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Hole States and Magnetic Anisotropy of a Quantum Dot[1] DAN REDERTH, HARI CHAPAGAIN, RAFAL OSZWALDOWSKI, SDSMT Physics, A.G. PETUKHOV, NASA Ames Research Center — In the era of spin-based advanced semiconductor materials [1], spin can be used for the control of quantum devices based on quantum dots (QDs) [2]. To facilitate the control of the electronic and magnetic properties, magnetic ions can be incorporated in the QDs. We study the properties of such a magnetic II-VI QD charged with one hole. To account for the complex structure of valence band, we propose a method based on the Luttinger-Kohn Hamiltonian. With a robust numerical algorithm suitable for any QD geometry, we study the interplay of quantum confinement and magnetic anisotropy of a flat QD. We go beyond the virtual crystal approximation [3]; our model also allows for position-dependent direction of magnetization. We discuss the differences between our and previous results, as well as the effects of temperature (mean-field approximation), and of the spin-orbit split-off band. We also discuss possible fluctuations of magnetization in QDs. Supported by DOE DE-SC00004890. [1] T. Dietl and H. Ohno, Rev. Mod. Phys. **86**, 187 (2013). [2] R. Hanson et al., Rev. Mod. Phys. **79**, 1217 (2007). [3] K. Vyborny, J. Han, R. Oszwaldowski, I. Zutic, and A. Petukhov, Phys. Rev. B **85**, 155312 (2012); F. V. Kyrychenko and J. Kossut, Phys. Rev. B **70**, 205317 (2004).

[1]DoE

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