

The magnetic moment of polycrystalline and epitaxial Co thin films

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The variation of the magnetic moment with dimensionality of magnetic materials, i. e. from atoms to bulk, is a longtime studied issue. For thin films, a constant magnetic moment is often assumed in modelling, however, intermixing and surface roughness may also have an impact.

With the help of polarised neutron reflectometry (PNR) we study the magnetic moment of polycrystalline Co/20 nm Pt/MgO(001) and epitaxial Co/W(110). The samples were grown by molecular beam epitaxy and subsequently measured with PNR at room temperature and in saturation in UHV.

Our results reveal the vertical depth profile of the magnetic moment of the Co films. In fact, the magnetisation is not constant but smeared out at the edges, due to roughness. Measurements at different film thicknesses reveal the evolution of the magnetic moment which may be separated in a bulk and a surface contribution and discussed with respect to published results.

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