526th ASRC Seminar

Date: 13:30 ～15:00, 10 July

Location: Meeting room 103, ASRC Building

Speaker: Prof. Stewart E. Barnes
(University of Miami)

Title: Rashba Spin-Orbit Anisotropy
and the Electric Field Control of Magnetism

The control of the magnetism of ultra-thin ferromagnetic layers using an electric field rather than a current, if large enough, would lead to many technologically important applications. To date it is assumed the changes in the magnetic anisotropy, leading to such a control, arises from surface charge doping of the magnetic layer. Much studied is the fact that, for non-magnetic metals or semi-conductors, a large surface electric field gives rise to a Rashba spin-orbit coupling which leads to a spin-splitting of the conduction electrons. For a magnet, this splitting is modified by the internal exchange field resulting in a large magnetic anisotropy energy via the Dzyaloshinskii-Moriya mechanism. This different, yet traditional, path to an electrically induced anisotropy energy can explain the electric field, thickness, and material dependence reported in many experiments.

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