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Anomalously large g-factor of single atoms adsorbed on a metal substrate JENS WIEBE, ALEXANDER A. KHAJETOORIANS, BRUNO CHILIAN, ROLAND WIESENDANGER, Institute of Applied Physics, Hamburg University, Jungiusstrasse 11, D-20355 Hamburg, Germany, SAMIR LOUNIS, Forschungszentrum Jülich, Peter Grünberg Institut and Institute for Advanced Simulation, 52425 Jülich, Germany, ANTONIO T. COSTA, Instituto de Física, Universidade Federal Fluminense, 24210-340 Niterói, Rio de Janeiro, Brazil, DOUGLAS L. MILLS, Department of Physics and Astronomy, University of California Irvine, California, 92697 USA — We performed magnetic field dependent inelastic scanning tunneling spectroscopy (ISTS) on individual Fe atoms adsorbed on different metal surfaces. ISTS reveals a magnetization excitation which is shifting linearly to higher energies in the magnetic field. The data is used to extract the magnetic anisotropies and the g-factors of the Fe atoms, as well as the lifetimes of the excitations. We find lifetimes of hundreds of femtoseconds limited by coupling to electron-hole pairs in the substrate and decreasing linearly upon application of the magnetic field. As expected, the magnetic anisotropy strongly depends on the substrate. Astoundingly, we find that the g-factor is $g \approx 3.1$ for Ag(111) instead of the regular value of 2 which is observed for the Cu(111) substrate [1]. This very large g-shift can be understood when considering the complete electronic structure of both the Ag(111) surface state and the Fe atom, as shown by *ab initio* calculations of the magnetic susceptibility.

[1] A. A. Khajetoorians et al., Phys. Rev. Lett. **106**, 037205 (2011).

Jens Wiebe
jwiebe@physnet.uni-hamburg.de
Institute of Applied Physics, Hamburg University,
Jungiusstrasse 11, D-20355 Hamburg, Germany

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