

ZERNIKE INSTITUTE COLLOQUIUM

Thursday, June 17th, 2010

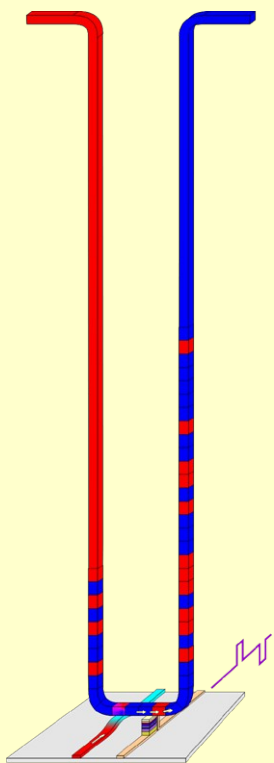
16:00h, Lecture Hall: 5111.0080

Coffee and cakes from 15:30h

The Spin on Electronics! Science and Technology of spin currents in nano-materials and nano-devices



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Recent advances in manipulating spin-polarized electron currents in atomically engineered magnetic heterostructures make possible entirely new classes of sensor, memory and logic devices - a research field generally referred to as spintronics¹. A magnetic recording read head, initially formed from a spin-valve, and more recently by a magnetic tunnel junction, has enabled a 1,000-fold increase in the storage capacity of hard disk drives since 1997. The very low cost of disk drives and the high performance and reliability of solid state memories, may be combined in the Racetrack Memory².

The Racetrack Memory is a novel three dimensional technology which stores information as a series of magnetic domain walls in nanowires, manipulated by spin polarized currents. Spintronic devices may even allow for “plastic” devices that mimic synaptic switches in the brain, thereby allowing for the possibility of very low power computing architectures.

¹ S.S.P. Parkin et al. Proc. IEEE **91**, 661-680 (2003);

² Science **320**, 190 (2008); Scientific American (June, 2009).



Dr. Stuart Parkin is an IBM Fellow (IBM's highest technical honor), Manager of the Magnetoelectronics group at the IBM Almaden Research Center, San Jose, CA and a Consulting professor in the Dept. of Applied Physics at Stanford University.



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