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**Novel All-Spin Devices** BEHTASH BEHIN-AEIN, DEEPANJAN DATTA, Purdue University, SAYEEF SALAHUDDIN, SUPRIYO DATTA, Purdue University — We propose a spintronic device that uses spin at every stage of its operation: information manipulation, transport, storage, input and output are all accomplished with magnets and spin-coherent channels. The all-spin device could potentially find use for low-power digital logic since it should satisfy the five essential requirements for logic applications namely nonlinearity, gain, concatenability, feedback prevention and a complete set of Boolean operations. Moreover it could provide a basis for unconventional approaches. For example the spin accumulation in a semiconducting channel underneath a magnetic contact could provide a weighted average of different inputs that makes it switch (fire) when it exceeds a threshold like neural networks. Alternatively the magnetic contacts on top of the channel could possibly serve as Input-Output interface for spin-based quantum computing.

Supriyo Datta  
Purdue University

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