. As an application, regimes for the amplification of short laser pulses in hot collisionless plasma by means of backward Raman scattering were found. In those regimes the effectiveness of the seed pulse for the plasma wave generation can be reduced. This reduction of the seed pulse effectiveness can be a large and deleterious effect during the linear stage of the amplification when the pumped seed pulse stretches out. During the nonlinear stage, when the pumped seed pulse compresses, the reduction of the seed pulse effectiveness becomes less important.

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