Anisotropic low-field magnetoresistance of polycrystalline manganite sensors

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Magnetic-field sensors of bulk $La_{0.67}Sr_{0.33}MnO_3$ and $La_{0.67}Ba_{0.33}MnO_3$ were fabricated. The investigations show that a large low-field magnetoresistance (MR) is exhibited by the polycrystalline samples. MR ratios of the sensors as large as 20% at 77 K and 1.5% at 298 K were observed in fields of 700 Oe. Corresponding field sensitivities as high as 170%/*T* at 3 mT and 298 K, and 700%–960%/*T* at 3–8 mT and 77 K were obtained. The low-field MR is associated with intergranular transport of spin-polarized electrons. It is found to be highly anisotropic. The phenomenon is discussed in terms of spin-polarized transport through two kinds of grain boundaries. These represent two extremes of grain-boundary environments.