Scanning Probe Methods Group, Prof. Dr. Roland Wiesendanger

Publications: Original Articles

Date of issue: 2026-05-30

Subgroup: Magneto-Theory

Localized spin waves in isolated kpi-skyrmions
L. Rózsa, J. Hagemeister, E. Y. Vedmedenko, and R. Wiesendanger, Phys. Rev. B **98** 224426 (2018)

Controlled creation and stability of kπ skyrmions on a discrete lattice
J. Hagemeister, A. Siemens, L. Ròzsa, E. Y. Vedmedenko, and R. Wiesendanger, Phys. Rev. B **97** 174436 (2018)

Effective damping enhancement in noncollinear spin structures
L. Rózsa, J. Hagemeister, E. Y. Vedmedenko, and R. Wiesendanger, Phys. Rev. B **30** 100404 (2018)

Inducing skyrmions in ultrathin Fe films by hydrogen exposure
P. J. Hsu, L. Rózsa, A. Finco, L. Schmidt, K. Palotas, E. Vedmedenko, L. Udvardi, L. Szunyogh, A. Kubetzka, K. von Bergmann, and R. Wiesendanger , Nature Communications **9** 1571 (2018)

Perturbative calculations of quantum spin tunneling in effective spin systems with a transversal magnetic field and transversal anisotropy
M. Krizanac, E. Y. Vedmedenko, and R. Wiesendanger,, New Journ. Phys. **19** 013032 (2017)

Skyrmions at the Edge: Confinement Effects in Fe/Ir(111)
J. Hagemeister, D. Iaia, E. Y. Vedmedenko, K. von Bergmann, A. Kubetzka, and R. Wiesendanger, Phys. Rev. Lett. **117** 207202 (2016)

Pattern formation in skyrmionic materials with anisotropic environments
J. Hagemeister, E. Y. Vedmedenko, and R. Wiesendanger, Phys. Rev. B **94** 104434 (2016)

Minimal radius of magnetic skyrmions: statics and dynamics
A. Siemens, Y. Zhang, J. Hagemeister, E. Vedmedenko, and R. Wiesendanger, New Journ. Phys. **18** 045021 (2016)

Quantum revivals and magnetization tunneling in effective spin systems
M. Krizanac, D. Altwein, E. Y. Vedmedenko, and R. Wiesendanger, New Journ. Phys. **18** 033029 (2016)

Dynamics of Bound Monopoles in Artificial Spin Ice: How to Store Energy in Dirac Strings
E. Y. Vedmedenko, Phys. Rev. Lett. **116** 077202 (2016)

Stability of Single Skyrmionic Bits
J. Hagemeister, N. Romming, K. von Bergmann, E.Y. Vedmedenko, and R. Wiesendanger, Nature Communications **6** 8455 (2015)

Description of a dissipative quantum spin dynamics with a Landau-Lifshitz/Gilbert like damping and complete derivation of the classical Landau-Lifshitz equation
R. Wieser, Eur. Phys. J. B **88** 77 (2015)

Bounds on expectation values of quantum subsystems and perturbation theory
K. Them, E. Y. Vedmedenko, K. Fredenhagen, and R. Wiesendanger, J. Phys. A: Math. Theor. **48** 075301 (2015)

Influence of long-range interactions on the switching behavior of particles in an array of ferromagnetic nanostructure
A. Neumann, D. Altwein, C. Thönnißen, R. Wieser, A. Berger, A. Meyer, E. Vedmedenko and H.-P. Oepen, New Journ. Phys. **16** 083012 (2014)

Towards experimental tests and applications of Lieb-Robinson bounds
K. Them, Phys. Rev. A **89** 022126 (2014)

Topologically Protected Magnetic Helix for All-Spin-Based Applications
E. Y. Vedmedenko and D. Altwein, Phys. Rev. Lett. **112** 017206 (2014)

Collective magnetism in arrays of spinor Bose–Einstein condensates
E.Y. Vedmedenko, M. Schult, J. Kronjäger, R. Wiesendanger, K. Bongs, and K. Sengstock, New Journ. Phys. **15** 063033 (2013)

Comparison of Quantum and Classical Relaxation in Spin Dynamics
R. Wieser, Phys. Rev. Lett. **110** 147201 (2013)

Non-equilibrium finite temperature dynamics of magnetic quantum systems: applications to spin-polarized scanning tunneling microscopy
K. Them, T. Stapelfeldt, E.Y. Vedmedenko, and R. Wiesendanger, New Journ. Phys. **15** 013009 (2013)

A theoretical study of the dynamical switching of a single spin by exchange forces
R. Wieser, V. Caciuc, C. Lazo, H. Hölscher, E. Y. Vedmedenko, and R. Wiesendanger, New Journal of Physics **15** 013011 (2013)

Role of hybridization in the Rashba splitting of noble metal monolayers on W(110)
M. Hortamani and R. Wiesendanger, Phys. Rev. B **86** 235437 (2012)

Atomic-scale magnetic dissipation from spin-dependent adhesion hysteresis
E. Y. Vedmedenko, Q. Zhu, U. Kaiser, A. Schwarz, and R. Wiesendanger, Phys. Rev. B **85** 174410 (2012)

Information Transfer by Vector Spin Chirality in Finite Magnetic Chains
M. Menzel, Y. Mokrousov, R. Wieser, J. E. Bickel, E. Vedmedenko, S. Blügel, S. Heinze, K. von Bergmann, A. Kubetzka, and R. Wiesedanger, Phys. Rev. Lett. **108** 197204 (2012)

Magnetic dipole configurations in honeycomb lattices: order and disorder
A. Schumann, P. Szary, E. Y. Vedmedenko, and H. Zabel, New J. Phys. **14** 035015 (2012)

Manipulation of domain walls using a spin-polarized STM
R. Wieser, T. Stapelfeldt, E. Y. Vedmedenko, and R. Wiesendanger , Europhys. Lett. **97** 17009 (2012)

Role of quadratic terms in the Heisenberg model for quantum spin dynamics
R. Wieser, Phys. Rev. B **84** 054411 (2011)

Domain Wall Manipulation with a Magnetic Tip
T. Stapelfeldt, R. Wieser, E. Y. Vedmedenko, and R. Wiesendanger, Phys. Rev. Lett. **107** 027203 (2011)

Spin-spin correlations in ferromagnetic nanosystems
E. Y. Vedmedenko, N. Mikuszeit, T. Stapelfeldt, R. Wieser, M. Potthoff, A. I. Lichtenstein and R. Wiesendanger , Eur. Phys. J. B **80** 331 (2011)

A multi-scale model of domain wall velocities based on ab initioparameters
P. Weinberger, E. Y. Vedmedenko, R. Wieser, and R. Wiesendanger, Philosophical Magazine **91** 2248 (2011)

Indirect Control of Antiferromagnetic Domain Walls with Spin Current
R. Wieser, E. Y. Vedmedenko, and R. Wiesendanger, Phys. Rev. Lett. **106** 067204 (2011)

Current driven domain wall motion in cylindrical nanowires
R. Wieser, E. Y. Vedmedenko, P. Weinberger, and R. Wiesendanger, Phys. Rev. B **82** 144430 (2010)

Domain wall motion damped by the emission of spin waves
R. Wieser, E. Y. Vedmedenko, and R. Wiesendanger , Phys. Rev. B **81** 024405 (2010)

Real-Space Observation of a Right-Rotating Inhomogeneous Cycloidal Spin Spiral by Spin-Polarized Scanning Tunneling Microscopy in a Triple Axes Vector Magnet
S. Meckler, N. Mikuszeit, A. Preßler, E. Y. Vedmedenko, O. Pietzsch, and R. Wiesendanger, Phys. Rev. Lett. **103** 157201 (2009)

Magnetic Ground State of Single and Coupled Permalloy Rectangles
S. Hankemeier, R. Frömter, N. Mikuszeit, D. Stickler, H. Stillrich, S. Pütter, E. Y. Vedmedenko, and H. P. Oepen, Phys. Rev. Lett. **103** 147204 (2009)

Atomic-Level Control of the DomainWall Velocity in Ultrathin Magnets by Tuning of Exchange Interactions
A. Stupakiewicz, E.Y. Vedmedenko, A. Fleurence, T. Maroutian, P. Beauvillain, A. Maziewski, and R. Wiesendanger, Phys. Rev. Lett. **103** 137202 (2009)

Magnetization Reversal of Nanoscale Islands: How Size and Shape Affect the Arrhenius Prefactor
S. Krause, G. Herzog, T. Stapelfeldt, L. Berbil-Bautista, M. Bode, E. Y. Vedmedenko, and R. Wiesendanger, Phys. Rev. Lett. **103** 127202 (2009)

The effect of tilted edges on the shape anisotropy and stray field coupling of uniformly magnetized rectangular elements
S. Pütter, N. Mikuszeit, E. Y. Vedmedenko, and H. P. Oepen, J. Appl. Phys. **106** 043916 (2009)

Quasiantiferromagnetic 120° Néel state in two-dimensional clusters of dipole-quadrupole-interacting particles on a hexagonal lattice
N. Mikuszeit, L. Baraban, E. Y. Vedmedenko, A. Erbe, P. Leiderer, and R. Wiesendanger, Phys. Rev. B **80** (2009)

Quantized spin waves in ferromagnetic and antiferromagnetic structures with domain walls
R. Wieser, E. Y. Vedmedenko, and R. Wiesendanger, Phys. Rev. B **79** 144412 (2009)

Quantized Spin Waves in Antiferromagnetic Heisenberg Chains
R. Wieser, E. Y. Vedmedenko, and R. Wiesendanger, Phys. Rev. Lett. **101** 177202 (2008)

Atomic-Scale Spin Spiral with a Unique Rotational Sense: Mn Monolayer on W(001)
P. Ferriani, K. von Bergmann, E. Y. Vedmedenko, S. Heinze, M. Bode, M. Heide, G. Bihlmayer, S. Blügel, and R. Wiesendanger, Phys. Rev. Lett. **101** 027201 (2008)

In search of multipolar order on the Penrose tiling
E. Y. Vedmedenko, S. Even-Dar Mandel, R. Lifshitz, Phil. Mag. **88** 2197 (2008)

Complex magnetic order on the atomic scale revealed by spin-polarized scanning tunnelling microscopy
K. von Bergmann, M. Bode, A. Kubetzka, O. Pietzsch, E. Y. Vedmedenko, R. Wiesendanger, Phil. Mag. **88** 2627 (2008)

Magnetic properties of single atoms of Fe and Co on Ir(111) and Pt(111)
C. Etz, J. Zabloudil, P. Weinberger, E. Y. Vedmedenko, Phys. Rev. B **77** 184425 (2008)

Magnetization reversal of microstructured kagome lattices
A. Westphalen, A. Schumann, A. Remhof, H. Zabel, M. Karolak, B. Baxevanis, E. Y. Vedmedenko, T. Last, U. Kunze, T. Eimüller, Phys. Rev. B **77** 174407 (2008)

Modulated multipolar structures in magnetic arrays
E. Y. Vedmedenko, R. Wiesendanger, Phil. Mag. **88** 2683 (2008)

Magnetostatic interactions on a square lattice
A. Remhof, A. Schumann, A. Westphalen, H. Zabel, N. Mikuszeit, E. Y. Vedmedenko, T. Last, and U. Kunze, Phys. Rev. B **77** 134409 (2008)

Entropy driven phase transition in itinerant antiferromagnetic monolayers
R. Wieser, E. Y. Vedmedenko, and R. Wiesendanger, Phys. Rev. B **77** 064410 (2008)

Chiral magnetic ordering in two-dimensional ferromagnets with competing Dzyaloshinsky-Moriya interactions
E.Y. Vedmedenko, L. Udvardi, P. Weinberger, R. Wiesendanger , Phys. Rev. B **75** 104431 (2007)

Multipole moments of general ellipsoids with two polarized domains
M. Schult, N. Mikuszeit, E. Y. Vedmedenko and R. Wiesendanger, J. Phys. A **40** 14791 (2007)

Lorentz covariance and the crossover of two-dimensional antiferromagnets
P. Crompton, Phys. Rev. B **75** 174520 (2007)

Influence of the lattice discreteness on magnetic ordering in nanostructures and nanoarrays
E. Y. Vedmedenko, phys. stat. sol. (b) **244** 1133 (2007)

Leading corrections to finite-size scaling for mixed-spin chains
R. Bischof and P. R. Crompton, JETP Letters **84** 613 (2006)

Vortex fluctuations and ordering of dipolar-coupled granular moments in thin ferromagnetic films
J. Kötzler, D. Görlitz, M. Kurfiß, L. von Sawilski, and E. Y. Vedmedenko , Phys. Rev. B **73** 224425 (2006)

Atomic spin structure of antiferromagnetic domain walls
M. Bode, E. Y. Vedmedenko, K. von Bergmann, A. Kubetzka, P. Ferriani, S. Heinze, and R. Wiesendanger, Nature Materials **5** 477 (2006)

Observation of a complex nanoscale magnetic structure in a hexagonal Fe monolayer
K. von Bergmann, S. Heinze, M. Bode, E. Y. Vedmedenko, G. Bihlmayer, S. Blügel, and R. Wiesendanger, Phys. Rev. Lett. **96** 167203 (2006)

Interplay between magnetic and spatial order in Quasicrystals
E. Y. Vedmedenko, U. Grimm, and R. Wiesendanger, Philosophical Magazine **86** 733-739 (2006)

Multipolar Ordering and Magnetization Reversal in Two-Dimensional Nanomagnet Arrays
E. Y. Vedmedenko, N. Mikuszeit, H. P. Oepen, and R. Wiesendanger, Phys. Rev. Lett. **95** 207202 (2005)

Multipole moments of the in-plane magnetized nanodiscs
N. Mikuszeit, E.Y. Vedmedenko, R. Wiesendanger, and H.P. Oepen, J. Appl. Phys. **97** 10J502 (2005)

Lattice-dependent anisotropy in the orientation of magnetic domain walls
E. Y. Vedmedenko, K. von Bergmann, H. P. Oepen, and R. Wiesendanger, J. Magn. Magn. Mater. **290-291** 746 (2005)

Multipole interaction of polarized single-domain particles
N. Mikuszeit, E. Y. Vedmedenko, and H. P. Oepen, J. Phys. C **16** 9037 (2004)

Noncollinear magnetic order in quasicrystals.
E. Y. Vedmedenko. U. Grimm, and R. Wiesendanger, Phys. Rev. Lett. **93** 76407 (2004)

Domain Wall Orientation in Magnetic Nanowires
E. Y. Vedmedenko, A. Kubetzka, K. von Bergmann, O. Pietzsch, M. Bode, J. Kirschner, H. P. Oepen, and R. Wiesendanger, Phys. Rev. Lett. **92** 77207 (2004)

Quasiperiodic magnetic Order and geometrical Frustration on the Penrose Tiling
E. Y. Vedmedenko, Ferroelectrics **305** 129 (2004)