524. Title:Time-resolved measurements of sum-frequency generation strongly enhanced in (113)B gaas/alas coupled multilayer cavity

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Abstract:Time-resolved measurements of sum-frequency generation (SFG) of two cavity modes, which were realized in a GaAs/AlAs coupled multilayer cavity structure grown on a (113)B-oriented GaAs substrate, were performed. Strongly enhanced SFG and second-harmonic generation (SHG) signals have been demonstrated by the simultaneous excitation of two cavity modes using 100 fs laser pulses. In the time-resolved measurements, the sample was irradiated by two 100 fs laser beams with a time delay and the SFG and SHG signals generated by combining two beams were detected using a small slit. The delay-time-dependent measurements have revealed that the SFG and SHG signals decay with the photon lifetime (0.6 ps) of the coupled multilayer cavity, and the oscillating behavior with the period (0.3 ps) corresponding to the optical frequency difference (3.3 THz) between two cavity modes is significant only for the SFG. The experimental results were well explained by the simulated light electric field inside the coupled cavity under two Gaussian pulse excitation.