Subfemtosecond pulse generation with molecular coherence control in stimulated Raman scattering

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Abstract: We study the generation of subfemtosecond pulses with the molecular coherence control in stimulated Raman scattering. We show analytically that the antiphased state temporally advances the higher frequencies with respect to the lower frequencies during a beating cycle. After some propagation distance, due to the dispersion and the difference between the antiphased and phased states in advancing high or low frequencies, the coherence is highest on the negative side of the detuning, when the two-photon Rabi frequency is about equal to the detuning. This asymmetry of the coherence magnitude with respect to the negative and positive sides of the Raman detuning is reflected in the behavior of the tuning characteristics of the high-order frequency components. When the Raman detuning is small, although the process is nonadiabatic, the subfemtosecond pulse generation may occur for both negative and positive sides of the detuning. ??1999 The American Physical Society.

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