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Magnetic anisotropies of quantum dots[1] KAREL VYBORNY, University at Buffalo, SUNY, NY and Academy of Sciences of the Czech Republic, J.E. HAN, RAFAL OSZWALDOWSKI, IGOR ZUTIC, University at Buffalo, SUNY, NY, A.G. PETUKHOV, South Dakota School of Mines and Technology, Rapid City, SD — Magnetic anisotropies in quantum dots (QDs) doped by magnetic ions are discussed in terms of two frameworks: anisotropic g-factors and magnetocrystalline anisotropy energy [1]. Two examples, related to zinc-blende p-doped materials, are given of how these frameworks are utilized: four-level Hamiltonian of a flat QD and a cuboid infinite-well QD containing a single hole. The latter model, despite being an idealization of a real QD, displays a rich phenomenology of anisotropies. We quantify the anisotropy constants for ZnSe and CdTe QDs, confirming that the Ising-like effective Hamiltonians apply to magnetic QDs [2]. Compared to bulk systems, confinement tuning offers a new way to control easy axes in magnetic QDs. [1] K. Vyborny et al., preprint (2011). [2] C. Le Gall et al., Phys. Rev. Lett. 107, 057401 (2011).

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Karel Vyborny
University at Buffalo, SUNY and Academy of Sciences of the Czech Rep.

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