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Direct surface charging and alkali-metal doping for tuning the interlayer exchange coupling and magnetic anisotropy TAMENE DASA, VALERI STEPANYUK, Max Planck Institute of Microstructure Physics — Manipulation of surface or interface charges allows one to control the magnetic orders in nanostructures. In this contributuion we show two main surface charge alteration techniques for tuning the interlayer exchange coupling and magnetic anisotropy of ferromagnetic layers interspaced with non-magnetic ones. Our ab-initio study reveals that a modest amount of extra charge could switch the mutual alignment of the magnetic layers from anti-ferromagnetic to ferromagnetic or vice verse, taking Fe/NxCu(Pt)/Fe trilayer as model system. We also propose adsorption of alkali metals as a natural way of surface charging mechanism. Clear evidence is found that the interlayer magnetic order can be tuned only by adsorbing alkali metals on the magnetic layer. A combined effect of non-magnetic overlayers and interlayer magnetic order leads to a high perpendicular magnetic anisotropy in FePt thin films. These findings suggest that the interplay of interlayer magnetic coupling with magnetic anisotropy could play a crucial role for magnetic hardening and controlling the spin states.

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