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**Giant tunnel electroresistance and electrical control of spin polarization with ferroelectric tunnel barriers**

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At room temperature, we use piezoresponse force microscopy to show robust ferroelectricity in BaTiO<sub>3</sub> ultrathin films, and conductive-tip atomic force microscopy to demonstrate the resistive readout of the polarization state via its influence on the tunnel current [1]. This giant electroresistance nondestructive readout paves the way for ferroelectric memories with simplified architectures, higher densities and faster operation. Additionally, ferroelectric tunnel junctions with ferromagnetic electrodes were engineered to demonstrate local, large and non-volatile control of carrier spin polarization by switching ferroelectric polarization [2]. Our results represent a giant interfacial type of magnetoelectric coupling and suggest a new low-power approach for spin-based information control.

[1] V. Garcia *et al.*, Nature 460, 81 (2009)

[2] V. Garcia *et al.*, Science 327, 1106 (2010)