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Spintronic Ratchet SAYEEF SALAHUDDIN, SUPRIYO DATTA, School of Electrical and Computer Engineering, Purdue University, West Lafayette, IN-47907 — Carefully designed ratchets are of great interest, practically and conceptually, as means to convert fluctuations into useful work. We argue that a recently proposed "Spin-Capacitor" [Appl. Phys. Lett. **87**, 013115 (2005)] exhibits characteristics that have close resemblance to ratchets. It shows unidirectional current-voltage (I-V) characteristics that depend on the spin excitation spectrum of a neighboring array [http://arxiv.org/abs/cond-mat/0511566]. More interestingly, if the spins in the array are out of equilibrium, useful work can be extracted at the expense of energy/entropy. This is manifested as a ***non-zero current at zero bias*** and we argue that a recent experiment in an integer quantum hall system [http://link.aps.org/abstract/PRL/v95/e056802] shows evidence for this general principle.

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