Electrical Side-Gate Control of Magnetic Anisotropy in a Composite Multiferroic

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Composite multiferroics consisting of a ferroelectric material interfaced with a ferromagnetic material can function above room temperature and exhibit improved magnetoelectric (ME) coupling compared to single-phase multiferroic materials, making them desirable for applications in energy-efficient electronic devices. This work studies the coupling between molecular beam epitaxy grown ferromagnets in a multiferroic heterostructure. The electrical control of magnetoresistance and magnetic anisotropy of single-crystalline $Fe_{0.75}Co_{0.25}$ on PMN-PT(001) is investigated using a side-gate geometry. Angle-dependent magnetoresistance scans reveal that the origin of this effect is strain-mediated magnetoelectric coupling. This electrical control of magnetic properties could serve as a building block for future magnetoelectronic and magnonic devices.

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