Atomic Structure, Magnetic Anisotropy and Magnetization Reversal in Fe films on Pt(997)

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Vicinal surfaces may serve as templates for the growth of films with nanoscale structural and strain modulation. In magnetic materials this gives rise to various contributions to the magnetic anisotropy energy density.

In our present work we revisit [1] the growth of Fe on Pt(997) and the resulting magnetic properties. Using electron diffraction (LEED, LEED-IV) we observe notable structural differences to previous reports under optimized growth conditions. The magnetic easy axis is rotated by 90° as a result. Our results suggest that the atomic structure established at the step edges provides the dominant contribution to the magnetocrystalline anisotropy energy density, even above the spin reorientation thickness.

We present and analyze in detail saturation magnetization, anisotropy field(s) and magnetization reversal at a Fe film thickness of five atomic layers.

References:

[1] D. Repetto et al., Phys. Rev. B 74, 054408 (2006)