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Magnetic field effects and nodal ground states in InP nanowire TIAGO DE CAMPOS, PAULO EDUARDO DE FARIA JUNIOR, Universidade de São Paulo, State University of New York at Buffalo, IGOR ZUTIC, State University of New York at Buffalo, GUILHERME SIPAHI, Universidade de São Paulo, State University of New York at Buffalo — Semiconductor nanowires (NWs) have attracted great interest in the last decade because oftheir unique optical, electronic, and spin-dependent properties. They are amongthe leading candidates to observe exotic states, such as Majorana Fermions [1]. In aseemingly trivial situation of a single particle confined in a quantum dot, it was predictedthat the valence band ground state with a node is possible and was attributed to theformation of orbital textures [2]. This peculiar behavior, may also be present in wurtziteInP NWs with a diameter less then 10 nm [3]. The presence ofthe nodal state modifies the its basic optical properties, such as the degree oflinear polarization. Here we study the change in these states when an external magneticfield is applied along nanowire axis. We studiedwurtzite [0001] and zincblende [111] InP nanowires calculated within a k.p methodformulation that describes both crystal phases in a single-particle Hamiltonian [4] and accountsfor the applied magnetic field.

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