

Oliver Bünermann

PERSONAL INFORMATION

Name: Bünermann, Oliver
Nationality: German
Date of birth: 14 June 1978
Email: oliver.buenermann@chemie.uni-goettingen.de
Family status: married
Children: 3



CURRENT POSITION

2010– Group Leader, Atom-Surface Scattering Dynamics, Institute for Physical Chemistry, Georg-August-Universität Göttingen, Germany
Web site: <http://uni-goettingen.de/en/atom-surface+scattering+dynamics/212020.html>

EDUCATION AND PROFESSIONAL PREPARATION

2021 Habilitation in Physical Chemistry, Georg-August Universität Göttingen, Germany
2009-2010 Post-doctoral researcher, Department of Chemistry, University of California, Berkeley, USA
2006-2009 Post-doctoral researcher, Faculty of Physics, University of Freiburg, Germany
2006 Ph.D. Faculty of Physics, University of Bielefeld, Germany
2003 Diploma, Faculty of Physics, University of Bielefeld, Germany

FELLOWSHIPS AND AWARDS

2009 Forschungsstipendium, DFG
2008 Dissertationspreis 2007 der Westfälisch Lippischen Universitätsgesellschaft (Ph.D. thesis award)

TEACHING ACTIVITIES

2010– Lectures in physical chemistry, Institute for Physical Chemistry, Georg-August-Universität Göttingen, Germany

INSTITUTIONAL RESPONSIBILITIES

2015- Executive Director of the International Center for Advanced Studies of Energy Conversion (ICASEC), Georg-August-Universität Göttingen, Germany
2021- Local chairman OV GDCh Göttingen

MEMBERSHIPS OF SCIENTIFIC SOCIETIES

Member of Deutsche Bunsen-Gesellschaft für physikalische Chemie
Member of Deutsche Physikalische Gesellschaft
Member of Gesellschaft Deutscher Chemiker

RESEARCH MENTORS

- Prof. Dr. Frank Stienkemeier, Bielefeld and Freiburg, Germany
- Prof. Dr. Daniel M. Neumark, Berkeley, USA
- Prof. Dr. Alec M. Wodtke, Göttingen, Germany

INVITED AND PEER-REVIEWED SCIENTIFIC PRESENTATIONS

1. 2nd International Workshop on Scattering of Atoms and Molecules from Surfaces, 2013, *Inelastic Hydrogen Atom Scattering: A new tool to investigate energy conversion processes at surfaces.*
2. XIXth Symposium on Atomic, Cluster and Surface Physics, 2014, *Inelastic Hydrogen Atom Scattering: A new tool to investigate energy conversion processes at surfaces.*
3. Gordon Research Conference on Dynamics at Surfaces, 2015, *Inelastic Hydrogen Atom Scattering from Metals: Importance of Electron-Hole-Pair Excitations.*

4. 20th Symposium on Atomic, Cluster and Surface Physics, 2016, *Inelastic Hydrogen Atom Scattering: Role of Electron-Hole Pair Excitations*.
5. Bunsen Tagung 2016, *Inelastic Hydrogen Atom Scattering: Role of Electron-Hole Pair Excitations*.
6. 3rd International Conference on Scattering of Atoms and Molecules from Surfaces, 2016, *Inelasticity in H atom scattering from surfaces*.
7. International Conference on Molecular Energy transfer in Complex Systems, 2017, *H atom scattering from surfaces*.
8. DPG Frühjahrstagung der Sektion Kondensierte Materie, 2018, *Hydrogen Atom Adsorption on Surfaces studied in Scattering Experiments*.
9. Symposio Max Planck / Colombia Fronteras de la Ciencia, 2019, *Dynamics and Surfaces - Hydrogen Atom Adsorption on Surfaces Studied in Scattering Experiments*.
10. Bunsen Tagung 2023, *Surface electronic structure of semiconductors probed by H atom scattering*.

RESEARCH PUBLICATIONS [1-38] ORCID: 0000-0001-9837-6548

1. Krüger, K., N. Hertl, A.M. Wodtke, and O. Bünermann, *Temperature dependence of the Ge(111) surface electronic structure probed by inelastic H atom scattering*. *Physical Review Materials* **8**, 034603 (2024), DOI: 10.1103/PhysRevMaterials.8.034603.
2. Liebetau, M., Y. Dorenkamp, O. Bünermann, and J. Behler, *Hydrogen Atom Scattering at the Al₂O₃ (0001) Surface: A Combined Experimental and Theoretical Study*. *Physical Chemistry Chemical Physics* **26**, 1696-1708 (2024), DOI: 10.1039/d3cp04729f.
3. Krüger, K., Y. Wang, L. Zhu, B. Jiang, H. Guo, A.M. Wodtke, and O. Bünermann, *Isotope effect suggests site-specific nonadiabaticity on Ge(111)c(2x8)*. *Natural Sciences* **4**, e20230019 (2024), DOI: 10.1002/ntls.20230019.
4. Bünermann, O., *Surface electronic Structure of Semiconductors Probed by H Atom Scattering*. *Bunsen-Magazin* **4/2023**, 122-124 (2023).
5. Krüger, K., Y. Wang, S. Tödter, F. Debbeler, A. Matveenko, N. Hertl, X. Zhou, B. Jiang, H. Guo, A.M. Wodtke, and O. Bünermann, *Hydrogen atom collisions with a semiconductor efficiently promote electrons to the conduction band*. *Nature Chemistry* **15**, 326-331 (2022), DOI: 10.1038/s41557-022-01085-x.
6. Hertl, N., K. Kruger, and O. Bünermann, *Electronically Nonadiabatic H Atom Scattering from Low Miller Index Surfaces of Silver*. *Langmuir* **38**, 14162-14171 (2022), DOI: 10.1021/acs.langmuir.2c02140.
7. Lecroart, L., N. Hertl, Y. Dorenkamp, H. Jiang, T.N. Kitsopoulos, A. Kandratsenka, O. Bünermann, and A.M. Wodtke, *Adsorbate modification of electronic nonadiabaticity: H atom scattering from p(2 × 2) O on Pt(111)*. *Journal of Chemical Physics* **155**, 034702 (2021), DOI: 10.1063/5.0058789.
8. Hertl, N., A. Kandratsenka, O. Bünermann, and A.M. Wodtke, *Multibounce and Subsurface Scattering of H Atoms Colliding with a van der Waals Solid*. *Journal of Physical Chemistry A* **125**, 5745-5752 (2021), DOI: 10.1021/acs.jpca.1c03433.
9. Bünermann, O., A. Kandratsenka, and A.M. Wodtke, *Inelastic Scattering of H Atoms from Surfaces*. *Journal of Physical Chemistry A* **125**, 3059-3076 (2021), DOI: 10.1021/acs.jpca.1c00361.
10. Jiang, H.Y., X. Tao, M. Kammler, F. Ding, A.M. Wodtke, A. Kandratsenka, T.F. Miller, and O. Bünermann, *Small nuclear quantum effects in scattering of H and D from graphene*. *Journal of Physical Chemistry Letters* **12**, 1991-1996 (2021), DOI: 10.1021/acs.jpcl.0c02933.
11. Wille, S., H. Jiang, O. Bünermann, A.M. Wodtke, J. Behler, and A. Kandratsenka, *An experimentally validated neural-network potential energy surface for H-atom on free-standing graphene in full dimensionality*. *Physical Chemistry Chemical Physics* **22**, 26113-26120 (2020), DOI: 10.1039/d0cp03462b

12. Jiang, H.Y., M. Kammler, F. Ding, Y. Dorenkamp, F.R. Manby, A.M. Wodtke, T.F. Miller, A. Kandratsenka, and O. Bünermann, *Imaging covalent bond formation by H atom scattering from graphene*. *Science* **364**, 379–382 (2019), DOI: 10.1126/science.aaw6378.
13. Jiang, H.Y., Y. Dorenkamp, K. Krüger, and O. Bünermann, *Inelastic H and D atom scattering from Au(111) as benchmark for theory*. *Journal of Chemical Physics* **150**, 184704 (2019), DOI: 10.1063/1.5094693.
14. Dorenkamp, Y., C. Volkmann, V. Roddatis, S. Schneider, A.M. Wodtke, and O. Bünermann, *Inelastic H Atom Scattering from Ultrathin Aluminum Oxide Films Grown by Atomic Layer Deposition on Pt(111)*. *Journal of Physical Chemistry C* **122**, 10096-10102 (2018), DOI: 10.1021/acs.jpcc.8b02692.
15. Kandratsenka, A., H.Y. Jiang, Y. Dorenkamp, S.M. Janke, M. Kammler, A.M. Wodtke, and O. Bünermann, *Unified description of H-atom-induced chemicurrents and inelastic scattering*. *Proceedings of the National Academy of Sciences of the United States of America* **115**, 680-684 (2018), DOI: 10.1073/pnas.1710587115.
16. Dorenkamp, Y., H.Y. Jiang, H. Köckert, N. Hertl, M. Kammler, S.M. Janke, A. Kandratsenka, A.M. Wodtke, and O. Bünermann, *Hydrogen collisions with transition metal surfaces: Universal electronically nonadiabatic adsorption*. *Journal of Chemical Physics* **148**, 034706 (2018), DOI: 10.1063/1.5008982.
17. Bünermann, O., H.Y. Jiang, Y. Dorenkamp, D.J. Auerbach, and A.M. Wodtke, *An ultrahigh vacuum apparatus for H atom scattering from surfaces*. *Review of Scientific Instruments* **89**, 094101 (2018), DOI: 10.1063/1.5047674.
18. Bünermann, O., H.Y. Jiang, Y. Dorenkamp, A. Kandratsenka, S.M. Janke, D.J. Auerbach, and A.M. Wodtke, *Electron-hole pair excitation determines the mechanism of hydrogen atom adsorption*. *Science* **350**, 1346-1349 (2015), DOI: 10.1126/science.aad4972.
19. Dvorak, M., M. Mueller, O. Bünermann, and F. Stienkemeier, *Size dependent transition to solid hydrogen and argon clusters probed via spectroscopy of PTCDA embedded in helium nanodroplets*. *Journal of Chemical Physics* **140**, 144301 (2014), DOI: 10.1063/1.4870395.
20. Kaufmann, S., D. Schwarzer, C. Reichardt, A.M. Wodtke, and O. Bünermann, *Generation of ultra-short hydrogen atom pulses by bunch-compression photolysis*. *Nature Communications* **5**, 5373 (2014), DOI: 10.1038/ncomms6373.
21. Dvorak, M., M. Müller, T. Knoblauch, O. Bünermann, A. Rydlo, S. Minniberger, W. Harbich, and F. Stienkemeier, *Spectroscopy of 3, 4, 9, 10-perylenetetracarboxylic dianhydride (PTCDA) attached to rare gas samples: Clusters vs. bulk matrices. I. Absorption spectroscopy*. *Journal of Chemical Physics* **137**, 164301 (2012), DOI: 10.1063/1.4759443.
22. Dvorak, M., M. Müller, T. Knoblauch, O. Bünermann, A. Rydlo, S. Minniberger, W. Harbich, and F. Stienkemeier, *Spectroscopy of 3, 4, 9, 10-perylenetetracarboxylic dianhydride (PTCDA) attached to rare gas samples: Clusters vs. bulk matrices. II. Fluorescence emission spectroscopy*. *Journal of Chemical Physics* **137**, 164302 (2012), DOI: 10.1063/1.4759445.
23. Bünermann, O., O. Kornilov, S.R. Leone, D.M. Neumark, and O. Gessner, *Femtosecond Extreme Ultraviolet Ion Imaging of Ultrafast Dynamics in Electronically Excited Helium Nanodroplets*. *IEEE Journal of Selected Topics in Quantum Electronics* **18**, 308-317 (2012), DOI: 10.1109/Jstqe.2011.2109054.
24. Bünermann, O., O. Kornilov, D.J. Haxton, S.R. Leone, D.M. Neumark, and O. Gessner, *Ultrafast probing of ejection dynamics of Rydberg atoms and molecular fragments from electronically excited helium nanodroplets*. *Journal of Chemical Physics* **137**, 214302 (2012), DOI: 10.1063/1.4768422.
25. Kornilov, O., O. Bünermann, D.J. Haxton, S.R. Leone, D.M. Neumark, and O. Gessner, *Femtosecond Photoelectron Imaging of Transient Electronic States and Rydberg Atom Emission from Electronically Excited He Droplets*. *Journal of Physical Chemistry A* **115**, 7891-7900 (2011), DOI: 10.1021/Jp2004216.

26. Roden, J., A. Eisfeld, M. Dvorak, O. Bünermann, and F. Stienkemeier, *Vibronic line shapes of PTCDA oligomers in helium nanodroplets*. *Journal of Chemical Physics* **134**, 054907 (2011), DOI: 10.1063/1.3526749.
27. Bünermann, O. and F. Stienkemeier, *Modeling the formation of alkali clusters attached to helium nanodroplets and the abundance of high-spin states*. *European Physical Journal D* **61**, 645-655 (2011), DOI: 10.1140/epjd/e2011-10466-0.
28. Kornilov, O., C.C. Wang, O. Bünermann, A.T. Healy, M. Leonard, C. Peng, S.R. Leone, D.M. Neumark, and O. Gessner, *Ultrafast Dynamics in Helium Nanodroplets Probed by Femtosecond Time-Resolved EUV Photoelectron Imaging*. *Journal of Physical Chemistry A* **114**, 1437-1445 (2010), DOI: 10.1021/Jp907312t.
29. Hernando, A., M. Barranco, R. Mayol, M. Pi, F. Ancilotto, O. Bünermann, and F. Stienkemeier, *Absorption Spectrum of Na Atoms Attached to Helium Nanodroplets*. *Journal of Low Temperature Physics* **158**, 105-111 (2010), DOI: 10.1007/s10909-009-9934-7.
30. Bünermann, O., M. Dvorak, F. Stienkemeier, A. Hernando, R. Mayol, M. Pi, M. Barranco, and F. Ancilotto, *Calcium atoms attached to mixed helium droplets: A probe for the He-3-He-4 interface*. *Physical Review B* **79**, 214511 (2009), DOI: 10.1103/Physrevb.79.214511.
31. Bünermann, O., G. Droppelmann, A. Hernando, R. Mayol, and F. Stienkemeier, *Unraveling the absorption spectra of alkali metal atoms attached to helium nanodroplets*. *Journal of Physical Chemistry A* **111**, 12684-12694 (2007), DOI: 10.1021/Jp0760760.
32. Mudrich, M., B. Forkl, S. Mueller, M. Dvorak, O. Bünermann, and F. Stienkemeier, *Kilohertz laser ablation for doping helium nanodroplets*. *Review of Scientific Instruments* **78**, 103106 (2007), DOI: 10.1063/1.2796849.
33. Hernando, A., R. Mayol, M. Pi, M. Barranco, F. Ancilotto, O. Bünermann, and F. Stienkemeier, *The structure and energetics of He-3 and He-4 nanodroplets doped with alkaline earth atoms*. *Journal of Physical Chemistry A* **111**, 7303-7308 (2007), DOI: 10.1021/Jp0701385.
34. Mayol, R., F. Ancilotto, M. Barranco, O. Bünermann, M. Pi, and F. Stienkemeier, *Alkali atoms attached to He-3 nanodroplets*. *Journal of Low Temperature Physics* **138**, 229-234 (2005), DOI: 10.1007/s10909-005-1555-1.
35. Stienkemeier, F., O. Bünermann, R. Mayol, F. Ancilotto, M. Barranco, and M. Pi, *Surface location of sodium atoms attached to He-3 nanodroplets*. *Physical Review B* **70**, 214508 (2004), DOI: 10.1103/Physrevb.70.214509.
36. Bünermann, O., M. Mudrich, M. Weidemuller, and F. Stienkemeier, *Spectroscopy of Cs attached to helium nanodroplets*. *Journal of Chemical Physics* **121**, 8880-8886 (2004), DOI: 10.1063/1.1805508.
37. Mudrich, M., O. Bünermann, F. Stienkemeier, O. Dulieu, and M. Weidemuller, *Formation of cold bialkali dimers on helium nanodroplets*. *European Physical Journal D* **31**, 291-299 (2004), DOI: 10.1140/epjd/e2004-00139-6.
38. Droppelmann, G., O. Bünermann, C.P. Schulz, and F. Stienkemeier, *Formation times of RbHe exciplexes on the surface of superfluid versus normal fluid helium nanodroplets*. *Physical Review Letters* **93**, 023402 (2004), DOI: 10.1103/Physrevlett.93.023402.