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Strongly Inhomogeneous Conduction in Cobaltite Films.[1] VLADIMIR ORLYANCHIK, MICHAEL WEISSMAN, UIUC, MARIA TORIJA, MANISH SHARMA, CHRIS LEIGHTON, UMN — The prototypical doped perovskite cobaltite, La0.5Sr0.5CoO3, has received considerable attention in bulk form. It was shown to be a ferromagnetic material with metallic conductivity. Here we show that the films, like bulk samples of the same composition, show resistance increasing with temperature when measured by Van der Pauw technique. However, when the resistance is measured in strip-shaped samples it reveals negative temperature dependence. Noise measurements performed in relatively large (e.g. 10-10 cm3) samples, revealed strongly non-Gaussian conductance fluctuations in the form of random telegraph noise. Field and temperature dependencies of Boltzmann factors of individual switchers show them to represent magnetic rotations rather than fluctuations between different thermodynamic phases (metallic and insulating). We argue that the inhomogeneous magnetic orientation dependent conductivity arises from strain-driven domain texture. The highly inhomogeneous conductivity may account for the unusual geometry dependent conductance.

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