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Spin Waves in GaMnAs/GaAs Superlattices D. M. WANG, R. MERLIN, University of Michigan, Y. J. CHO, X. LIU, J. K. FURDYNA, University of Notre Dame — We report on the spin-wave behavior of GaMnAs/GaAs superlattices as a function of the thickness of the nonmagnetic layer. Spin-wave frequencies were determined from time-domain magnetic Kerr measurements using a standard pump-probe setup. We studied two superlattices grown by molecular beam epitaxy on GaAs (001) substrates and, for comparison purposes, a single 120-nm-thick $Ga_{0.955}Mn_{0.045}As$ layer. The superlattices consist of 6 repetitions of 20-nm-thick $Ga_{0.955}Mn_{0.045}As$ layers separated by either $d = 3$ or 6 nm of GaAs. For magnetic fields $H < 0.22$ T, applied along the magnetic easy axis [100], the thin film and the superlattices exhibit a nearly d-independent mode of frequency $\nu \cong 5 + 33H$ (GHz), whereas the sample with $d = 6$ nm shows a second oscillation at $\nu \cong 7 + 33H$ (GHz), which we assign to a higher-order confined spin-wave. The existence of this mode is tentatively ascribed to a reduction in the coupling between neighboring magnetic layers.

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