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Driven magnetic patterns in quantum dots ALEX MATOS-ABIAGUE, JAMES PIENTKA, JONG E. HAN, IGOR ZUTIC, University at Buffalo-SUNY — We theoretically investigate the response of magnetic impurities in a quantum dot driven by a dc current. A bias voltage applied between the leads attached to the quantum dot drives the current. In addition, an external gate is used to tune the energy levels of the dot. The steady state magnetic configuration and current are self-consistently determined by using the non-equilibrium Green function formalism. The results reveal the emergence of different magnetization patterns in dependence on the bias and gate voltages for various sets of system parameters (number of magnetic impurities, tunneling coupling between dot and leads, and size of the dot). Under certain conditions and as the result of correlations between current and local magnetization, signatures of magnetic patterns formation can be observed in the I-V characteristics of the quantum dot. This allows for the design and characterization of magnetic patterns in quantum dots by electrical means.

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