Abstract Submitted
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Broken vector spin chirality in biatomic Fe chains on Ir(001)[1] S. BLUGEL, Y. MOKROUSOV, Peter Grunberg Institut and Institute for Advanced Simulation, Forschungszentrum Juelich and JARA, 52425 Juelich, Germany, M. MENZEL, R. WIESER, K. VON BERGMANN, E. VEDMEDENKO, A. KUBETZKA, R. WIESENDANGER, Institut fur Angewandte Physik, Universitat Hamburg, 20355 Hamburg, Germany, S. HEINZE, Institut fur Theoretische Physik und Astrophysik, Christian-Albrecht-Universitat zu Kiel, 24098 Kiel, Germany — We investigate from *ab initio* the magnetism of biatomic Fe chains, which form due to self-organization on the (5×1)-reconstructed Ir(001) surface [1,2]. Using the `FLEUR` code [3], we calculate the magnetic properties and exchange interactions in this system, finding a very small Heisenberg exchange along the chain of the order of 10 meV/Fe-atom. Upon including spin-orbit coupling we obtain the contribution from the Dzyaloshinskii-Moriya interaction and find that it leads to a 120° spin-spiral ground state of the Fe chains with a unique rotational sense. The results of the Monte-Carlo simulations based on the parameters from *ab initio* are in a very good agreement to STM experiments on the system. Moreover, simulations indicate a robustness of the spin chiral order parameter, which decays with temperature much slower than the scalar spin correlation, in analogy to a vector spin chiral liquid state. We discuss possible applications of the magnetism in these chains with respect to the transfer of information on the nanoscale.
[1] L. Hammer *et al.*, Phys. Rev. B **67**, 125422 (2003). [2] Y. Mokrousov *et al.*, Phys. Rev. B **80**, 195420 (2009). [3] www.flapw.de

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