

Abstract Submitted
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Band structure of wurtzite quantum dots with cylindrical symmetry LOK LEW YAN VOON, Wright State University, CALIN GALERIU, Worcester Polytechnic Institute, BENNY LASSEN, MORTEN WILLATZEN, RODERICK MELNIK, University of Southern Denmark — A six-band $\mathbf{k} \cdot \mathbf{p}$ theory for wurtzite semiconductor nanostructures with cylindrical symmetry will be presented. Our work extends the formulation of Vahala and Sercel [*Phys. Rev. Lett.* **65**, 239 (1990)] to the Rashba-Sheka-Pikus Hamiltonian for wurtzite semiconductors, without the need for the axial approximation. Results comparing this new formulation for studying the electronic structure of wurtzite GaN and CdS cylindrical quantum dots with the conventional formulation will be shown; our formulation is computationally superior. An application to the search for level crossing in the valence band of cylindrical quantum rods as a function of aspect ratio will be given.

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