

Academic Curriculum Vitae

Tim Schäfer

*August 31st, 1981 in Kassel
Georg-August-Universität Göttingen
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Marital Status

Married, 2 children

School

06/2000 Abitur Jacob-Grimm Schule, Kassel

Academic Studies

10/2001 – 01/2006 Studies of chemistry at the Georg-August-Universität Göttingen
02/2005 – 05/2005 Erasmus stay at the University of Florence in the group of Prof. A. Brandi
06/2005 – 01/2006 Studies on the *Influence of cations on the vibrational energy transfer in azulene crown ethers* in the group of Prof. J. Troe at the Max-Planck-Institut für Biophysikalische Chemie, Göttingen
01/2006 Diploma in chemistry at Georg-August-Universität Göttingen (sehr gut)

Research Experience

01/2006 – 10/2009 Studies on the *Vibrational energy relaxation and rotational dynamics of associated liquids over a wide range of temperatures and pressures* in the group of Prof. J. Troe, supervised by Prof. D. Schwarzer at the Max-Planck-Institut für Biophysikalische Chemie, Göttingen
06/2009 PhD examination (*summa cum laude*)
11/2009 – 12/2011 Postdoctoral studies on *Vibrationally promoted electron emission at metal surfaces* with Prof. A. M. Wodtke at University of California Santa Barbara, USA (from 10/2010: Georg-August-Universität Göttingen)
01/2012 – current Head of the subgroup on *State-to-state molecular-beam surface-scattering* with Prof. A. M. Wodtke at the Georg-August Universität Göttingen

05/2012 – 07/2012	Parental Leave
07/2012 – 10/2012	Guest Scientist in the group of Prof. G. Meijer at the Fritz-Haber-Institut, Berlin
	Awards
10/2001 – 09/2003	Anniversary Scholarship of the German Association of Chemical Industry (Jubiläumstipendium, Verband der Chemischen Industrie)
11/2006 – 10/2008	PhD Scholarship of the German Association of Chemical Industry (Promotionsstipendium, Verband der Chemischen Industrie)
	Selected Presentations
9/2014	<i>Controlling electron transfer reactions at a metal surface</i> , invited talk, Conference on Cold and Controlled Molecules and Ions, Monte Verita, Switzerland
11/2015	<i>Surface Scattering with Controlled Molecular Beams</i> , invited talk, Dalian Institute of Chemical Physics, Dalian, China
06/2017	<i>State-to-state molecular beam surface scattering of diatomic molecules</i> , invited talk, International Symposium on Molecular Beams, Nijmegen, Netherlands
09/2018	<i>Steric Effects in Molecule – Surface Collisions</i> , invited talk, Stereodynamics 2018, Arosa, Switzerland
07/2019	<i>Molecular beam surface scattering of polyatomic molecules</i> , invited talk, Dynamics of Molecular Collisions 2019, Big Sky, USA
09/2019	<i>Molecular beam surface scattering of chiral molecules: towards enantioselective detection of surface reaction products</i> , invited talk, 3rd Sino-German Young Scientist Symposium on Structures & Dynamics at Surfaces 2019, Dalian, China
	Teaching Experience
Since 2012	Head of the thermodynamics laboratory class, Bachelor program Georg-August-Universität Göttingen
Since 2014	Lecture “Dynamics at surfaces”, 3 hours per week per semester, Master program, Georg-August-Universität Göttingen
Since 2017	Lecture “Introduction to Physical Chemistry”, 2 hours per week per semester, Bachelor program, Georg-August-Universität Göttingen
Since 2017	Lecture “Introduction to Thermodynamics”, 3 hours per week per semester, Bachelor program, Georg-August-Universität Göttingen

Grants

- 2016** DFG, "Playing Squash with molecules: surface scattering with polyatomic molecules", 276,734 €.
- 2018** DFG/MWK Niedersachsen, "Femtosecond oscillator/amplifier system with frequency conversion unit", 381,000 €.
- 2018** LaserLab Europe, "Photoelectron circular dichroism of fenchone from multiphoton ionization with nanosecond laser pulses", 7,500 €.
- 2018** DAAD, "Metal organic frameworks for catalytic conversion of greenhouse gases", 11,000 €.
- 2020** LaserLab Europe, "Enantiomeric excess measurements in multi-component mixtures using nanosecond photoelectron circular dichroism", 7,500 €.
- 2021** DFG, "Velocity resolved kinetics of enantioselective olefin epoxidation on chiral surfaces", 351,966 €.

Conference Organization

- Nov. 2015** 1st German-Chinese Young Scientist Symposium on Structures & Dynamics at Surfaces, Beijing; funded by the Sino-German center for research, 45,000€.
- May 2017** 2nd German-Chinese Young Scientist Symposium on Structures & Dynamics at Surfaces, Göttingen; funded by the Sino-German center for research, 63,000€.

Publication List Tim Schäfer (August 2020)

1. T. Schäfer, D. Schwarzer, J. Lindner, and P. Vöhringer, *ND-stretching vibrational energy relaxation of NH₂D in liquid-to-supercritical ammonia studied by femtosecond mid-infrared spectroscopy*, J. Chem. Phys. **128**, 064502 (2008).
2. C. Reichardt, T. Schäfer, J. Schroeder, P. Vöhringer and D. Schwarzer, *Ultrafast photodecomposition of dibenzoyl peroxide studied by time-resolved infrared spectroscopy*, in Ultrafast Phenomena **XVI**, P. Corkum, K. Nelson, E. Riedle, R. Schoenlein, S. DeSilvestri (eds.), Springer, Berlin, pp. 490-492 (2009).
3. J. Lindner, T. Schäfer, D. Schwarzer, and P. Vöhringer, *Vibrational energy relaxation in liquid-to-supercritical ammonia studied by femtosecond mid-infrared spectroscopy*, in Ultrafast Phenomena **XVI**, P. Corkum, K. Nelson, E. Riedle, R. Schoenlein, S. DeSilvestri (eds.), Springer, Berlin, pp. 466-468 (2009).
4. T. Schäfer, J. Lindner, P. Vöhringer, and D. Schwarzer, *OD stretch vibrational relaxation of HOD in liquid to supercritical H₂O*, J. Chem. Phys. **130**, 224502 (2009).
5. J. LaRue, T. Schäfer, D. Matsiev, L. Velarde, N. H. Nahler, D. J. Auerbach and A. M. Wodtke, *Vibrationally promoted electron emission at a metal surface: electron kinetic energy distributions*, Phys. Chem. Chem. Phys., **13**, 97-99 (2011).
6. J. LaRue, T. Schäfer, D. Matsiev, L. Velarde, N. H. Nahler, D. J. Auerbach and A. M. Wodtke, *Electron Kinetic Energies from Vibrationally Promoted Surface Exoemission: Evidence for a Vibrational Autodetachment Mechanism*, J. Phys. Chem. A, **115**, 14306 (2011).
7. T. Schäfer, N. Bartels, N. Hocke, X. Yang, and A. M. Wodtke, *Orienting polar molecules without multipole lenses: Optical state selection with adiabatic orientation*, **Frontier Article**, Chem. Phys. Lett., **535**, 1 (2012).
8. T. Schäfer, A. Kandratsenka, P. Vöhringer, J. Schroeder, and D. Schwarzer, *Vibrational energy relaxation of the ND-stretching vibration of NH₂D in liquid NH₃*, Phys. Chem. Chem. Phys., **14**, 11651 (2012).
9. N. Bartels, T. Schäfer, J. Hühnert, R. W. Field, and A. M. Wodtke, *Production of a beam of highly vibrationally excited CO using perturbations*, J. Chem. Phys. **136**, 214201 (2012).
10. T. Schäfer, N. Bartels, K. Golibrzuch, C. Bartels, H. Köckert, D. J. Auerbach, T. N. Kitsopoulos and A. M. Wodtke, *Observation of direct vibrational excitation in gas-surface collisions of CO with Au(111): A new model system for surface dynamics*, Phys. Chem. Chem. Phys., **15**, 1863 (2013).
11. N. Bartels, B. C. Krüger, S. Meyer, A. M. Wodtke, and T. Schäfer, *Suppression of Spontaneous Emission in the Optical Pumping of Molecules: Pump-Dump-Sweep-Probe*, J. Phys. Chem. Lett., **4**, 2367-2370 (2013)
12. F. Grätz, D. P. Engelhart, R. J.V. Wagner, H. Haak, G.. Meijer, A. M. Wodtke and T. Schäfer, *Surface scattering with velocity controlled molecular beams: The role of vibration in electron emission for CO* on Au(111)*, Phys. Chem. Chem. Phys., **5**(36), 14951 (2013).
13. N. Bartels, K. Golibrzuch, C. Bartels, L. Chen, D. J. Auerbach, A. M. Wodtke and T. Schäfer, *Observation of orientation-dependent electron transfer in molecule-surface collisions*, Proc. Natl. Acad. Sci. U.S.A., **110**(44), 17738 (2013).

14. N. Bartels, K. Golibrzuch, C. Bartels, L. Chen, D. J. Auerbach, A. M. Wodtke and T. Schäfer, *Dynamical steering in an electron transfer surface reaction: oriented NO($v = 3$, $0.08 < E_i < 0.89$ eV) relaxation in collisions with a Au(111) surface*, J. Chem. Phys., **140**(5), 054710 (2014).
15. F. Grätz, D. P. Engelhart, R. J. V. Wagner, G. Meijer, A. M. Wodtke and T. Schäfer, *CO ($a^3\Pi$) quenching at a metal surface: Evidence of an electron transfer mediated mechanism*, J. Chem. Phys., **141**(4), 044712 (2014).
16. N. Bartels, B. C. Krüger, D. J. Auerbach, A. M. Wodtke and T. Schäfer, *Controlling an electron-transfer reaction at a metal surface by manipulating reactant motion and orientation*, Angew. Chem. (International Ed. in English), **53**(50), 13690–4 (2014).
17. B. C. Krüger, N. Bartels, C. Bartels, A. Kandratsenka, J. C. Tully, A. M. Wodtke and T. Schäfer, *NO Vibrational Energy Transfer on a Metal Surface: Still a Challenge to First-Principles Theory*, J. Phys. Chem. C, **119**, 3268–3272 (2015).
18. D. P. Engelhart, R. J. V. Wagner, P. C. Johnsen, A. M. Wodtke and T. Schäfer, *Adsorbate enhancement of electron emission during the quenching of metastable CO at metal surfaces*, Phys. Chem. Chem. Phys., **111**, 11540–11545 (2015).
19. D. P. Engelhart, F. Grätz, R. J. V. Wagner, H. Haak, G. Meijer, A. M. Wodtke and T. Schäfer, *A new Stark decelerator based surface scattering instrument for studying energy transfer at the gas-surface interface*, Rev. Sci. Instrum., **86**, 043306 (2015).
20. D. P. Engelhart, R. J. V. Wagner, A. Meling, A. M. Wodtke and T. Schäfer, *Temperature programmed desorption of weakly bound adsorbates on Au(111)*, Surface Science., **650**, 11-16 (2016).
21. B. C. Krüger, S. Meyer, A. Kandratsenka, A. M. Wodtke and T. Schäfer, *Vibrational Inelasticity of Highly vibrationally Excited NO on Ag(111)*, J. Phys. Chem. Lett., **7**, 441-446 (2016).
22. B. C. Krüger, N. Bartels, A. M. Wodtke and T. Schäfer, *Final rotational state distributions from NO($v_i = 11$) in collisions with Au(111): the magnitude of vibrational energy transfer depends on orientation in molecule-surface collisions*, Phys. Chem. Chem. Phys., **18** (22), 14976 - 14979 (2016).
23. G. B. Park, B. C. Krüger, S. Meyer, D. Schwarzer and T. Schäfer, *The v_6 fundamental frequency of the \tilde{A} state of formaldehyde and Coriolis perturbations in the $3v_4$ level*, J. Chem. Phys., **144**, 194308 (2016).
24. G. B. Park, B. C. Krüger, S. Meyer, A. M. Wodtke, and T. Schäfer, *A $1+1'$ resonance-enhanced multiphoton ionization scheme for rotationally state-selective detection of formaldehyde via the $A^1A_2 \leftarrow X^1A_1$ transition*, Phys. Chem. Chem. Phys., **18**, 22355-22363 (2016).
25. A. Kastner, T. Ring, B. C. Krüger, G. B. Park, T. Schäfer, A. Senftleben, and T. Baumert, *Intermediate state dependence of the photoelectron circular dichroism of fenchone observed via femtosecond resonance-enhanced multi-photon ionization* J. Chem. Phys. **147**, 013926 (2017).
26. G. B. Park, B.C. Krüger, S. Meyer, A. Kandratsenka, A. M. Wodtke, T. Schäfer, *An axis-specific rotational rainbow in the direct scatter of formaldehyde from Au(111) and its influence on trapping probability*. Phys. Chem. Chem. Phys., **19**, 19904–19915 (2017).
27. B.C. Krüger, G. B. Park, S. Meyer, R. J. V. Wagner, A. M. Wodtke, T. Schäfer, *Trapping-desorption and direct-scattering of formaldehyde at Au(111)*. Phys. Chem. Chem. Phys., **19**, 19896–19903 (2017).

28. R. J. V. Wagner, N. Henning, B.C. Krüger, G. B. Park, J. Altschäffel, A. Kandratsenka, A. M. Wodtke, T. Schäfer, *Vibrational Relaxation of Highly Vibrationally Excited CO Scattered from Au(111): Evidence for CO-Formation*, J. Phys. Chem. Lett, **111**, 4887-4892, (2017).
29. B.C. Krüger, T. Schäfer, A. M. Wodtke, G. B. Park, *Quantum-state resolved lifetime of triplet (\tilde{a}^3A_2) formaldehyde*, J. Mol. Spectrosc., **362**, 61–68. (2019).
30. R. J. V. Wagner, B. C. Krüger, G. B. Park, M. Wallrabe, A. M. Wodtke, T. Schäfer, *Electron transfer mediates vibrational relaxation of CO in collisions with Ag(111)*, Phys. Chem. Chem. Phys, **21**(4), 1650–1655 (2019).
31. G. Westphal, M. Wallrabe, T. Schäfer, *Unravelling Reaction Products of Styrene Oxide Adsorbed on Ag(111) Using REMPI-Assisted Temperature-Programmed Desorption*. J. Phys. Chem. C, **124** (1), 799–804 (2020).
32. A. Kastner, G. Koumarianou, P. Glodic, P. C. Samartzis, N. Ladda, S. T. Ranecky, T. Ring, S. Vasudevan, C. Witte, H. Braun, H. G. Lee, A. Senftleben, R. Berger, G. B. Park, T. Schäfer, T. Baumert, *High-resolution resonance-enhanced multiphoton photoelectron circular dichroism*, Phys. Chem. Chem. Phys, **22**(14), 7404-7411 (2020).
33. G. Westphal, J. Wega, R. E. A. Dissanayake, T. Schäfer, *Chirality detection of surface desorption products using photoelectron circular dichroism*, J Chem. Phys. **153**, 054707 (2020).