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Coherent Phonons Spectroscopy in Si/SiGe superlattices HELENE MICHEL, University of California Santa Cruz, YOUNES EZZAHRI, ALI SHAKOURI, University of California Santa Cruz, GILLES PERNOT, Universite de Bordeaux 1, JEAN-MICHEL RAMPNOUX, STEFAN DILHAIRE — Ultrafast pump-probe experiments have been extensively used for coherent zone-folded acoustic phonon spectroscopy in semiconductor superlattices (SL). Most of the spectroscopy studies have been realized via impulsive stimulated Raman scattering (ISRS). More recently some studies, focused on $Si/Si_xGe_{1-x}SL$, have combined the spectroscopy via ISRS with the spectroscopy of phonons Bragg reflected via picosecond acoustic experiment. In the latter case, sample needs to be covered by a metallic film which serves as a transducer to convert the optical energy into an impulse heating and thermal expansion. This launches coherent acoustic phonons into the SL structure. Here we present a systematic study of coherent phonons in different $Si/Si_xGe_{1-x}SL$ structures with two different superlattice periods and transducer thicknesses. The measured acoustic spectrums show that the thickness of the transducer should be chosen as function as the SL period to be able to generate and detect both phonons Bragg reflected and excited by ISRS.

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