Breakdown of modulational approximations in multimode nonlinear interactions[1] FELIPE RIZZATO, PAULO IORRA, SAMUEL MARINI, EDUARDO PETER, RENATO PAKTER, ABRAHAM CHAVEZ, Instituto de Fisica, UFRGS, Brasil — The present work investigates the breakdown of the modulational approximation in a multimode extension of the three wave (triplet) nonlinear interaction. The modulational approach is accurate when the nonlinear wave coupling is weak, which causes amplitudes and phases to evolve slowly in time. We examine the types of dynamics arising when the coupling rises from very small to large values. At small couplings, when the modulational approach is valid, amplitude excursions are small and energy remains confined to the most unstable triplet subset of the multimode system. Above a critical value of the coupling, amplitude excursions abruptly become much larger and energy distributes more evenly among the active modes. Estimates for the critical coupling and relaxation times can be obtained with proper analysis of the most unstable triplet.[2]

[2]Iorra et al, Physica A **436**, 686 (2015).

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