Abstract Submitted
for the MAR10 Meeting of
The American Physical Society

Continuous analytical solutions for strain applied to quantum dot and rings[1] JAMES NIMMO, IGOR FILIKHIN, VLADIMIR SUSLOV, BRANISLAV VLAHOVIC, North Carolina Central University — Several analytical strain matrix component solutions for quantum dot (QD) various geometries have been derived using principles of continuous mechanics. These strain calculations were used to determine the shift in electron energies for various QD and ring configurations and sizes (see, for instance, M. Grundmann et al. PRB 52, 11969 (1995)). In the presented work we propose simplified strain approximation for such calculations. This approximation is accompanied by the band gap model given in I. Filikhin et al. PRB 73, 205332 (2006). The results of our calculation are compared to those of previous ones. Besides, comparisons are made between 2D and 3D electron energy calculations. Finally the limits of continuous strain calculations are discussed.

[1]This work is supported by NSF CREST award, HRD-0833184 and NASA award NNX09AV07A.

Igor Filikhin
North Carolina Central University

Date submitted: 15 Dec 2009 Electronic form version 1.4