

Maxwell–Bloch equations without spectral broadening: the long-time asymptotics of an input pulse in a long two-level laser amplifier

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We study the problem of propagation of an input electromagnetic pulse through a long two-level laser amplifier under trivial initial conditions. We consider an unstable model described by the Maxwell–Bloch equations without spectral broadening. We obtain rigorous asymptotic results at large times, in two regions: in a region near the light cone and in the tail region. The region near the light cone is described by pulses of narrowing width and growing amplitude, while in the tail region, a new type of solitons is found against an oscillating background.

Primary authors: MINAKOV, Oleksandr (Charles University); KOTLYAROV, Volodymyr

Presenter: MINAKOV, Oleksandr (Charles University)