

Magnetic depth profiling of FM/AF/FM trilayers using polarized neutron reflectometry with polarization analysis

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Ferromagnetic/antiferromagnetic (FM/AF) interfaces are well known for their exchange bias properties as well as for interlayer exchange coupling in multilayers mediated across the AF. Here, we investigate the properties of trilayers where FM layers of FeCoV are separated by antiferromagnetic NiO layers. We employ polarized neutron reflectometry with polarization analysis to obtain layer resolved information about the magnetization vectors of individual FM layers. This provides an insight into the exchange coupling between the FM layers mediated by the antiferromagnetic spacer. We find a strong coupling for small thicknesses of the AF spacer. The interlayer exchange coupling relaxes with increasing AF thickness allowing an antiparallel orientation of the magnetization of the FM layers beyond a certain AF thickness. The antiparallel configuration is presumably accompanied by a twist of the AF spins.