Abstract Submitted
for the MAR10 Meeting of
The American Physical Society

Magnetic Polarons in Anisotropic Quantum Dots RAFAL OSZWALDOWSKI, SUNY, University at Buffalo, ANDRE PETUKHOV, South Dakota School of Mines & Technology, IGOR ZUTIC, SUNY, University at Buffalo — Tunability of confinement in magnetically-doped quantum dots (QDs) allows to tailor magnetism to an extent not available in bulk semiconductors. Versatile control of magnetic ordering, along with piezomagnetism, has been predicted even at a fixed number of carriers [1]. Recent experiments on colloidal QDs revealed strongly bound magnetic polarons (MPs) [2]. Previous studies of MPs in bulk semiconductors showed that the mean-field theory predicts a spurious magnetic phase transition, which is removed by taking into account spin fluctuations [3]. Here we present our theoretical results for MPs forming in QDs with pronounced magnetic anisotropy, which influences the spin fluctuations. We apply our findings to explain some peculiarities of the magnetic behavior of type-II ZnSe/(Zn,Mn)Te QDs, where magnetic polarons are found to persist to at least 200K [4]. Supported by ONR, AFOSR, and NSF-ECCS CAREER.

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Date submitted: 23 Nov 2009 Electronic form version 1.4