Abstract Submitted
for the MAR09 Meeting of
The American Physical Society

Shot noise in a Mn-doped quantum dot nanomagnet[1] L.D. CONTRERAS-PULIDO, ICMM-CSIC, Spain, J. FERNANDEZ-ROSSIER, Universidad de Alicante, Spain, R. AGUADO, ICMM-CSIC, Spain — A single-electron transistor (SET) based upon a II-IV semiconductor quantum dot doped with a single Mn ion behaves as a nanomagnet whose magnetic properties can be controlled electrically, and the effective exchange between the Mn and the carriers depends whether the SET is operated in the electron or the hole region. For holes, the Ising coupling for symmetric dots in absence of spin-flip Mn-hole exchange, results in Coulomb Blockade oscillations which depend on the spin state of the Mn atom [1]. We extended such analysis and studied finite-frequency shot noise through the SET [2]. Shot noise shows various regimes which, as a function of gate and bias voltages, reflect different magnetic configurations of the nanomagnet. We find super-Poissonian noise in a region of bias and gate voltages where the competing dynamics between slow and fast channels (corresponding to different orientations between the hole and the Mn ion) results in bunching. This behavior appears as a resonance around zero frequency, reflecting charge relaxation dynamics. We also discuss the role of transverse spin-flip terms. [1] J. Fernandez-Rossier and R. Aguado, Phys. Rev. Lett. 98, 106805 (2007) [2] D. Contreras-Pulido, J. Fernandez-Rossier and R. Aguado, in preparation

[1]LDCP acknowledges financial support from CONACyT

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Date submitted: 21 Nov 2008 Electronic form version 1.4