Curriculum Vitae

Robert E. Zillich

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employment

since 2007	assistant professor ("Universitätsassistent") at the Institute for Theoretical Physics, Johannes Kepler Universität, Linz, Austria
June 2004 – Dec 2006	postdoctoral fellow / researcher at the Fraunhofer Institut für Techno- und Wirtschaftsmathematik, Kaiserslautern, Germany *research activity*: development of multiscale molecular dynamics simulation algorithms for equilibrium and non-equilibrium statistical physics
July 2001 – May 2004	postdoctoral fellow in the Chemistry Department, University of California, Berkeley, USA and Miller Institute for Basic Research in Science, Berkeley, USA *research activity*: calculation of molecule spectra in superfluid helium with quantum Monte Carlo (MC) simulations (diffusion MC, path integral MC, variational MC), and with quantum many-body theory (correlated basis function theory)

education

13.6.2001	PhD degree (title: Dr. techn.) at the Johannes Kepler Universität, Linz, Austria advisor: Prof. Eckhard Krotscheck title of thesis: Atom Scattering off Superfluid ^{4}He Clusters and Films
11.12.1997	diploma degree at the Johannes Kepler Universität, Linz advisor: Prof. Eckhard Krotscheck title of thesis: Scattering of ^{3}He off thin ^{4}He-films

research grants

1.1.2008 – 31.12.2009	Amadée grant 2008-09, FR 14/2008 by ÖAD: academic exchange grant with Palms SIMPA, Université de Rennes ÖAD
1.8.2001 – 31.7.2004	NSF grant CHE 107541: Molecular solvation phenomena in nanoscale superfluids (PI: Prof. K. Birgitta Whaley)
1.7.2003 – 30.6.2004	NSF grant NPACI 930004: Quantum Monte Carlo calculations for nanoscale superfluid, semiconductors, and qubit arrays (PI: Prof. K. Birgitta Whaley) continuation: 1.7.2004 – 31.12.2005; 1.1.2006 – 31.12.2006; 1.4.2007 – 31.3.2008

awards & fellowships

2008	Programa de movilidad de profesores visitantes en masteres oficiales del Ministerio de Educacion y Ciencia de Espana (mobility program for visiting professors teaching master courses, awarded by the Spanish Ministry of Education and Science)
2007	Honourable Mention – Kümmel Early Achievement Award, RPMBT14 in Barcelona, Spain
2001	Miller Research Fellowship for Basic Research in Science, Berkeley, California
1998	Wilhelm-Macke-Award for diploma thesis, Linz, Austria

invited research stays

Feb. 2008	invited professor at Universitat Politecnica de Catalunya, Barcelona, Spain (see "awards")
July 2007	invited assistant professor at Palms SIMPA, Université de Rennes 1 (J.-M. Launay and A. Viel): Rb-He exciplex formation; scattering dynamics of impurities in Helium
Oct. – Nov. 2002	Konkuk University, Seoul, South Korea, invited by Prof. Yongkyung Kwon: development of path integral Monte Carlo code
June – Aug. 1998	University of Minnesota, invited by Prof. Charles E. Campbell: atomic transmission through thin superfluid films
July – Aug. 1997	Texas A&M University, College Station, invited by Prof. Eckhard Krotscheck

conferences (since 2002)

2008	APS March Meeting, New Orleans, Louisiana (selected talk)
	EGAS'08 Conference, Graz, Austria (selected talk)
	LT 25, Amsterdam, Netherlands (selected talk)
2007	Recent Progress in Many-Body Theory 14, Barcelona, Spain (selected talk)
	NanoForum 2007, Linz (invited talk)
2006	Workshop on New Developments in Quantum Monte Carlo, Tempe, Arizona (invited talk)
2005	343rd WE-Heraeus-Seminar on helium nanodroplets, Germany (talk)
2004	Quantum Fluids and Solids, Trento, Italy (poster)
2003	Quantum Fluids and Solids, Albuquerque, New Mexico (poster)
	Gordon Research Conference on Matrix Isolated Species, Lewiston (poster)
	Dynamics of Molecular Collisions, Lake Tahoe, California (poster)
2002	Workshop on Rare Gas Clusters, Telluride, Colorado (talk)
	Vth Workshop on Quantum Fluid Clusters, Trento, Italy (talk)

teaching

2007/2008	graduate seminar: Bose Einstein Condensation and Cold Fermi Gases
2007,2008	lecture: Computational Physics II
1999	teaching assistant for the courses Theoretical Physics I & II (classical mechanics and electrodynamics, resp.) for undergraduate students
1998	teaching assistant for the seminar Advanced Quantum Theory for graduate students
1995–1997	tutor for the course series Theoretical Physics (undergraduate and graduate level)

scientific interest

many-body theory	development of microscopic quantum many-body methods for strongly correlated systems, e.g. superfluid Helium, Bose-Einstein condensates in the large scattering length regime
quantum Monte Carlo	development of path integral, variational, and diffusion Monte Carlo methods and application to problems involving strong interactions, also in combinations with analytic quantum many-body methods
molecular dynamics	development of multiscale MD simulations techniques; atomistic simulations of hydrodynamic flow (nanofluidics, turbulence)

publications

1. J. Mayrhofer and R. E. Zillich: "Condensate Fraction of Liquid Helium-4 Clusters", in preparation

2. R. E. Zillich, F. Mazzanti, G. E. Astrakharchik, and J. Boronat: "Dynamics of a two-dimensional system of dipoles", submitted to Phys. Rev. Lett. (2008)

3. M. Leino, A. Viel, and R. E. Zillich: "Electronically excited rubidium atom in helium clusters and films", J. Chem. Phys., in print (2008)

4. R. E. Zillich and K. B. Whaley: "Rotational Spectra in Helium-4 Clusters and Droplets: Size Dependence and Rotational Linewidth", Recent Progress in Many-Body Theories, J. Boronat, G. E. Astrakharchik, F. Mazzanti (eds.), World Scientific Publ. (2008)

5. E. Krotscheck and R. E. Zillich: "Hydrogen and ^{3}He Atoms on ^{4}He Surfaces: Bound states and scattering features", Phys. Rev. B **77**, 094507 (2008)

6. R. E. Zillich, K. B. Whaley, and K. van Haeften: "Line shape of rotational spectrum of CO in ^{4}He droplets", J. Chem. Phys. **128**, 094303 (2008)

7. R. E. Zillich and K. B. Whaley: "Solvation structure and rotational dynamics of LiH in ^{4}He clusters", J. Phys. Chem. A **111**, 7489 (2007)

8. H. M. Böhm, V. Apaja, E. Krotscheck, and R. E. Zillich: "Quantum Reflection, Evaporation, and Transport Currents in ^{4}He", J. of Low Temp. Phys. **148**, 115 (2007)

9. E. Krotscheck and R. E. Zillich: "Dynamics of atom scattering from ^{4}He nanoclusters", EPJ D **43**, 113 (2007)

10. V. Apaja, E. Krotscheck, A. Rimnac, and R. E. Zillich: "Quantum Reflection, Evaporation, and Transport Currents in ^{4}He", Recent progress in many-body theories, S. Hernandez and H. Cataldo (eds.), World Scientific, Singapore (2007)

11. K. van Haeften, S. Rudolph, I. Simanovski, M. Havenith, R. E. Zillich, and K. B. Whaley: "Spectroscopy of CO isotopomers in ^{4}He droplets", Phys. Rev. B **73**, 054502 (2006)

12. V. Apaja, E. Krotscheck, A. Rimnac, and R. E. Zillich: "Quantum reflection, evaporation, and transport currents at ^{4}He surfaces", Int. J. Mod. Phys. B **20**, 5047 (2006)

13. R. E. Zillich, F. Paesani, Y. Kwon, and K. B. Whaley: "Path integral methods for rotating molecules in superfluids", J. Chem. Phys. **123**, 114301 (2005)

14. F. Paesani, R. E. Zillich, Y. Kwon, and K. B. Whaley: "OCS in para-hydrogen clusters: Rotational dynamics and superfluidity", J. Chem. Phys. **122**, 181106 (2005)

15. R. E. Zillich, Y. Kwon, and K. B. Whaley: "Roton-Rotation Coupling of Acetylene in ^{4}He", Phys. Rev. Lett. **93**, 250401 (2004)

16. R. E. Zillich and K. B. Whaley: "Quantum Rotation of HCN and DCN in ^{4}He", Phys. Rev. B **69**, 104517 (2004)

17. F. Paesani, R. E. Zillich, and K. B. Whaley: "OCS in small para-hydrogen clusters: Energetics and structure with $N = 1 - 8$ complexed hydrogen molecules", J. Chem. Phys. **119**, 11682 (2003)

18. R. E. Zillich and K. B. Whaley: "Comparison of rotational energies and rigidity of OCS-paraH_2 and OCS-^{4}He complexes", Chem. Phys. **295**, 275 (2003)

19. E. Krotscheck, V. Apaja, A. Rimnac, and R. Zillich: "Quantum liquids in confinement: the microscopic view", J. Phys. Cond. Mat. **15**, S95 (2003)

20. E. Krotscheck and R. Zillich: "Dynamics of He-4 droplets", J. Chem. Phys. **115**, 10161–10174 (2001)

21. E. Krotscheck, M. D. Miller, and R. Zillich: "Dynamics of Helium in restricted geometries", Physica B **280**, 59 (2000)

22. R. Zillich and E. Krotscheck: "Elastic and Inelastic Scattering off ^{4}He Droplets", Physica B **284–288**, 154 (2000)

23. R. Zillich and E. Krotscheck: "Atom and Neutron Scattering at ^{4}He Droplets", J. de Physique IV **10**, 173 (2000)

24. S. Kilic, E. Krotscheck, and R. Zillich: "Binding of Two Helium Atoms in Confined Geometries", J. of Low Temp. Phys. **116**, 245 (1999)

25. K. Schörkhuber, E. Krotscheck, J. Paaso, M. Saarela, and R. Zillich: "Fermi Liquid Properties of ^{3}He-^{4}He Mixtures", G. S. Agnastostatos (ed.), Condensed Matter Physics **3**, 319 (1999)

26. E. Krotscheck and R. Zillich: "Atom Scattering from Helium Droplets", G. S. Agnastostatos (ed.), 23rd Workshop on Condensed Matter Theories 1999, Nova Science Publishers

27. E. Krotscheck and R. Zillich: "Scattering of ^{3}He Atoms from ^{4}He Surfaces", Phys. Rev. B **58**, 5707 (1998)

28. E. Krotscheck, M.Saarela, K. Schörkhuber, and R. Zillich: "Concentration Dependence of the Effective Mass of He3 Atoms in ^{3}He-^{4}He Mixtures", Phys. Rev. Lett **80**, 4709 (1998)

29. E. Krotscheck, J. Paaso, M. Saarela, K. Schörkhuber, and R. Zillich: "Single Particle and Fermi Liquid Properties of ^{3}He-^{4}He Mixtures", Phys. Rev. B **58**, 12282 (1998)

30. E. Krotscheck and R. Zillich: "Scattering of ^{3}He and ^{4}He atoms from ^{4}He clusters", J. of Low Temp. Phys. **113**, 387 (1998)

31. M. Saarela, E. Krotscheck, J. Paaso, K. Schörkhuber, and R. Zillich: "Fermi Liquid Properties of ^{3}He-^{4}He Mixtures", J. of Low Temp. Phys. **113**, 993 (1998)