

Scanning Probe Methods Group, Prof. Dr. Roland Wiesendanger

Publications: Original Articles

Subgroup: STM/SPSTM on Magnetic Nanostructures

Date of issue: 2025-08-28

Discovery and characterization of a new type of domain wall in a row-wise antiferromagnet

J. Spethmann, M. Grünebohm, R. Wiesendanger, K. von Bergmann, and A. Kubetzka, *Nature Communications* **12** 3488 (2021)

Real-space imaging of atomic-scale spin textures at nanometer distances

A. Schlenhoff, S. Kovarik, S. Krause and R. Wiesendanger, *Appl. Phys. Lett.* **116** 122406 (2020)

Colloquium: Atomic spin chains on surfaces

D.-J. Choi, N. Lorente, J. Wiebe, K. von Bergmann, A. F. Otte, and A. J. Heinrich, *Rev. Mod. Phys.* **91** 041001 (2019)

Vacuum Resonance States as Atomic-Scale Probes of Noncollinear Surface Magnetism

A. Schlenhoff, S. Kovarik, S. Krause, and R. Wiesendanger, *Phys. Rev. Lett.* **123** 087202 (2019)

Step-Edge-Induced Anisotropic Chiral Spin Coupling in Ultrathin Magnetic Films

A. Schlenhoff, S. Krause, and R. Wiesendanger, *Phys. Rev. Lett.* **123** 037201 (2019)

Magneto-Seebeck tunneling on the atomic scale

C. Friesen, H. Osterhage, J. Friedlein, A. Schlenhoff, R. Wiesendanger, and S. Krause, *Science* **363** 1065 (2019)

Magnetic domain walls in strain-patterned ultrathin films

A. Finco, M. Perini, A. Kubetzka, K. von Bergmann, and R. Wiesendanger, *Phys. Rev. B* **98** 174435 (2018)

Pb-induced skyrmions in a double layer of Fe on Ir(111)

J. Sassmannshausen, A. Kubetzka, P.-J. Hsu, K. von Bergmann, and R. Wiesendanger, *Phys. Rev. B* **98** 144443 (2018)

Scanning Seebeck tunneling microscopy

C. Friesen, H. Osterhage, J. Friedlein, A. Schlenhoff, R. Wiesendanger, and S. Krause, *J. Phys. D: Appl. Phys.* **51** 324001 (2018)

Domain walls and Dzyaloshinskii-Moriya interaction in epitaxial Co/Ir(111) and Pt/Co/Ir(111)

M. Perini, S. Meyer, B. Dupé, S. von Malottki, A. Kubetzka, K. von Bergmann, R. Wiesendanger, and S. Heinze, *Phys. Rev. B* **97** 184425 (2018)

Competition of Dzyaloshinskii-Moriya and Higher-Order Exchange Interactions in Rh/Fe Atomic Bilayers on Ir(111)

N. Romming, H. Pralow, A. Kubetzka, M. Hoffmann, S. von Malottki, S. Meyer, B. Dupé, R. Wiesendanger, K. von Bergmann, and S. Heinze, *Phys. Rev. Lett.* **120** 207201 (2018)

Toward tailoring Majorana bound states in artificially constructed magnetic atom chains on elemental superconductors

H. Kim, A. Palacio-Morales, T. Posske, L. Rózsa, K. Palotás, L. Szunyogh, M. Thorwart, R. Wiesendanger, *Science Advances* **4** eaar5251 (2018)

Inducing skyrmions in ultrathin Fe films by hydrogen exposure

P. J. Hsu, L. Rózsa, A. Finco, L. Schmidt, K. Palotás, E. Vedmedenko, L. Udvardi, L. Szunyogh, A. Kubetzka, K. von Bergmann, and R. Wiesendanger, *Nature Communications* **9** 1571 (2018)

A gateway towards non-collinear spin processing using three-atom magnets with strong substrate coupling

J. Hermenau, J. Ibañez-Azpiroz, Chr. Hübner, A. Sonntag, B. Baxevanis, K. T. Ton, M. Steinbrecher, A. A. Khajetoorians, M. dos Santos Dias, S. Blügel, R. Wiesendanger, S. Lounis, and J. Wiebe, *Nature Communications* **8** 642 (2017)

Temperature-Induced Increase of Spin Spiral Periods

A. Finco, L. Rózsa, P.-J. Hsu, A. Kubetzka, E. Vedmedenko, K. von Bergmann, and R. Wiesendanger, *Phys. Rev. Lett.* **119** 037202 (2017)

Impact of the skyrmion spin texture on magnetoresistance

A. Kubetzka, Ch. Hanneken, R. Wiesendanger, and K. von Bergmann, *Phys. Rev. B* **95** 104433 (2017)

Electric-field-driven switching of individual magnetic Skyrmions

P.-J. Hsu, A. Kubetzka, A. Finco, N. Romming, K. von Bergmann, and R. Wiesendanger, *Nature Nanotechnology* **12** 123 (2017)

Reorientation of the diagonal double-stripe spin structure at Fe1+_yTe bulk and thin-film surfaces

T. Hänke, U. R. Singh, L. Cornils, S. Manna, A. Kamlapure, M. Bremholm, E. M. J. Hedegaard, B. B. Iversen, Ph. Hofmann, J. Hu, Z. Mao, J. Wiebe, and R. Wiesendanger, *Nature Commun.* **8** 13939 (2017)

Tailoring noncollinear magnetism by misfit dislocation lines

A. Finco, P.-J. Hsu, A. Kubetzka, K. von Bergmann, and R. Wiesendanger, *Phys. Rev. B* **94** 214402 (2016)

Coupling of Coexisting Noncollinear Spin States in the Fe Monolayer on Re(0001)

A. Palacio Morales, A. Kubetzka, K. von Bergmann, and R. Wiesendanger, *Nano Letters* **16** 6252 (2016)

Symmetry breaking in spin spirals and skyrmions by in-plane and canted magnetic fields

L. Schmidt, J. Hagemeister, P.-J. Hsu, A. Kubetzka, K. von Bergmann, and R. Wiesendanger, *New Journ. Phys.* **18** 075007 (2016)

Nanoscale magnetic skyrmions in metallic films and multilayers: a new twist for spintronics

R. Wiesendanger, *Nature Reviews Materials* **1** 16044 (2016)

The properties of isolated chiral skyrmions in thin magnetic films

A. O. Leonov, T. L. Monchesky, N. Romming, A. Kubetzka, A. N. Bogdanov, and R. Wiesendanger, *New Journ. Phys.* **18** 065003 (2016)

Pinning and movement of individual nanoscale magnetic skyrmions via defects

Ch. Hanneken, A. Kubetzka, K. von Bergmann, and R. Wiesendanger, *New Journ. Phys.* **18** 055009 (2016)

Skyrmionics gets hot

S. Krause and R. Wiesendanger, *Nature Materials* **15** 493 (2016)

Structural and magnetic properties of Ni/Fe nanostructures on Ir(111)

D. Iaia, A. Kubetzka, K. von Bergmann, and R. Wiesendanger, *Phys. Rev. B* **93** 134409 (2016)

Spin-sensitive shape asymmetry of adatoms on noncollinear magnetic substrates

D. Serrate, Y. Yoshida, M. Moro-Lagares, A. Kubetzka, and R. Wiesendanger, *Phys. Rev. B* **93** 125424 (2016)

High-frequency magnetization dynamics of individual atomic-scale magnets

S. Krause, A. Sonntag, J. Hermenau, J. Friedlein, and R. Wiesendanger, *Phys. Rev. B* **93** 064407 (2016)

Absence of a spin-signature from a single Ho adatom as probed by spin-sensitive tunneling

M. Steinbrecher, A. Sonntag, M. dos Santos Dias, M. Bouhassoune, S. Lounis, J. Wiebe, R. Wiesendanger, and A. A. Khajetorians, *Nature Communications* **7** 10454 (2016)

Guiding Spin Spirals by Local Uniaxial Strain Relief

P.-J. Hsu, A. Finco, L. Schmidt, A. Kubetzka, K. von Bergmann, and R. Wiesendanger, *Phys. Rev. Lett.* **116** 017201 (2016)

Stability of Single Skyrmionic Bits

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

Electrical detection of magnetic skyrmions by tunnelling non-collinear magnetoresistance

C. Hanneken, F. Otte, A. Kubetzka, B. Dupé, N. Romming, K. von Bergmann, R. Wiesendanger, and S. Heinze, *Nature Nanotechnology* **10** 1039 (2015)

Magnetic bubbles with a twist

K. von Bergmann, *Science* **349** 234 (2015)

Magnetic Nano-skyrmion Lattice Observed in a Si-Wafer-Based Multilayer System

A. Schlenhoff, P. Lindner, J. Friedlein, S. Krause, R. Wiesendanger, M. Weinl, M. Schreck, and M. Albrecht, *ACS Nano* **9** 5908 (2015)

Field-Dependent Size and Shape of Single Magnetic Skyrmions

N. Romming, A. Kubetzka, C. Hanneken, K. von Bergmann, and R. Wiesendanger, *Phys. Rev. Lett.* **114** 177203 (2015)

Influence of the Local Atom Configuration on a Hexagonal Skyrmion Lattice

K. von Bergmann, M. Menzel, A. Kubetzka, and R. Wiesendanger, *Nano Lett.* **15** 3280 (2015)

Spin Polarization of the Split Kondo State

K. von Bergmann, M. Ternes, S. Loth, C. P. Lutz, and A. J. Heinrich, *Phys. Rev. Lett.* **114** 076601 (2015)

Giant magnetization canting due to symmetry breaking in zigzag Co chains on Ir(001)

B. Dupé, J. E. Bickel, Y. Mokrousov, F. Otte, K. von Bergmann, A. Kubetzka, S. Heinze, and R. Wiesendanger, *New J. Phys.* **17** 023014 (2015)

Superconductivity of lanthanum revisited: enhanced critical temperature in the clean limit

P. Löptien, L. Zhou, A. A. Khajetoorians, J. Wiebe, and R. Wiesendanger, *J. Phys.: Condens. Matter* **26** 425703 (2014)

Interface-induced chiral domain walls, spin spirals and skyrmions revealed by spin-polarized scanning tunneling microscopy

K. von Bergmann, A. Kubetzka, O. Pietzsch, and R. Wiesendanger, *J. Phys.: Condens. Matter* **26** 394002 (2014)

Scanning tunneling microscopy study of Fe, Co and Cr growth on Re(0001)

S. Ouazi, T. Pohlmann, A. Kubetzka, K. von Bergmann, and R. Wiesendanger, *Surf. Sci.* **630** 280 (2014)

Thermal Stability of an Interface-Stabilized Skyrmion Lattice

A. Sonntag, J. Hermenau, S. Krause, and R. Wiesendanger, *Phys. Rev. Lett.* **113** 077202 (2014)

Computing with spins and magnets

B. Behin-Aein, J.-P. Wang, and R. Wiesendanger, *MRS Bulletin* **39** 696 (2014)

Enhanced Atomic-Scale Spin Contrast due to Spin Friction

S. Ouazi, A. Kubetzka, K. von Bergmann, and R. Wiesendanger, *Phys. Rev. Lett.* **112** 076102 (2014)

Electric-field-induced magnetic anisotropy in a nanomagnet investigated on the atomic scale

A. Sonntag, J. Hermenau, A. Schlenhoff, J. Friedlein, S. Krause, and R. Wiesendanger, *Phys. Rev. Lett.* **112** 017204 (2014)

Tailoring Molecular Self-Assembly of Magnetic Phthalocyanine Molecules on Fe- and Co-Intercalated Graphene

M. Bazarnik, J. Brede, R. Decker, and R. Wiesendanger, *ACS Nano* **7** 11341 (2013)

Co atoms on Bi₂Se₃ revealing a coverage dependent spin reorientation transition

T. Eelbo, M. Sikora, G. Bihlmayer, M. Dobrzański, A. Kozłowski, I. Miotkowski, and R. Wiesendanger, *New Journ. Phys.* **15** 113026 (2013)

Writing and Deleting Single Magnetic Skyrmions

N. Romming, C. Hanneken, M. Menzel, J. E. Bickel, B. Wolter, K. von Bergmann, A. Kubetzka, and R. Wiesendanger, *Science* **341** 6146 (2013)

Modification of Electrical Properties of Graphene by Substrate-Induced Nanomodulation

Jong-Kwon Lee, S. Yamazaki, Hoyeol Yun, Jinwoo Park, G. P. Kennedy, Gyu-Tae Kim, O. Pietzsch, R. Wiesendanger, SangWook Lee, Suklyun Hong, U. Dettlaff-Weglikowska, and S. Roth, *Nano Letters* **13** 3494-500 (2013)

Influence of the degree of decoupling of graphene on the properties of transition metal adatoms

T. Eelbo, M. Wasniowska, M. Gyamfi, S. Forti, U. Starke, and R. Wiesendanger, *Phys. Rev. B* **87** 205443 (2013)

Adatoms and Clusters of 3d Transition Metals on Graphene: Electronic and Magnetic Configurations

T. Eelbo, M. Wasniowska, P. Thakur, M. Gyamfi, B. Sachs, T. O. Wehling, S. Forti, U. Starke, C. Tieg, A. I. Lichtenstein, and R. Wiesendanger, *Phys. Rev. Lett.* **110** 136804 (2013)

Atomic-scale magnetism of cobalt-intercalated graphene

R. Decker, J. Brede, N. Atodiresei, V. Caciuc, S. Blügel, and R. Wiesendanger, *Phys. Rev. B* **87** 041403 (2013)

Current-Driven Spin Dynamics of Artificially Constructed Quantum Magnets

A. A. Khajetoorians, B. Baxevanis, C. Hübner, T. Schlenk, S. Krause, T. O. Wehling, S. Lounis, A. Lichtenstein, D. Pfannkuche, J. Wiebe, and R. Wiesendanger, *Science* **339** no. 6115 pp (2013)

Tunneling anisotropic magnetoresistance on the atomic scale

K. von Bergmann, M. Menzel, D. Serrate, Y. Yoshida, S. Schröder, P. Ferriani, A. Kubetzka, R. Wiesendanger, and S. Heinze, *Phys. Rev. B* **86** 134422 (2012)

Magnetic coupling of single Co adatoms to a Co underlayer through a Pd spacer of variable thickness

L. V. Dzemiantsova, M. Hortamani, C. Hanneken, A. Kubetzka, K. von Bergmann, and R. Wiesendanger, *Phys. Rev. B* **86** 094427 (2012)

Spin Friction Observed on the Atomic Scale

B. Wolter, Y. Yoshida, A. Kubetzka, S.-W. Hla, K. von Bergmann, and R. Wiesendanger, *Phys. Rev. Lett.* **109** 116102 (2012)

Individual Atomic-Scale Magnets Interacting with Spin-Polarized Field-Emitted Electrons,
A. Schlenhoff, S. Krause, A. Sonntag, and R. Wiesendanger, Phys. Rev. Lett. **109** 097602 (2012)

Impact of intercalated cobalt on the electronic properties of graphene on Pt(111)
M. Gyamfi, T. Eelbo, M. Wasniowska, and R. Wiesendanger, Phys. Rev. B **85** 205434 (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. Heine, K. von Bergmann, A. Kubetzka, and R. Wiesendanger, Phys. Rev. Lett. **108** 197204 (2012)

Orbital selective coupling between Ni adatoms and graphene Dirac electrons

M. Gyamfi, T. Eelbo, M. Wasniowska, T. O. Wehling, S. Forti, U. Starke, A. I. Lichtenstein, M. I. Katsnelson, and R. Wiesendanger, Phys. Rev. B **85** 161406(R) (2012)

Conical spin-spiral state in an ultra-thin film driven by higher-order spin interactions

Y. Yoshida, S. Schröder, P. Ferriani, D. Serrate, A. Kubetzka, K. von Bergmann, S. Heinze, and R. Wiesendanger, Phys. Rev. Lett. **108** 087205 (2012)

Micromagnetic description of the spin spiral in Fe double-layer stripes on W(110)

S. Meckler, O. Pietzsch, N. Mikuszeit, and R. Wiesendanger, Phys. Rev. B **85** 024420 (2012)

Atom-specific spin mapping and buried topological states in a homologous series of topological insulators

S. V. Eremeev, G. Landolt, T. V. Menshchikova, B. Slomski, Y. M. Koroteev, Z. S. Aliev, M. B. Babanly, J. Henk, A. Ernst, L. Patthey, A. Eich, A. A. Khajetoorians, J. Hagemeister, O. Pietzsch, J. Wiebe, R. Wiesendanger, P. M. Echenique, S. S. Tsirkin, I. R. Amiraslanov, J. H. Dil, and E. V. Chulkov, Nat. Commun. **3** 635 (2012)

Multiscale magnetic study of Ni(111) and graphene on Ni(111)

L.V. Dzemiantsova, M. Karolak, F. Lofink, A. Kubetzka, B. Sachs, K. von Bergmann, S. Hankemeier, T.O. Wehling, R. Frömter, H.P. Oepen, A.I. Lichtenstein, and R. Wiesendanger, Phys. Rev. B **84** 205431 (2011)

Joule heating and spin-transfer torque investigated on the atomic scale using a spin-polarized scanning tunneling microscope

S. Krause, G. Herzog, A. Schlenhoff, A. Sonntag, and R. Wiesendanger, Phys. Rev. Lett. **107** 186601 (2011)

Fe adatoms on graphene/Ru(0001): Adsorption site and local electronic properties

M. Gyamfi, T. Eelbo, M. Wasniowska, and R. Wiesendanger, Phys. Rev. B **84** 113403 (2011)

Magnetic properties of monolayer Co islands on Ir(111) probed by spin-resolved scanning tunneling microscopy

J. E. Bickel, F. Meier, J. Brede, A. Kubetzka, K. von Bergmann, and R. Wiesendanger, Phys. Rev. B **84** 054454 (2011)

Magnetostatics and the rotational sense of cycloidal spin spirals

N. Mikuszeit, S. Meckler, R. Wiesendanger, and R. Miranda, Phys. Rev. B **84** 054404 (2011)

Spontaneous atomic-scale magnetic skyrmion lattice in two dimensions

S. Heinze, K. von Bergmann, M. Menzel, J. Brede, A. Kubetzka, R. Wiesendanger, G. Bihlmayer, S. and Blügel, Nature Physics **7** 713 -- 718 (2011)

Inhomogeneous electronic properties of monolayer graphene on Ru(0001)

M. Gyamfi, T. Eelbo, M. Wasniowska, and R. Wiesendanger, Phys. Rev. B **83** 153418 (2011)

Magnetoelastic effects in nanostructures

J. I. Arnaudas, A. Badia-Majós, L. Berbil-Bautista, M. Bode, F. J. Castano, M. Ciria, C. de la Fuente, J. L. Diez-Ferrer, S. Krause, B. G. Ng, R. C. O'Handley, C. A. Ross, and R. Wiesendanger, The Physics of Metals and Metallography **168** 177 (2010)

Bulk Cr tips with full spatial magnetic sensitivity for spin-polarized scanning tunneling microscopy

A. Schlenhoff, S. Krause, G. Herzog, and R. Wiesendanger, Appl. Phys. Lett. **97** 083104 (2010)

An approach for automated scale invariant STM-scan matching using SIFT

H. Bistry, B. Wolter, B. Schütz, R. Wiesendanger, and J. Zhang, Proc. IEEE Nano 2010 **2** 897 (2010)

Imaging and Manipulating the Spin Direction of Individual Atoms

D. Serrate, P. Ferriani, Y. Yoshida, S.-W. Hla, M. Menzel, K. von Bergmann, S. Heinze, A. Kubetzka and R. Wiesendanger, Nature Nanotechnology **5** 350 (2010)

Heat assisted spin torque switching of quasistable nanomagnets across a vacuum gap

G. Herzog, S. Krause, and R. Wiesendanger, Appl. Phys. Lett. **96** 102505 (2010)

Nanoscale spin structures dominated by magnetoelastic interactions around dislocation cores as seen via spin-polarized STM

L. Berbil-Bautista, S. Krause, M. Bode, A. Badía-Majós, C. de la Fuente, R. Wiesendanger, and J. I. Arnaudas, Phys. Rev. B **80** 241408(R) (2009)

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)

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)

A low-temperature spin-polarized scanning tunneling microscope operating in a fully rotatable magnetic field

S. Meckler, M. Gyamfi, O. Pietzsch, R. Wiesendanger, Rev. Sci. Instr. **80** 023708 (2009)

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)

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)

Structure and magnetism of ultra-thin chromium layers on W(110)

B. Santos, J. M. Puerta, J. I. Cerdá, R. Stumpf, K. von Bergmann, R. Wiesendanger, M. Bode, K. F. McCarty, and J. de la Figuera, New J. Phys. **10** 13005 (2008)

Comment on "Three-Dimensional, Spin-Resolved Structure of Magnetic Vortex and Antivortex States in Patterned Co Films Using Scanning Ion Microscopy with Polarization Analysis"

M. Bode, O. Pietzsch, A. Kubetzka, W. Wulfhekel, D. McGrouther, S. McVitie, and J. N. Chapman, Phys. Rev. Lett. **100** 029703 (2008)

Magnetismus mit Dreh

K. von Bergmann, M. Bode, R. Wiesendanger, Phys. Unserer Zeit **39** 93 (2008)

Complex magnetism of the Fe monolayer on Ir(111)

K. von Bergmann, S. Heinze, M. Bode, G. Bihlmayer, S. Blügel, and R. Wiesendanger, New Journ. Phys. **9** 396 (2007)

Current-Induced Magnetization Switching with a Spin-Polarized Scanning Tunneling Microscope

S. Krause, L. Berbil-Bautista, G. Herzog, M. Bode, and R. Wiesendanger, Science **317** 1537 (2007)

Spin-polarized scanning tunneling microscopy and spectroscopy of ferromagnetic Dy(0001)/W(110) films

L. Berbil-Bautista, S. Krause, M. Bode, and R. Wiesendanger, Phys. Rev. B **76** 064411 (2007)

Spin-polarized scanning tunneling microscopy in field emission mode

A. Kubetzka, M. Bode, and R. Wiesendanger, Appl. Phys. Lett. **91** 012508 (2007)

On the preparation and electronic properties of clean W(110) surfaces

M. Bode, S. Krause, L. Berbil-Bautista, S. Heinze and R. Wiesendanger, Surf. Sci. **601** 3308 (2007)

Chiral magnetic order at surfaces driven by inversion asymmetry

M. Bode, M. Heide, K. von Bergmann, P. Ferriani, S. Heinze, G. Bihlmayer, A. Kubetzka, O. Pietzsch, S. Blügel, and R. Wiesendanger, Nature **447** 190 (2007)

Co double-layer nanostructures on Pt(111) studied by spin-polarized scanning tunnelling microscopy

F. Meier, K. von Bergmann, J. Wiebe, M. Bode, and R. Wiesendanger, J. Phys. D **40** 1306 (2007)

Spin-dependent electronic and magnetic properties of Co nanostructures on Pt(111) studied by spin-resolved scanning tunneling spectroscopy

F. Meier, K. von Bergmann, P. Ferriani, J. Wiebe, M. Bode, K. Hashimoto, S. Heinze, and R. Wiesendanger, Phys. Rev. B **74** 195411 (2006)

Consequences of line defects on the magnetic structure of high anisotropy films: Pinning centers on Dy/W(110)

S. Krause, L. Berbil-Bautista, T. Hänke, F. Vonau, M. Bode, and R. Wiesendanger, Europhys. Lett. **76** 637 (2006)

Spin-Resolved Electronic Structure of Nanoscale Cobalt Islands on Cu(111)

O. Pietzsch, S. Okatov, A. Kubetzka, M. Bode, S. Heinze, A. Lichtenstein, and R. Wiesendanger, Phys. Rev. Lett. **96** 237203 (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)

Spin-polarized scanning tunneling spectroscopy of dislocation lines in Fe films on W(110)

M. Bode, K. von Bergmann, A. Kubetzka, O. Pietzsch, and R. Wiesendanger, J. Magn. Magn. Mater. **304** 1 (2006)

Coverage-dependent spin reorientation transition temperature of the Fe double-layer on W(110) observed by scanning tunneling microscopy

K. von Bergmann, M. Bode, and R. Wiesendanger, J. Magn. Magn. Mater. **305** 279 (2006)

Spin-polarized scanning tunneling microscopy through an adsorbate layer: Sulfur-covered Fe/W(110)

L. Berbil-Bautista, S. Krause, T. Hänke, M. Bode, and R. Wiesendanger, Surf. Sci. Lett. **600** L20 (2006)

Growth of Cr on Ir(111) studied by scanning tunneling microscopy

F. Marcinowski, K. von Bergmann, M. Bode, and R. Wiesendanger, Surf. Sci. **600** 1034 (2006)

Temperature-dependent scanning tunneling spectroscopy of Cr(001): Orbital Kondo resonance versus surface state

T. Hänke, M. Bode, S. Krause, L. Berbil-Bautista, and R. Wiesendanger, Phys. Rev. B **72** 085453 (2005)

Absence of spin-flip transition at the Cr(001) surface: A combined spin-polarized scanning tunneling microscopy and neutron scattering study

T. Hänke, S. Krause, L. Berbil-Bautista, M. Bode, R. Wiesendanger, V. Wagner, D. Lott, and A. Schreyer, Phys. Rev. B **71** 184407 (2005)

Imaging the Switching Behavior of Superparamagnetic Nanoislands by Spin-Polarized Scanning Tunneling Microscopy

M. Bode, A. Kubetzka, K. von Bergmann, O. Pietzsch, and R. Wiesendanger, J. Microsc. Res. & Techn. **66** 117 (2005)

Spin-polarized scanning tunneling microscopy: Insight into magnetism from nanostructures to atomic scale spin structures

K. von Bergmann, M. Bode, A. Kubetzka, O. Pietzsch, and R. Wiesendanger, J. Microsc. Res. & Techn. **66** 61 (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)

Revealing Antiferromagnetic Order of the Fe Monolayer on W(001): Spin-Polarized Scanning Tunneling Microscopy and First-Principles Calculations

A. Kubetzka, P. Ferriani, M. Bode, S. Heinze, G. Bihlmayer, K. von Bergmann, O. Pietzsch, S. Blügel, and R. Wiesendanger, Phys. Rev. Lett. **94** 87204 (2005)

Growth and Magnetism of Fe on Cr(001): A Spin-Polarized Scanning Tunneling Spectroscopy and Magnetic Force Microscopy Study

M. Bode, R. Ravlic, M. Kleiber, and R. Wiesendanger, Appl. Phys. A **80** 907 (2005)

Spin-polarized scanning tunneling microscopy of antiferromagnetic surfaces

M. Bode, R. Ravlic, M. Kleiber, and R. Wiesendanger, Nova Acta Leopoldina **340** 61 (2005)

Magnetism of iron on tungsten(001) studied by spin-resolved scanning tunneling microscopy and spectroscopy.

K. von Bergmann, M. Bode, and R. Wiesendanger, Phys. Rev. B **70** 174455 (2004)

The Environment Matters - Even on the Atomic Scale

M. Bode, Science **306** 234 (2004)

Observation of 5f-states on U/W(110) films by means of scanning tunneling spectroscopy

L. Berbil-Bautista, T. Hänke, M. Getzlaff, R. Wiesendanger, I. Opahle, K. Koepernitz, and M. Richter, Phys. Rev. B **70** 113401 (2004)

Spin-polarized electron scattering at single oxygen adsorbates on a magnetic surface

K. von Bergmann, M. Bode, A. Kubetzka, M. Heide, S. Blügel, and R. Wiesendanger, Phys. Rev. Lett. **92** 46801 (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)*

Shape dependent Thermal Switching Behavior of Superparamagnetic Nanoislands.

*M. Bode, O. Pietzsch, A. Kubetzka and R. Wiesendanger, Phys. Rev. Lett. **92** 67201 (2004)*

Thickness dependent magnetization states of Fe islands on W(110): From single domain to vortex and diamond patterns.

*M. Bode, A. Wachowiak, J. Wiebe, A. Kubetzka, M. Morgenstern, and R. Wiesendanger, Appl. Phys. Lett. **84** 948 (2004)*

Spin-polarized scanning tunneling spectroscopy of nano-scale cobalt islands on Cu(111)

*O. Pietzsch, A. Kubetzka, M. Bode, and R. Wiesendanger, Phys. Rev. Lett. **92** 57202 (2004)*

Fundamental studies of magnetism down to the atomic scale: present status and future perspectives of spin-polarized scanning tunneling microscopy.

*R. Wiesendanger, M. Bode, A. Kubetzka, O. Pietzsch, M. Morgenstern, A. Wachowiak, and J. Wiebe, J. Magn. Magn. Mater. **272-276** 2115 (2004)*

Recent Advances in Spin-Polarized Scanning Tunneling Microscopy.

*O. Pietzsch, A. Kubetzka, M. Bode, and R. Wiesendanger, Appl. Phys. A **78** 781 (2004)*

Correlation of structural, local electronic and magnetic properties of Fe on Cr(001) studied by spin-polarized scanning tunneling spectroscopy.

*R. Ravlic, M. Bode, and R. Wiesendanger, J. Phys.: Condens. Matter **15** S2513 (2003)*

Spin-polarized STM investigation of magnetic domain walls.

*A. Kubetzka, O. Pietzsch, M. Bode, R. Ravlic, and R. Wiesendanger, Acta Physica Polonica A **104** 259 (2003)*

Surface electronic properties of Fe nanoparticles on c(2x2)-N/Cu(001)

*M. Getzlaff, M. Bode, and R. Wiesendanger, Acta Physica Polonica A **104** 327 (2003)*

Direct observation of confined states in individual metallic single wall carbon nanotubes.

*Th. Maltezopoulos, A. Kubetzka, M. Morgenstern, R. Wiesendanger, S. G. Lemay, and C. Dekker, Appl. Phys. Lett. **83** 1011 (2003)*

Evidence of a topological antiferromagnetic order on ultrathin Cr(001) film surface studied by spin-polarized scanning tunneling spectroscopy

*T. Kawagoe, Y. Suzuki, M. Bode, and K. Koike, J. Appl. Phys. **93** 6575 (2003)*

Correlation of dislocation and domain structure of Cr(001) investigated by spin-polarized scanning tunneling microscopy.

*R. Ravlic, M. Bode, A. Kubetzka, and R. Wiesendanger, Phys. Rev. B **67** 174411 (2003)*

Determining the spin-polarization of surfaces by spin-polarized scanning tunneling spectroscopy.

*A. Kubetzka, O. Pietzsch, M. Bode, and R. Wiesendanger, Appl. Phys. A **76** 873 (2003)*

Spin-orbit induced local band structure variations revealed by scanning tunneling spectroscopy.

*M. Bode, A. Kubetzka, S. Heinze, O. Pietzsch, R. Wiesendanger, M. Heide, X. Nie, G. Bihlmayer, and S. Blügel, J. Phys.: Condens. Matter **15** S679 (2003)*

Spin-polarized scanning tunneling microscopy study of 360° walls in an external magnetic field.

*A. Kubetzka, O. Pietzsch, M. Bode, and R. Wiesendanger, Phys. Rev. B **67** 20401 (2003)*

Magnetization-direction dependent local electronic structure probed by scanning tunneling spectroscopy.

*M. Bode, S. Heinze, A. Kubetzka, O. Pietzsch, X. Nie, G. Bihlmayer, S. Blügel, and R. Wiesendanger, Phys. Rev. Lett. **89** 237205 (2002)*

Spin-resolved spectro-microscopy of magnetic nanowire arrays.

*M. Bode, A. Kubetzka, O. Pietzsch, and R. Wiesendanger, Surf. Sci. **514** 135 (2002)*

Structural, electronic, and magnetic properties of a Mn monolayer on W(110).

*M. Bode, S. Heinze, A. Kubetzka, O. Pietzsch, M. Hennefarth, M. Getzlaff, R. Wiesendanger, X. Nie, G. Bihlmayer, and S. Blügel, Phys. Rev. B **66** 014425 (2002)*

Magnetic properties of the Cr(001) surface studied by spin-polarized scanning tunneling spectroscopy.

*M. Kleiber, M. Bode, R. Ravlic, N. Tezuka, and R. Wiesendanger, J. Magn. Magn. Mater. **240** 64 (2002)*

Spin-Polarized Scanning Tunneling Microscopy with Antiferromagnetic Probe Tips.

A. Kubetzka, M. Bode, O. Pietzsch, and R. Wiesendanger, Phys. Rev. Lett. **88** 057201 (2002)

Direct Observation of Internal Spin-Structure of Magnetic Vortex Cores.

A. Wachowiak, J. Wiebe, M. Bode, O. Pietzsch, M. Morgenstern, and R. Wiesendanger, Science **298** 577 (2002)

Atomic-scale magnetic domain walls in quasi-one-dimensional Fe nanostripes.

M. Pratzer, H. J. Elmers, M. Bode, O. Pietzsch, A. Kubetzka, and R. Wiesendanger, Phys. Rev. Lett. **87** 127201 (2001)

Observation of Magnetic Hysteresis at the Nano-Scale by Spin Polarized Scanning Tunneling Spectroscopy.

O. Pietzsch, A. Kubetzka, M. Bode, and R. Wiesendanger, Science **292** 2053 (2001)

Magnetism of nanoscale Fe islands studied by spin-polarized scanning tunneling spectroscopy.

A. Kubetzka, O. Pietzsch, M. Bode, and R. Wiesendanger, Phys. Rev. B **63** 140407 (2001)

Spin-polarized scanning tunneling spectroscopy on Fe-nanowires.

M. Bode, O. Pietzsch, A. Kubetzka, and R. Wiesendanger, Appl. Phys. A **72** 149 (2001)

Experimental Evidence for Intra-Atomic Non-Collinear Magnetism at Thin Film Probe Tips.

M. Bode, O. Pietzsch, A. Kubetzka, S. Heinze, and R. Wiesendanger, Phys. Rev. Lett. **86** 2142 (2001)

Spin-dependent tunneling effects on magnetic nanostructures

M. Getzlaff, M. Bode, A. Kubetzka, O. Pietzsch, and R. Wiesendanger, Chin. Phys. **10** S186 (2001)

Imaging Magnetic Nanostructures by Spin-Polarized Scanning Tunneling Spectroscopy

M. Bode, O. Pietzsch, A. Kubetzka, and R. Wiesendanger, J. Electr. Spectr. Relat. Phenom. **114** 1055 (2001)

Topology-induced spin frustrations at the Cr(001) surface studied by spin-polarized scanning tunneling spectroscopy.

M. Kleiber, M. Bode, R. Ravlic, and R. Wiesendanger, Phys. Rev. Lett. **85** 4606 (2000)

Lattice relaxation of Gd on W(110)

S.A.Nepijko, M.Getzlaff, R.Pascal, Ch.Zarnitz, M.Bode and R.Wiesendanger, Surf. Sci. **466** 89 (2000)

Chalcogen adsorption and surface magnetism.

M. Getzlaff, C. Westphal, J. Bansmann, and G. Schönhense, J. Electr. Spectr. Relat. Phen., J. Electr. Spectr. Relat. Phenom. **107** 293 (2000)

Real-Space Imaging of Two-Dimensional Antiferromagnetism on the Atomic Scale.

S. Heinze, M. Bode, A. Kubetzka, O. Pietzsch, X. Nie, S. Blügel, and R. Wiesendanger, Science **288** 1805 (2000)

Epitaxial cobalt films on W(110) an experimental and theoretical photoemission study with polarized synchrotron radiation.

J. Bansmann, L. Lu, M. Getzlaff, M. Fluchtmann, and J. Braun, Surf. Sci. **454** 686 (2000)

Real-Space Observation of Dipolar Antiferromagnetism in Magnetic Nanowires by Spin-Polarized Scanning Tunneling Spectroscopy.

O. Pietzsch, A. Kubetzka, M. Bode, and R. Wiesendanger, Phys. Rev. Lett. **84** 5212 (2000)

H-induced plastic deformation of Gd thin films studied by STM.

A. Pundt, M. Getzlaff, M. Bode, R. Kirchheim, and R. Wiesendanger, Phys. Rev. B **61** 9964 (2000)

A Low-Temperature UHV Scanning Tunneling Microscope with a Split-Coil Magnet and a Rotary Motion Stepper Motor for High Spatial Resolution Studies of Surface Magnetism.

O. Pietzsch, A. Kubetzka, D. Haude, M. Bode, and R. Wiesendanger, Rev. Sci. Instr. **71** 424 (2000)

STM Study of Hydrogen on and in Gadolinium Films.

M. Getzlaff and R. Wiesendanger, European Microscopy and Analysis **68** 7 (2000)

Hydrogen induced plastic deformation of thin films.

A. Pundt, U. Laudahn, U. v. Hülsen, U. Geyer, T. Wagner, M. Getzlaff, M. Bode, R. Wiesendanger, and R. Kirchheim, Mat. Res. Soc. Symp. Proc. **594** 75 (1999)

GdFe₂ alloy formation studied on the atomic scale by scanning tunneling microscopy

R. Pascal, M. Getzlaff, H. Tödter, M. Bode, and R. Wiesendanger, Phys. Rev. B **60** 16109 (1999)

Recent advances in spin-polarized scanning tunneling spectroscopy for imaging of magnetic domains

*R. Wiesendanger, M. Bode, and M. Getzlaff, J. Magn. Soc. Jpn. **23** 195 (1999)*

Temperature-dependent exchange splitting of a surface state on a local-moment magnet: Tb(0001)

*M. Bode, M. Getzlaff, A. Kubetzka, R. Pascal, O. Pietzsch, and R. Wiesendanger, Phys. Rev. Lett. **83** 3017 (1999)*

Growth of thin Mn-films on W(110) studied by means of in-situ scanning tunneling microscopy

*M. Bode, M. Hennefarth, D. Haude, M. Getzlaff, and R. Wiesendanger, Surf. Sci. **432** 8 (1999)*

Vacuum-tunneling magnetoresistance: the role of spin-polarized surface states

*R. Wiesendanger, M. Bode, and M. Getzlaff, Appl. Phys. Lett. **75** 124 (1999)*

Quantitative aspects of spin-polarized scanning tunneling spectroscopy of Gd(0001)

*M. Bode, M. Getzlaff, and R. Wiesendanger, J. Vac. Sci. & Tech. A **17** 2228 (1999)*

Coadsorption of H and CO on Gd (0001)

*M. Getzlaff, M. Bode, and R. Wiesendanger, Appl. Surf. Sci. **142** 428 (1999)*

GdFe2 alloy formation observed by STM

*M. Getzlaff, R. Pascal, H. Tödter, M. Bode, and R. Wiesendanger, Appl. Surf. Sci. **142** 543 (1999)*

New insight into the surface magnetic properties of Gd(0001)

*M. Getzlaff, M. Bode, S. Heinze, and R. Wiesendanger, Appl. Surf. Sci. **142** 558 (1999)*

The adsorption process of hydrogen on Gd (0001)

*M. Getzlaff, M. Bode, R. Pascal, and R. Wiesendanger, Appl. Surf. Sci. **142** 63 (1999)*

Adsorbates on Gd (0001): A combined scanning tunneling microscopy and photoemission study

*M. Getzlaff, M. Bode, R. Pascal, and R. Wiesendanger, Phys. Rev. B **59** 8195 (1999)*

Oxygen on Fe(110): Magnetic properties of the adsorbate system

*M. Getzlaff, J. Bansmann, and G. Schönhense, J. Magn. Magn. Mater. **192** 458 (1999)*

Spin polarized vacuum tunneling: correlation of electronic and magnetic properties on the nanometer scale

*M. Getzlaff, M. Bode, and R. Wiesendanger, Surf. Rev. Lett. **6** 591 (1999)*

Preparation of highly ordered GdFe2 alloys

*M. Getzlaff, R. Pascal, H. Tödter, M. Bode, and R. Wiesendanger, Surf. Rev. Lett. **6** 741 (1999)*

Prediction of bias-voltage dependent corrugation reversal for STM images of bcc-(110)-surfaces: W(110), Ta(110) and Fe(110)

*S. Heinze, S. Blügel, R. Pascal, M. Bode, and R. Wiesendanger, Phys. Rev. B **58** 16432 (1998)*

Spin-Polarized Vacuum Tunneling into the Exchange-split Surface State of Gd(0001)

*M. Bode, M. Getzlaff, and R. Wiesendanger, Phys. Rev. Lett. **81** 4256 (1998)*

Determination of radial matrix elements and phase shifts in the photoemission process using a rotatable electric field vector

*M. Getzlaff, M. Bode, and R. Wiesendanger, Phys. Rev. B **58** 9681 (1998)*

Hydrogen adsorption on Gd(0001)

*M. Getzlaff, M. Bode, and R. Wiesendanger, Surf. Sci. **410** 189 (1998)*

Local electronic properties in the presence of internal and external magnetic fields studied by variable-temperature scanning tunneling spectroscopy

*R. Wiesendanger, M. Bode, R. Dombrowski, M. Getzlaff, M. Morgenstern, and C. Wittneven, Jpn. J. Appl. Phys. **37** 3769 (1998)*

Temperature-dependent exchange-splitting of the magnetic Gd(0001) surface state

*M. Getzlaff, M. Bode, S. Heinze, R. Pascal, and R. Wiesendanger, J. Magn. Magn. Mater. **184** 155 (1998)*

Electronic structure of Gd and Tb on W(110) in the submonolayer coverage regime studied by STM and STS

*R. Pascal, Ch. Zarnitz, H. Tödter, M. Bode, M. Getzlaff, and R. Wiesendanger, Appl. Phys. A **66** 1121 (1998)*

Magnetic exchange splitting of the Gd(0001) surface state studied by variable-temperature scanning tunneling spectroscopy

*M. Bode, M. Getzlaff, S. Heinze, R. Pascal, and R. Wiesendanger, Appl. Phys. A **66** 121 (1998)*

Surface state of Gd(0001) films on W(110): Scanning tunneling microscopy study

*M. Bode, R. Pascal, M. Getzlaff, and R. Wiesendanger, Acta Phys. Pol. **93** 273 (1998)*

Recent advances in spin-polarized scanning tunneling microscopy for imaging of magnetic domains

R. Wiesendanger, M. Bode, and M. Getzlaff, J. Magn. Soc. Jpn. (1998)

Recent developments in scanning probe microscopy and spectroscopy for imaging of magnetic domains

M. Getzlaff, M. Bode, A. Wadas, and R. Wiesendanger, Proc. ICEM-14, Cancun (Mexico), Electron Microscopy (1998)

Adsorption of hydrogen on structured gadolinium

*M. Getzlaff, M. Bode, R. Pascal, and R. Wiesendanger, Proc. ICEM14, Cancun (Mexico), Electron Microscopy **3** 171 (1998)*

Visualization of heterogeneously catalytic processes

*M. Getzlaff, M. Bode, and R. Wiesendanger, Proc. ICEM14, Cancun (Mexico), Electron Microscopy **3** 173 (1998)*

Surface electronic structure of Gd(0001) films on W(110)

*R. Pascal, C. Zarnitz, M. Bode, M. Getzlaff, and R. Wiesendanger, Appl. Phys. A **65** 603 (1997)*

Atomic and local electronic structure of Gd thin films studied by STM and STS

*R. Pascal, Ch. Zarnitz, M. Bode, and R. Wiesendanger, Phys. Rev. B **56** 3636 (1997)*

STM-study of the growth of Gd/W(110) at submonolayer coverages

*R. Pascal, C. Zarnitz, M. Bode, and R. Wiesendanger, Surf. Sci. **385** L990 (1997)*

Fabrication of atomic gratings based on self-organization of adsorbates with repulsive interaction

*R. Pascal, Ch. Zarnitz, M. Bode, and R. Wiesendanger, Appl. Phys. A **65** 81 (1997)*

Magnetic nanostructures studied by scanning probe microscopy and spectroscopy

*R. Wiesendanger, M. Bode, M. Kleiber, M. Löhdorf, R. Pascal, A. Wadas, and D. Weiss, J. Vac. Sci. & Tech. B **15** 1330 (1997)*

Scanning tunneling spectroscopy of Fe/W(110) using iron covered probe tips

*M. Bode, R. Pascal, and R. Wiesendanger, J. Vac. Sci. & Tech. A **15** 1285 (1997)*

An UHV-STM for in-situ studies of thin film growth.

*Ch. Witt, U. Mick, M. Bode, and R. Wiesendanger, Rev. Sci. Instr. **68** 1455 (1997)*

Nanostructural and local electronic properties of Fe/W(110) correlated by scanning tunneling spectroscopy

*M. Bode, R. Pascal, and R. Wiesendanger, Phys. Rev. B **54** 8385 (1996)*

Fabrication of atomic wires by self-organization

*Ch. Witt, M. Bode, and R. Wiesendanger, Appl. Phys. A **63** 303 (1996)*

Issues of atomic-resolution structure and chemical analysis by scanning probe microscopy and spectroscopy

*M. Bode, R. Pascal, W. Allers, U.D. Schwarz and R. Wiesendanger, J. Vac. Sci. & Tech. A **14** 1161 (1996)*

Chemical-specific imaging of multicomponent metal surfaces on the nanometer scale by scanning tunneling spectroscopy

*M. Bode, R. Pascal, and R. Wiesendanger, Appl. Phys. A **62** 571 (1996)*

Tunnelspektroskopie vom Einzelatom zum Festkörper

*M. Bode, R. Pascal, and R. Wiesendanger, Phys. Bl. **52** 551 (1996)*

Local and Scanning Tunneling Spectroscopy of 0D - 3D Metallic Nanostructures

*M. Bode, R. Pascal, and R. Wiesendanger, Proc. 1st Int. Symp. Advanced Physical Fields, ed. K. Yoshihara, National Research Inst. for Metals **1** (1996)*

Micromagnetic properties and magnetization switching of single domain Co dots studied by magnetic force microscopy

*M. Löhdorf, A. Wadas, G. Lütjering, D. Weiss, and R. Wiesendanger, Z. Phys. B. **101** 1 (1996)*

Distance-dependent STM study of the lateral resolution on metal surfaces

*M. Bode, R. Pascal, and R. Wiesendanger, Z. Phys. B. **101** 103 (1996)*

Imaging and tunneling spectroscopy of individual iron adsorbates at room temperature

*M. Bode, R. Pascal, and R. Wiesendanger, Z. Phys. B. **99** 143 (1996)*