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Single electron Transport in diluted magnetic semiconductor quantum dots J. FERNANDEZ-ROSSIER, Universidad de Alicante, R. AGUADO, Instituto de Ciencia de Materiales, CSIC — We consider a single electron transistor based upon a II-VI semiconductor quantum dot doped with a few Mn atoms.Our proposal is motivated by the recent fabrication and optical probing of single CdTe quantum dots doped with a single Mn [1]. The numerical diagonalization of the quantum dot Hamiltonian is possible in the case of small number of both carriers and Mn [2],[3],[4]. Our calculations [5] reveal that the magnetic ions behave like a quantum nanomagnet whose the total spin and magnetic anisotropy depend dramatically both on the number of carriers and their orbital nature. We show that single electron transport spectroscopy permits a complete characterization of electronic excitations of the dot. A protocol of gate voltage pulses that permits the preparation and detection of the quantum state of a single Mn spin is presented.

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