

the nonlinear phase-matching frequency Δf_{PM} where the MI gain peaks. This result is important as it establishes a fundamental property of the nonlinear evolution of modulation instabilities in nonlinear dispersive media. Our observations have also widespread applications to optical frequency conversion devices. Indeed, as it was earlier pointed out for vector MIs in birefringent fibers [36], and confirmed experimentally [37–39], the concept of the phase-matching of parametric mixing processes is of limited use in the strongly depleted pump regime, unless it is suitably extended by means of a fully nonlinear large-signal theory.

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