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Mapping of Strain and Induced Polarization in GaMnAs/GaAs nanowires EDWIN FOHTUNG, Physics Department, University of California San Diego, A. MINKEVICH, A.A. MATYSHEV, M. RIOTTE, D. GRIGORIEV, T. SLOBODSKYY, V. HOLY, O.G. SHPYRKO, T. BAUMBACH — The effects of surface energy and non-localized interactions are the two major physical mechanisms that guarantees size dependent of elastic properties at the nanoscale. With the limit for linear elasticity defined in the vicinity of the lattice parameter for most materials, non-localized interaction can only arise due to the discrete nature of matter and fluctuations in interatomic forces averaged out within the elastic tensors. Using an extended elasticity theory that introduces higher order perturbations to the classical energy density state of a crystalline material, we demonstrate the possibility of mapping the strain and polarization in device nanostructures with the aid of synchrotron radiation coherent diffraction imaging. We provide experimentally confirmed 2D mapping of the strain field and polarization in etched GaMnAs on GaAs periodic wires.

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