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Shot-Noise in a Quantum Dot as a Spin-current Diode[1] F.M. SOUZA, Instituto de Física, Universidade Federal de Uberlandia, P.H. PENTEADO, Instituto de Física de São Carlos, Universidade de São Paulo, C.A. MERCHANT, N. MARKOVIC, Dept of Physics and Astronomy, Johns Hopkins University, J.C. EGUES, Instituto de Física de São Carlos, Universidade de São Paulo — Shot-noise is an unavoidable non-equilibrium current fluctuation that arises from the granularity of the electron charge. In the present work, we investigate shot-noise for the recently proposed spin diode system (1,2). This consists of a quantum dot coupled to two metallic leads, one nonmagnetic (NM) and another ferromagnetic (FM). In the Coulomb blockade regime this system displays a spin-diode effect (1,2), which has recently been probed in a carbon nanotube based quantum dot (2). Our calculation shows that the shot-noise provides a robust signature for this spin-polarization rectification effect. In the bias range for which the current polarization is zero the shot-noise is super-Poissonian. In contrast, for voltages such that the current is spin polarized, the shot-noise becomes sub-Poissonian. Hence shot noise can provide an interesting additional tool to probe spin-polarized transport in these systems. We shall also discuss recent experimental progress in this direction (3). (1) F. M. Souza, J. C. Egues, and A. P. Jauho, Phys. Rev. B 75, 165303 (2007). (2) C. A. Merchant and N. Markovic, Phys. Rev. Lett. 100, 156601 (2008). (3) C. A. Merchant and N. Markovic, J. Appl. Phys. 105, 07C711 (2009).

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Fabricio M. Souza
Instituto de Fisica, Universidade Federal de Uberlandia

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