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A single minority spin-flip detector Y. HANCOCK, Laboratory of Physics, Helsinki University of Technology, PO Box 4100, FI-02015 HUT, Finland — A family of inhomogeneous Hubbard models is shown to have multi-level spin-switching properties. The generic structure of the device is NNNMMMNNN, which defines a linear (quasi-0D) cluster, having open boundary conditions. Within the context of the Hubbard model, N refers to a nonmagnetic (U=0) atom and M is a magnetic atom having finite value of the Hubbard U. The model is solved by numerically exact diagonalization. Localized spin-switching is obtained as a function of the electron filling and is activated by application of an external magnetic field. Arbitrary numbers of nonmagnetic atoms at the edges of the chain, relative to the number of magnetic atoms in the system, lead to a range of spin-switching signals. One potential application to be demonstrated is that of a single minority spin-flip detector.

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