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Modulated electroreflectance from multilayer InGaAs quantum wires and dot chains ZHIXUN MA, TODD HOLDEN, Physics department and New York State Center for Advanced Technology in Photonics Applications, Brooklyn College of CUNY, ZHIMING WANG, LYUDMILA MALIKOVA, GREGORY SALAMO, Department of Physics, University of Arkansas, Fayetteville, Arkansas 72701 — In coherent multilayer quantum wire structures, the strains are accommodated elastically without plastic relaxation, resulting in a modification of the electronic states even in the barriers. The electronic properties of strained InGaAs/GaAs quantum wire/chain systems have been investigated using modulated electroreflectance and theoretical calculation based on an envelope function method. Various optical transitions such as the state splitting of heavy-light holes were observed and assigned to be transitions from InGaAs quantum wires/chains and two wetting layers with different thickness. A very important finding is that the strain-induced heavy-light hole splitting not only happens in the InGaAs wells, but also in GaAs barriers. These experimental results uncover the nature of the residual strain effects on the energy structure and confirm the theoretical prediction.

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