

Abstract Submitted
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Electrical field control of interface magnetic anisotropy¹ LEI XU, SHUFENG ZHANG, University of Arizona — The interface magnetic anisotropy of ferromagnetic metals comes from the spin-orbit interaction. By explicitly taking into account the interaction between the symmetry-broken interface potential and the spin-dependent electric dipoles of the Bloch states, we find that the interface spin-orbit coupling can be modeled by the Rashba spin-orbit Hamiltonian (RSOH). Due to the presence of the RSOH, the spin up and down states of the ferromagnet are spin mixed at the interface. Among other consequences, the RSOH induces a perpendicular surface magnetic anisotropy whose magnitude is comparable to the observed values in transition metals. When an external electric field is applied across the interface, the induced screening potential modifies the RSOH and thus the perpendicular anisotropy can be manipulated. Our calculated results are in agreement with the experiments [1].

[1] Endo et al., Appl. Phys. Lett. 96, 212503 (2010); T. Nozaki et al, Appl. Phys. Lett. 96, 022506 (2010).

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