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Digital magneto resistance in magnetic MOBILEs¹ CHRISTIAN ERTLER, JAROSLAV FABIAN, Institute of Theoretical Physics, University of Regensburg, D-93040 Regensburg, Germany — Resonant tunneling structures comprising magnetic semiconductor layers are promising for realizing efficient spin filters and detectors [1]. Recently [2], we showed that a paramagnetic MOBILE (Monostable-Bistable Transition Logic Element), which consists of two serial connected resonant tunneling diodes (RTDs), the nonmagnetic load and the driver with a paramagnetic quantum well (QW), exhibits digital magneto resistance (DMR): a continuous change of the external magnetic field above a threshold value leads to a discrete jump of the output voltage from low to high. We have also proposed a nonvolatile ferromagnetic MOBILE, where the driver-RTD comprises a ferromagnetic emitter and QW. We show that DMR is realized by changing the relative orientation of the magnetizations above a threshold angle. In the low voltage regime the driver IV can be changed from ohmic to negative differential resistance behavior. Since conventional MOBILEs have been demonstrated to work up to 100 GHz the proposed device might be useful for performing very fast detections of magnetic signals. [1] I. Zutic, J. Fabian, and S. Das Sarma, *Rev. Mod. Phys.* 76, 323 (2004). [2] C. Ertler and J. Fabian, *Appl. Phys. Lett.* 89, 193507 (2006).

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