



# Oliver Bünermann

## PERSONAL INFORMATION

Name: Bünermann, Oliver

Nationality: German

Date of birth: 14 June 1978

Web site: <http://uni-goettingen.de/en/atom-surface+scattering+dynamics/212020.html>

## EDUCATION AND PROFESSIONAL PREPARATION

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

## CURRENT POSITION

2010– Group Leader, Atom-Surface Scattering Dynamics, Institute for Physical Chemistry, Georg-August University Göttingen, 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, University of Göttingen, Göttingen Germany

## INSTITUTIONAL RESPONSIBILITIES

2015- Executive Director of the International Center for Advanced Studies of Energy Conversion (ICASEC), Georg-August University of Göttingen, Germany

## MEMBERSHIPS OF SCIENTIFIC SOCIETIES

Member of Deutsche Bunsen-Gesellschaft für physikalische Chemie

Member of Deutsche Physikalische Gesellschaft

## RESEARCH MENTORS

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

## MAJOR COLLABORATIONS

- Geert-Jan Kroes, *Hydrogen atom scattering from metals*, Chemistry, University Leiden, Netherlands
- Xueming Yang, *Rydberg tagging for surface scattering*, Dalian Institute of Chemical Physics, China
- Daniel J. Auerbach, *Surface Dynamics*

## 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. 20<sup>th</sup> Symposium on Atomic, Cluster and Surface Physics, 2016, *Inelastic Hydrogen Atom Scattering:*

### *Role of Electron-Hole Pair Excitations*

5. 115<sup>th</sup> General Assembly of the German Bunsen Society for Physical Chemistry, 2016, *Inelastic Hydrogen Atom Scattering: Role of Electron-Hole Pair Excitations*
6. 3<sup>rd</sup> 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*

### **RESEARCH PUBLICATIONS [1-26]**

1. Jiang, H.Y., M. Kammler, F. Ding, Y. Dorenkamp, F.R. Manby, A.M. Wodtke, T.F.I. Miller, A. Kandratsenka, and O. Buenermann, *Imaging covalent bond formation by H atom scattering from graphene*. *Science* **364**, 379–382 (2019).
2. Buenermann, 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).
3. Dorenkamp, Y., C. Volkman, V. Roddatis, S. Schneider, A.M. Wodtke, and O. Buenermann, *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).
4. Dorenkamp, Y., H.Y. Jiang, H. Kockert, N. Hertl, M. Kammler, S.M. Janke, A. Kandratsenka, A.M. Wodtke, and O. Buenermann, *Hydrogen collisions with transition metal surfaces: Universal electronically nonadiabatic adsorption*. *Journal of Chemical Physics* **148**, 034706 (2018).
5. Kandratsenka, A., H.Y. Jiang, Y. Dorenkamp, S.M. Janke, M. Kammler, A.M. Wodtke, and O. Buenermann, *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).
6. Buenermann, O., H. 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 (2015).
7. Dvorak, M., M. Mueller, O. Buenermann, 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).
8. Kaufmann, S., D. Schwarzer, C. Reichardt, A.M. Wodtke, and O. Buenermann, *Generation of ultra-short hydrogen atom pulses by bunch-compression photolysis*. *Nature Communications* **5**, 5373 (2014).
9. Dvorak, M., M. Mueller, T. Knoblauch, O. Buenermann, 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).
10. Dvorak, M., M. Mueller, T. Knoblauch, O. Buenermann, 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).
11. Buenermann, 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).

12. Buenermann, 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).
13. Kornilov, O., O. Buenermann, 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).
14. Roden, J., A. Eisfeld, M. Dvorak, O. Buenermann, and F. Stienkemeier, *Vibronic line shapes of PTCDA oligomers in helium nanodroplets*. *Journal of Chemical Physics* **134**, 054907 (2011).
15. Buenermann, 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).
16. Kornilov, O., C.C. Wang, O. Buenermann, 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).
17. Hernando, A., M. Barranco, R. Mayol, M. Pi, F. Ancilotto, O. Buenermann, and F. Stienkemeier, *Absorption Spectrum of Na Atoms Attached to Helium Nanodroplets*. *Journal of Low Temperature Physics* **158**, 105-111 (2010).
18. Buenermann, 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).
19. Buenermann, 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).
20. Mudrich, M., B. Forkl, S. Mueller, M. Dvorak, O. Buenermann, and F. Stienkemeier, *Kilohertz laser ablation for doping helium nanodroplets*. *Review of Scientific Instruments* **78**, 103106 (2007).
21. Hernando, A., R. Mayol, M. Pi, M. Barranco, F. Ancilotto, O. Buenermann, 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).
22. Mayol, R., F. Ancilotto, M. Barranco, O. Buenermann, M. Pi, and F. Stienkemeier, *Alkali atoms attached to He-3 nanodroplets*. *Journal of Low Temperature Physics* **138**, 229-234 (2005).
23. Stienkemeier, F., O. Buenermann, 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).
24. Buenermann, O., M. Mudrich, M. Weidemuller, and F. Stienkemeier, *Spectroscopy of Cs attached to helium nanodroplets*. *Journal of Chemical Physics* **121**, 8880-8886 (2004).
25. Mudrich, M., O. Buenermann, F. Stienkemeier, O. Dulieu, and M. Weidemuller, *Formation of cold bialkali dimers on helium nanodroplets*. *European Physical Journal D* **31**, 291-299 (2004).
26. Droppelmann, G., O. Buenermann, 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).