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Electric-field-induced modification in Dzyaloshinskii-Moriya interaction of Co monolayer on Pt(111) KOHJI NAKAMURA, TORU AKIYAMA, TOMONORI ITO, Mie University, TERUO ONO, Kyoto University, MICHAEL WEINERT, University of Wisconsin - Milwaukee — Magnetism induced by an external electric field (E-field) has received much attention as a potential approach for controlling magnetism at the nano-scale with the promise of ultra-low energy power consumption. Here, the E-field-induced modification of the Dzyaloshinskii-Moriya interaction (DMI) for a prototypical transition-metal thin layer of a Co monolayer on Pt(111) is investigated by first-principles calculations by using the full-potential linearized augmented plane wave method that treats spin-spiral structures in an E-field. With inclusion of the spin-orbit coupling (SOC) by the second variational method for commensurate spin-spiral structures, the DMI constants were estimated from an asymmetric contribution in the total energy with respect to the spin-spiral wavevector. The results predicted that the DMI is modified by the E-field, but the change is found to be small compared to that in the exchange interaction (a symmetric contribution in the total energy) by a factor of ten.

Kohji Nakamura
Mie Univ

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