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Carrier-mediated magnetism and bound magnetopolarons in quantum dots RAFAL OSZWALDOWSKI, SUNY Buffalo and N. Copernicus University, Torun, Poland, ANDRE PETUKHOV, South Dakota School of Mines and Technology, Rapid City, IGOR ZUTIC, SUNY Buffalo — While Mn-doped quantum dots (QDs) offer versatile control of magnetic order [1], important challenges remain in understanding of these systems beyond the mean-field approximation. Furthermore, to describe the carrier-mediated magnetism in arrays of magnetic QDs and their non-equilibrium properties, it is important to consider the presence of both electrons and holes in these systems. We develop a formalism that accounts for both equilibrium and light-controlled magnetopolaron effects [2]. We study QDs of different sizes and find that their magnetic and photo-induced properties are extremely size-sensitive. We compare our theory with recent experiments on circularly-polarized photoluminescence in magnetic QDs [3] where both the magnetopolaron energies and power dependence of the circular polarization were measured. We thank I. R. Sellers for valuable discussions. Supported by ONR and NSF-ECCS CAREER.
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