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Anisotropic Magnetoresistance in single-crystalline Ag/NiO/Fe_3O_4/MgO(001) sample JIA LI, ALI SUCIPT TAN, JIM SON, ERIC JIN, ZI Q. QIU, Department of Physics, University of California at Berkeley — Anisotropic Magnetoresistance (AMR) is a well-known phenomenon in ferromagnetic (FM) materials that the resistivity exhibit different values as the electric current flows parallel and perpendicular to the magnetization direction, respectively. Recognizing that the AMR depends on the spin axis rather than spin direction, we propose that AMR effect should also exist in antiferromagnetic (AFM) materials. In this presentation, we will report the AMR effect in single crystalline Ag/Fe_3O_4/NiO/MgO(001) films in which the electrical current is mainly carried by the nonmagnetic Ag film. By changing the FM Fe_3O_4 magnetization direction with an external magnetic field, the AFM NiO spin axis direction can be changed through the Fe_3O_4/NiO coupling. We observe a non-zero AMR effect in Ag and that the AMR value depends sensitively on the Ag thickness, suggesting that the observed AMR comes from the spin-dependent NiO/Ag interfacial scattering. Moreover, the magnitude of the AMR effect at 1nm thick Ag in Ag/Fe_3O_4/NiO/MgO(001) is comparable to the AMR value from single Fe film.

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