Curriculum Vitae

Lars Diekhöner, lektor, ph.d.

Personal

Born 22.08.71, Danish citizen. Married, 3 children (born 2001, 2004 and 2008)

Address

Work: Aalborg Universitet
Institut for Materialer og Produktion
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Skjernvej 4A, DK-9220 Aalborg

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Education

Ph.D. Physics (Experimental Surface Science), Syddansk Universitet, Odense, *2000*.
Cand.scient. Physics/mathematics, Odense Universitet, *1998*.
B.Sc. Physics, Odense Universitet, *1994*.

Affiliations and positions

2005- : Lektor (Associate Professor), Aalborg Universitet, Institut for Fysik og Nanoteknologi

2001-2004: Post doc., Max-Planck-Institut für Festkörperforschung, Stuttgart, Germany (Prof. K. Kern)

June 2000 - July 2000, September 2000 - December 2000: Post doc. at Odense Universitet.

Oct.-Nov. 1999: Visited Prof. C. B. Mullins, The University of Texas at Austin, USA.

1996 - 2000: Graduate student at Odense Universitet, Fysisk Institut. (Prof. A.C. Luntz)

Feb. 1995 - June 1995: Exchange student at Norges Teknisk-Naturvitenskapelige Universitet, Trondheim, Norway. [Erasmus Fellowship]

1991 - 1995: Undergraduate student at Odense Universitet.

Research interests

Nano-, surface- and materials-science. In particular experimental studies of atoms, molecules and inorganic thin films on surfaces studied by Scanning Tunneling Microscopy and other surface science techniques. Topics of interests include electronic structure, correlated electron systems, magnetism, molecular self-assembly, chemistry and physics at surfaces. Materials science and technological applications.

Publications

40 papers in peer reviewed journals (of these: 10 as first-author, 7 in Physical Review Letters, 1 in Nature Physics).
h-index: 20, 1592 citations

Funding:

2006: “international Ph.D.-stipend” financed by FIST (DKK 1.760.000)
2006: “Rammebevilling” from Forskningsrådet for Natur og Univers (DKK 792.000)
2010: ”Apparaturbevilling” from ”Det Obelske Familiefond” (DKK 1.000.000)
2013: ”Apparaturbevilling” from ”Spar Nord Fonden” (DKK 121.200)
2014: host for ”individuelt post doc stipendium”, FTP-project: applicant Yinying Wei (DKK 2.500.000)
2020: Eurostars project, (DKK 1.700.000)
2020: part of ESS Fyrtårn: “Magnetisme og kvantematerialer” (DKK 1.600.000)

Teaching and supervision

Courses on all levels including Solid State Physics, Magnetic properties of nanostructures, Scanning Probe Microscopy, Surface Science, Electromagnetism, Thermodynamics and Mechanics.
Graduate and undergraduate project supervision.
Educated 2 Post Docs, 2 PhD students and 22 Master’s students in Aalborg.
Currently supervising 1 PhD-student

Administration

Research Group coordinator, Physics group, Department of Materials and Production, AAU
Member of the “Samarbejdsudvalg” of the department
Member of the Censor corps in Physics. Have acted as censor on all levels at universities in Denmark.

Publications

Papers in peer reviewed journals

[40] P.R. Whelan, D. De Fazio, I. Pasternak, J.D. Thomsen, S. Zelzer, M.O. Mikkelsen, T.J. Booth, L. Diekhöner, U. Sassi, D. Johnstone, P.A. Midgley, W. Strupinski, P.U. Jepsen, A.C. Ferrari and P. Bøggild
Mapping nanoscale carrier confinement in polycrystalline graphene by terahertz spectroscopy
Scientific Reports, **14**, 3163 (2024), link

[39] A. Ørsted, S.V. Salling and L. Diekhöner
Unraveling the electronic structure of cobalt oxide nanoislands on Au(111)
Physical Review B, **108**, 165424 (2023) link

[38] L. Diekhöner, C.S. Meyer and S. Eiskjær
The magnetic field strength and the force distance dependency of the magnetically controlled growing rods used for early onset scoliosis
Scientific Reports, **13**, 3045 (2023), link

[37] D. Batet, F.T. Zohra, S.B. Kristensen, S.J. Andreasen, and L. Diekhöner
Continuous Durability Study of a High Temperature Polymer Electrolyte Membrane Fuel Cell Stack
Applied Energy, **277**, 115588 (2020), link

[36] M. Pörtner , Y. Wei, A. Riss, K. Seufert, M. Garnica, J.V. Barth, A.P. Seitsonen, L. Diekhöner and W. Auwärter
Charge state control of F_{16}CoPc on h-BN on Cu(111)
Advanced Materials Interfaces, **7**, 2000080 (2020), link

- Cover: link

[35] M.P. Bahlke, P. Wahl, L. Diekhöner and C. Herrmann
$Co(CO)_n$/Cu(001): Towards understanding chemical control of the Kondo effect.
Journal of Applied Physics, **125**, 142910 (2019), link, preprint

[34] K.S. Svane, M.S. Baviloliaei, B. Hammer and L. Diekhöner
An extended chiral surface coordination network based on Ag_7-clusters.
Journal of Chemical Physics, 149, 164710 (2018), link, preprint
- Editors pick
- Covered in Physics Today: link

[33] M.S. Baviloliaei and L. Diekhöner
Molecular self-assembly at nanometer scale modulated surfaces: Trimesic acid on Ag(111), Cu(111) and Ag/Cu(111)
Physical Chemistry Chemical Physics, **16**, 11265 (2014), link,

[32] L. Vitali, P. Wahl, R. Ohmann, J. Bork, Y. Zhang, L. Diekhöner and K. Kern
Quantum transport through single atoms and molecules.
Physica Status Solidi B, **250**, 2437 (2013), link

[31] P. Wahl, L. Diekhöner, M.A. Schneider, F. Treubel, C.T. Lin and K. Kern
Local spectroscopy of the Kondo lattice $YbAl_3$: Seeing beyond the surface with scanning tunneling microscopy and spectroscopy.
Physical Review B, **84**, 245131 (2011), link

[30] J. Bork, Y. Zhang, L. Diekhöner, L. Borda, P. Simon, J. Kroha, P. Wahl and K. Kern
A tunable two-impurity Kondo system in an atomic point contact
Nature Physics, **7**, 901 (2011), link, preprint

[29] J. Bork, L. Diekhöner, Z. Li and J. Onsgaard
Electronic structure and ordering of multilayers of Co and Ag on Cu(111) investigated by photoelectron spectroscopy
Surface Science, **604**, 1536 (2010) pdf

[28] J. Bork, J. Onsgaard and L. Diekhöner
Growth and structure of Ag on bilayer Co nanoislands on Cu(111)
Journal of Physics: Condensed Matter, **22**, 135005 (2010) pdf

[27] J. Bork, P. Wahl, L. Diekhöner and K. Kern
Potential Energy Landscape of Metallic Moire Patterns
New Journal of Physics, **11,** 113051 (2009) pdf

[26] P. Wahl, A.P. Seitsonen, L. Diekhöner, M. A. Schneider and K. Kern
Kondo-effect of Substitutional Cobalt Impurities at Copper Surfaces
New Journal of Physics, **11**, 113015 (2009) pdf

[25] P. Wahl, L. Diekhöner, M. A. Schneider and K. Kern
Background Removal in Scanning Tunneling Spectroscopy of single Atoms and Molecules on Metal Surfaces
Review of Scientific Instruments, **79**, 043104 (2008) pdf

[24] N.N. Negulyaev, V.S. Stepanyuk, P. Bruno, L. Diekhöner, P. Wahl and K. Kern
Bilayer growth of nanoscale Co islands on Cu(111)
Physical Review B, **77**, 125437 (2008) pdf

[23] A. Silva, K. Pedersen, L. Diekhöner, P. Morgen, and Z. Li
Ordered Au(111) layers on Si(111)
Journal of Vacuum Science and Technology, **25**, 908-911 (2007) pdf

[22] P. Wahl, P. Simon, L. Diekhöner, V.S. Stepanyuk, P. Bruno, M. A. Schneider and K. Kern
Exchange interaction between single magnetic adatoms
Physical Review Letters, **98**, 056601 (2007) pdf
- selected for the Virtual Journal of Nanoscale Science & Technology; **15**, issue 6 (2007)

[21] M.A. Schneider, P. Wahl, L. Vitali, L. Diekhöner, R. Vogelgesang, K. Kern
Local measurement of hot-electron phase-coherence at metal surfaces
Applied Physics A; **88**, 443-447 (2007) pdf

[20] P.Wahl, L. Diekhöner, G. Wittich, L. Vitali, M.A. Schneider, and K. Kern
Kondo effect of molecular complexes at surfaces: Ligand control of the local spin coupling
Physical Review Letters, **95** 166601 (2005) pdf

[19] M.A. Schneider, P.Wahl, L. Diekhöner, L. Vitali, G. Wittich and K. Kern
Kondo effect of Co adatoms on Ag monolayers on noble metal surfaces
Japanese Journal of Applied Physics, **44**, 5328 (2005) pdf

[18] M.A. Schneider, L. Vitali, P.Wahl, N. Knorr, L. Diekhöner, G. Wittich, M. Vogelgesang and K. Kern
Kondo state of Co Kondo impurities at noble metal surfaces
Applied Physics A, **80**, 937 (2005). pdf

[17] P. Wahl, L. Diekhöner, M.A. Schneider, L. Vitali, G. Wittich and K. Kern
Kondo temperature of magnetic impurities at surfaces
Physical Review Letters, **93** 176603 (2004) pdf

[16] S. Ahlert, L. Diekhöner, R. Sordan, K. Kern and M. Jansen
Surface step structure of $Ag_{13}OsO_6$, experimental evidence for Ag_{13} cluster building blocks
Chemical Communications 462 (2004) pdf

[15] M. Roth, M. Weinelt, Th. Fauster, P.Wahl, M. A. Schneider, L. Diekhöner and K. Kern
Scattering of image-potential-state electrons by steps on Cu(001)
Applied Physics A; **78**, 155-159 (2004) pdf

[14] P. Wahl, M.A. Schneider, L. Diekhöner, R. Vogelgesang and K. Kern
Quantum coherence of image potential states
Physical Review Letters; **91** 106802 (2003) pdf

[13] L. Diekhöner, M.A. Schneider, A.N. Baranov, V.S. Stepanyuk, P. Bruno and K. Kern
Surface states of cobalt nanoislands on Cu(111)
*Physical Review Letters; **90**, 236801 (2003) pdf*
- selected for the Virtual Journal of Nanoscale Science & Technology; **7**, issue 25 (2003)

[12] H. Mortensen, E. Jensen, L. Diekhöner, A. Baurichter, A.C. Luntz and V.V. Petrunin
State resolved inelastic scattering of N_2 from Ru(0001)
*Journal of Chemical Physic; **118**, 11200-11209 (2003) pdf*

[11] L. Diekhöner, L. Hornekær, H. Mortensen, E. Jensen, A. Baurichter, V. V. Petrunin and A.C. Luntz
Evidence for strong non-adiabatic coupling in N_2 associative desorption from and dissociative adsorption on Ru(0001)

Journal of Chemical Physics; **117**, 5018-5030 (2002) pdf

[10] N. Knorr, M.A. Schneider, L. Diekhöner, P. Wahl and K. Kern
Kondo effect of single Co atoms on Cu surfaces
Physical Review Letters; **88**, 968041 (2002) pdf

[9] H. Mortensen, L. Diekhöner, A. Baurichter and A.C. Luntz
CH_4 dissociation on Ru(0001): a view from both sides of the barrier
Journal of Chemical Physics; **116**, 5781-5794 (2002) pdf

[8] L. Diekhöner, H. Mortensen, A. Baurichter, E. Jensen, V. V. Petrunin and A.C. Luntz
N_2 dissociative adsorption on Ru(0001): the role of energy loss
Journal of Chemical Physics; **115**, 9028-9035 (2001) pdf

[7] L. Diekhöner, H. Mortensen, A. Baurichter and A.C. Luntz
Laser Assisted Associative Desorption of N_2 and CO from Ru(0001)
Journal of Chemical Physics; **115**, 3356-3373 (2001) pdf

[6] L. Diekhöner, H. Mortensen, C. Åkerlund, A. Baurichter and A.C. Luntz
Dynamic displacement of N_2 from Ru(0001) by incident D and H atoms
Journal of Chemical Physics; **114**, 4215-4220 (2001) pdf

[5] H. Mortensen, L. Diekhöner, A. Baurichter, E. Jensen and A.C. Luntz
Dynamics of ammonia decomposition on Ru(0001)
Journal of Chemical Physics; **113**, 6882-6887 (2000) pdf

[4] L. Diekhöner, H. Mortensen, A. Baurichter and A.C. Luntz
Coverage dependence of activation barriers: Nitrogen on Ru(0001)
Journal of Vacuum Science and Technology A; **18**, 1509-1513 (2000) pdf

[3] L. Diekhöner, H. Mortensen, A. Baurichter, A.C. Luntz and B. Hammer
Dynamics of high barrier surface reactions: Laser Assisted Associative Desorption of N_2 from Ru(0001)
Physical Review Letters; **84**, 4906-4909 (2000) pdf

[2] L. Diekhöner, A. Baurichter, H. Mortensen and A.C. Luntz
Observation of metastable atomic nitrogen adsorbed on Ru(0001)
Journal of Chemical Physics; **112**, 2507-2515 (2000) pdf

[1] L. Diekhöner, D.A. Butler, A. Baurichter and A.C. Luntz
Parallel pathways in methanol decomposition on Pt(111)
Surface Science; **409**, 384-391 (1998) pdf

Conference Proceedings

L. Diekhöner, M.A. Schneider, P. Wahl, A.N. Baranov, V.S. Stepanyuk, P. Bruno and K. Kern
Spin polarized surface states of cobalt nanoislands on Cu(111) [**Invited paper**]
AIP Conference Proc. 696, 53 (2003) [12th International Conference on Scanning Tunneling Microscopy/Spectroscopy and Related Techniques] pdf

Ph.D. Thesis

Dynamics of High Barrier Gas-surface Reactions studied by Laser Assisted Associative Desorption

SDU-Odense Universitet, Fysisk Institut, (2000) pdf

Lecture notes

”Electric, optical and magnetic properties of nanostructures”, 140 pp. (with Thomas Garm Pedersen)

Invited talks and seminars

“Dynamics of high barrier surface reactions: Laser Assisted Associative Desorption of N_2 from Ru(0001)”
Colloquium, Physics Department, Odense University, Denmark, 14 December 1999.

“Dynamics of high barrier gas-surface reactions: Laser Assisted Associative Desorption of N_2 from Ru(0001)”
Seminar, Institute of Physics and Astronomy and CAMP, University of Aarhus, Denmark, 23 August 2000.

“Dynamics of high barrier gas-surface reactions studied by LAAD”
Seminar, Max-Planck-Institut für Festkörperforschung, Nanoscale Science Dep., 25 October 2000

“Spin-polarized surface states of Cobalt nanoislands on Cu(111)”
12th International Conference on Scanning Tunneling Microscopy/Spectroscopy and Related Techniques (STM’03), Eindhoven, Holland, 21-25 July 2003

“A close view of electrons at surfaces: Dynamics, magnetism and correlation effects”
Colloquium, Physics Department, University of Southern Denmark, 14 September 2004.

“Electron correlation at magnetic atoms and molecules on metal surface”
The 12’th International Colloquium on Scanning Probe Microscopy (ICSPM 12), Atagawa Hights, Shizuoko, Japan, 9-11 December 2004

“Magnetic nanostructures and single atoms: What a couple!”
Seminar, Max-Planck-Institut für Mikrostrukturphysik, Halle, Germany, 26 October 2005

“A close view of electrons at surfaces: Electronic states, magnetism and correlation effects”
Seminar, Center for Individual Nanoparticle Functionality, Physics Department, Technical University of Denmark, 3. November 2006.

“Magnetic exchange coupling between single Cobolt atoms”
Colloquium, Department of Physics and Chemistry, University of Southern Denmark, 29. May 2007.

“Atomistic description of nanoisland growth: Co on single crystal Cu surfaces”
IUTAM-Symposium on ”Modelling Nanomaterials and Nanosystems”, Aalborg, Denmark, May 2008.

“Magnetic nanostructures and single atoms on metal surfaces”
Seminar, NanoSyd, University of Southern Denmark, April 2009

“Magnetic nanostructures and single atoms on metal surfaces”
Seminar, iNANO, Aarhus University, 23. September 2010

“Kondo physics and magnetic interactions of cobalt atoms at surfaces”
Seminar, Hong Kong University of Technology and Science, 28. October 2011

“Kondo physics and magnetic interactions of cobalt atoms at surfaces”
Seminar, Max-Planck-Institut für Mikrostrukturphysik, Halle, Germany, 27. Januar 2012

“Molecular self-assembly on nanoscale modulated metal surfaces“
Festkörperkolloquium der Fakultät für Physik, TU-München, 11. June 2015

“Molecular interactions at single crystal metal surfaces“
Seminar, SDU-Sønderborg, 19. August 2020

”Exploring nanoscale materials at surfaces”
Seminar, Physics Department, Technical University of Denmark, 8. December 2023.

Popular accounts

”Nanovidenskab og –teknologi“
Foredrag for Rotary-klubben, Nørresundby, 23. November 2005

”Nanovidenskab og –teknologi“
Foredrag for Rotary-klubben, Aalborg Østre, 6. December 2005

“Nanoteknologi: Fysik på nanoskala”
Folkeuniversitetet Aalborg, 22. March 2007

“Nanoteknologi: Fysik på nanoskala”
Folkeuniversitetet Aalborg, 23. October 2007

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