

Abstract Submitted
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Electric field control of interface magnetic anisotropy¹ LEI XU, SHUFENG ZHANG, Department of Physics University of Arizona — The interface magnetic anisotropy of ferromagnetic metals comes from the spin-orbit interaction. But unlike the semiconductor heterostructures, the strong electron screening would make the Rashba spin-orbit coupling (RSOC) localized within the electron screening length at metallic interface. Now 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 this interaction may generate a RSOC, which is much stronger than the direct Pauli spin-orbit coupling. Due to the presence of the RSOC, the spin up and down states of the ferromagnet are spin mixed at the interface. Among other consequences, the RSOC induces a perpendicular surface magnetic anisotropy whose magnitude is comparable to the observed values in transition metals. When we apply an external electric field across the interface, the induced screening potential modifies the RSOC and thus the perpendicular anisotropy can be manipulated.

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Lei Xu
Department of Physics University of Arizona

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