

Abstract Submitted
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Step Decorated Ferromagnetic Fe Stripes on Pt(997) RUIHUA CHENG, J. PEARSON, F.Y. FRADIN, HAIFENG DING, Y. GUSLIYENKO, DONGQI LI, S.D. BADER, Argonne National Laboratory — We investigate the step decoration and magnetic properties of Fe grown on a Pt(997) vicinal single crystal by means of reflection high energy electron diffraction (RHEED), scanning tunneling microscopy (STM) and the surface magneto-optical Kerr effect (SMOKE). RHEED and STM indicate that Fe stripes form at low coverage due to step decoration. SMOKE data taken along a wedge indicate that the Fe is ferromagnetic above 0.2 ML with its magnetic easy axis canted out of plane. As temperature is increased near the Curie temperature, there is an irreversible spin reorientation to the perpendicular out-of-plane direction. The canting can be understood as arising from a competition between an in-plane, step-induced magnetic anisotropy and a perpendicular surface anisotropy associated with extended terraces due to the polarization of the proximal Pt. The spin reorientation can be understood as arising from the different temperature dependences of the two competing anisotropies, with the two-dimensional surface anisotropy overcoming the one-dimensional step anisotropy at elevated temperature. Above 1.7 ML the perpendicular easy-axis reorients in plane due to the emergence of the shape anisotropy.

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