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Raman-Brillouin electronic density in GaAs/AlAs superlattices. NICOLAS LARGE, CEMES, Toulouse and DIPC, San Sebastian, ADNEN MLAYAH, CEMES, Toulouse, JAVIER AIZPURUA, DIPC, San Sebastian, JEAN-ROCH HUNTZINGER, GES, Montpellier, BERNARD JUSSERAND, INSP, Paris — Raman-Brillouin scattering by acoustic phonons is an accurate experimental method to characterize vibrational states of nanostructures and understand their optical properties. Many nanoscaled systems such as quantum dots, wires, wells and membranes have been studied by the means of this technique. We present here a theoretical and experimental study of the Raman-Brillouin scattering in GaAs/AlAs superlattices. Within third order perturbation theory, we describe the Raman-Brillouin scattering process by introducing a Raman-Brillouin Electronic Density (RBED). The RBED is constructed by combining the superlattice electronic states according to their optical transition rates. This approach is useful when numerous intermediate electronic states are involved in the scattering process. It has been proven to successfully interpret the Raman- Brillouin scattering in quantum dots[1] and membranes[2]. We calculate the RBED for specific GaAs/AlAs superlattices and study the dependence of the Raman-Brillouin spectra on the GaAs/AlAs layer thickness ratio and incident photon energy. Comparison with experiments will be discussed. [1] J.R. Huntzinger et al, Phys. Rev. B 74, 115308 (2006) [2] A. Mlayah, J.R. Huntzinger and N. Large, Phys. Rev. B 75, 245303 (2007)

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