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Novel Mode-Particle Resonances for Ballooning Modes in Fusion Reacting Plasmas[1] B. BASU, MIT, A. CARDINALI, ENEA (Italy), B. COPPI, MIT — The excitation of ballooning modes introduced originally in the mid-sixties [1,2] is important in the dynamics of magnetically confined plasmas. A significant class of these modes, that are localized along the magnetic field lines, is oscillatory in time [3,4] and can be viewed as a superposition of oppositely propagating waves with equal amplitudes. Each of these waves is assumed to involve a mode-particle resonance with a high energy particle population. The resulting superposition leads to a composite mode [4] that has a significantly different time dependence from that given by the well known Landau damping of single plasma waves. In fusion burning plasmas [3] thermal particles, that are the majority and can sustain ballooning mode structures, coexist with high energy particle populations. The considered composite modes are shown to be of relevance to this kind of plasmas.
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