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Electric-field control of magnetic order above room temperature[1]

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Controlling magnetism by electric fields is a key issue for the future development of low-power spintronics. Progress has been made in the electrical control of magnetic anisotropy, domain structure, spin polarization or critical temperatures. However, the ability to turn on and off robust ferromagnetism at room temperature and above has remained elusive. Here we will present a new approach for the electrical control of magnetic and spintronic properties based on the combination of ferroelectric materials with magnetic transition-metal alloys. We demonstrate a giant, low-voltage control of magnetism, just above room temperature. The data are interpreted in the light of first-principles in terms of both strain and field-effect. Our results correspond to a magnetoelectric coupling larger than previous reports by at least one order of magnitude and open new perspectives for the use of ferroelectrics in spintronics.

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