CURRICULUM VITAE

Name: **Zhisong WANG** Mr.
Date of Birth: 15th July 1969
Place of Birth: Henan, China

Contact details:
Institute for Quantum Studies and Department of Physics,
Texas A&M University, College Station, TX 77843-4242

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HONORS and AFFILIATIONS

DAAD (German Academic Exchange Service) Fellow, 1996-1998
American Physical Society

CAREER EXPERIENCE

Research

July 2003 – present
Postdoctoral Research Associate
Institute of Quantum Studies & Physics Department
Texas A&M University

Projects:
- Bio-inspired, laser-powered molecular motors
- Optimal laser operation of molecular machines
- Design of photonic nano-devices for protein folding measurement at single-molecule level

April 2001 – June 2003
Postdoctoral Research Associate
Department of Chemistry and Biochemistry
University of Texas at Austin

Projects:
- Thermodynamics of a single protein molecule under unfolding mechanical force
- Theory of nanosecond resolved fluorescence spectroscopy for single protein molecules
- Computational study of scaling phenomena of chemically denatured proteins
- Dynamics of intramolecular loop formation of polypeptide chains

February 1999 – April 2001
Postdoctoral Research Assistant

Interdisciplinary Research Center in Surface Sciences
The University of Liverpool, UK

Projects:

- Development of high-dimensional, quantum wavepacket dynamics for molecules scattering/dissociating at metal surfaces and comparison to state-to-state scattering/dissociation measurement
- Quantized surface thermal motion & quantized energy transfer to scattering/dissociating molecules and experimental manifestation in state-to-state cross sections
- Quantum theory for intramolecular energy transfer: energy flow between translational, rotational and vibrational motion of a molecule scattering at a surface
- Bohmian mechanics as a novel framework for computational quantum dynamics

Teaching

September-October 2003
Department of Chemistry, Princeton University
Tutor for graduate course "Molecular applications of quantum optics"

February 1993 - October 1994
Physics Department II, Fudan University, Shanghai, China
Tutor for undergraduate course "Methods of Mathematical Physics"

EDUCATION

April 1996 - October 1998
Ph.D study
Institute of Theoretical Physics, University of Tuebingen, Germany

Research project for Ph.D thesis:

- Collective flows of fundamental particles in nucleus-nucleus collision at relativistic energy
- Quantum molecular dynamics & Relativistic molecular dynamics

September 1990 - January 1993
Master of Science study
Institute of Modern Physics, Fudan University, Shanghai, China

September 1986 - September 1990
Bachelor of Science study
Physics Department, Jilin University, Changchun, China

October 1994 – March 1996
Full-time enrollment in the Intensive German Language Courses
Tongji University, Shanghai, China

SELECTED PUBLICATIONS

*** A bio-inspired, laser-operated molecular locomotive**
Z.S. Wang, 2004, submitted to *Physical Review E*

*** A molecular pump and its application to single-molecule bio-spectroscopy**
Z.S. Wang, M.O. Scully, 2004, submitted to *Physical Review E*

*** Influence of local, residual structure on the scaling behavior and dimensions of unfolded proteins: a Monte Carlo study supports the random-coil nature of the chemically denatured state**
Z.S. Wang, K. W. Plaxco, D. E. Makarov, 2004, submitted to *Protein Science*

*** Nanosecond dynamics of single polypeptide molecules revealed by photoemission statistics of fluorescence resonance energy transfer: a theoretical study**
Z.S. Wang and D.E. Makarov, *The Journal of Physical Chemistry* **B107** (2003) 5617-5622

*** On the interpretation of force extension curves of single protein molecules**
D.E. Makarov, Z.S. Wang, J. Thompson and H. Hansma
The Journal of Chemical Physics **116** (2002) 7760-7764

*** Rate of intramolecular contact formation in peptides: the loop length dependence**
Z.S. Wang and D. E. Makarov, *The Journal of Chemical Physics*, **117** (2002) 4591-4593

*** Surface temperature dependence of the inelastic scattering of hydrogen molecules from metal surfaces**
Z.S.Wang, G.R.Darling and S. Holloway, *Physical Review Letters 87 (2001) 6102-6105*

*** Dissociation dynamics from a *de Broglie*-Bohm perspective**
Z.S.Wang, G.R.Darling and S. Holloway, *The Journal of Chemical Physics* **115** (2001) 10373-10381

***Translation-to-rotational energy transfer of H_2 molecules scattering on Cu(111) surface**
Z.S.Wang, G.R.Darling and S.Holloway, *Surface Science* **458** (2000) 63-70

*** Anisotropy of subthreshold K^+ emission in heavy ion reactions**
Z.S.Wang, Amand Faessler, C.Fuchs, V.S.Uma Maheswari and D.Kosov
Physical Review Letters **79** (1997) 4096-4099

PERSONAL REFERENCES

1. Prof. **Marlan O. Scully**
   (Director of Institute)
   Institute for Quantum Studies and Department of Physics,
   Texas A&M University, College Station, TX 77843-4242
   Phone: (979) 862 2333, Fax: (979) 458 1235
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2. Prof. **Amand Faessler**
   (Director of Institute)
   Institute of Theoretical Physics
   University of Tuebingen
   Auf der Morgenstelle 14, 72076 Tuebingen, Germany
   Phone: ++49 – 7071 – 297 6370, Fax: ++49 – 7071 - 296400
   E-mail: amand.faessler@uni-tuebingen.de

3. Prof. **Stephen Holloway**
   (Head of Department)
   Department of Chemistry & Surface Science Center
   University of Liverpool
   L69 3BX, Liverpool, UK
   Phone: +44 – 151 - 7943537 or +44 – 97324 - 7856, Fax: +44 – 151 - 7080662
   E-mail: stephen@ssci.liv.ac.uk

4. Prof. **Kevin Lehmann**
   Department of Chemistry
   Princeton University, Princeton, NJ 08544
   Phone: (609)258-5026, Fax: (609)258-6746
   E-mail: lehmann@princeton.edu

5. Prof. **Kevin W. Plaxco**
   Department of Chemistry and Biochemistry
   & Interdepartmental Program in Biomolecular Science and Engineering
   University of California, Santa Barbara
   Santa Barbara, CA 93106
   Phone: (805) 893 - 5558, Fax: (805) 893 - 4120
   E-mail: kwp@chem.ucsb.edu

6. Prof. **Dimitrii E. Makarov**
   University of Texas at Austin
   Department of Chemistry & Biochemistry, Center for Computational Biology & Bioinformatics
   Austin, Texas 78713
   Phone: (512) 471 - 4575, Fax: (512) 471 - 8696
   E-mail: makarov@mail.cm.utexas.edu

INVITED TALKS

*** Monitor single protein molecules: intramolecular fluorescence energy transfer**
Invited talk at DARPA-ONR Summer Workshop on Quantum Electronics, July 2003, Grand Targhee, Wyoming

*** Towards nanosecond resolution for monitoring single protein motion**
Invited talk at Texas A&M University, 09 April 2003, College Station

*** Molecular dynamics in the light of single-molecule measurement**
-from hydrogen molecules at solid surfaces to proteins in solution
Invited talk at *University of Delaware*, 13 Feb. 2003, Newark

*** Computational protein biophysics in the light of single-molecule measurements**
Invited talk at *Ohio University*, 27 Jan. 2003, Athens

*** Protein folding theory in light of single-molecule measurements**
Invited talk at *the National University of Singapore*, 18 July 2002, Singapore

*** Molecular dissociation and inelastic scattering at thermal metal surfaces**
– a *quantum dynamics* study
Invited talk at *Baylor University*, 28 May 2002, Waco

*** Translation-to-rotational energy transfer of H_2 molecules scattering from Cu(111) surface**
Invited talk at *Third European Workshop on Time-dependent Methods in Gas-Surface Dynamics*, 26-28 September 1999, Leiden, Holland

*** Radial flow of kaons in relativistic nucleus-nucleus collisions**
Invited talk at the *1998 Spring Forum of The German Physics Society,* March 1998, Bochum, Germany.

*** Kaon dynamics in relativistic nucleus-nucleus collisions**
Invited talk at the *SIS-Theory-Workshop Rauischholzhausen X*, 18-20 June 1998, Rauischholzhausen, Germany.

FULL LIST OF PUBLICATIONS IN REFEREED JOURNALS

1. A bio-inspired, laser-operated molecular locomotive
Z.S. Wang, 2004, submitted to *Physical Review E*

2. On laser operation of molecular machines
Z.S. Wang, Y. Rostovtsev, M.O. Scully, 2004, in preparation

3. On cooling of laser-powered molecular machines
Z.S. Wang, 2004, in preparation

4. A molecular pump and its application to single-molecule bio-spectroscopy
Z.S. Wang, M.O. Scully, 2004, submitted to *Physical Review E*

5. A single dye molecule lases
Z.S. Wang, M.O. Scully, 2004, submitted to *Physical Review E*

6. Towards a photonic nano-device on chip for protein folding measurement at single-molecule level
Z.S. Wang, M.O. Scully, in preparation

7. Photon statistics of single-molecule fluorescence resonance energy transfer
G.O. Ariunbold, G.S. Agarwal, Z.S. Wang, H. Walther and M. O. Scully, 2004, submitted to *The Journal of Physical Chemistry*

8. **Influence of local, residual structure on the scaling behavior and dimensions of unfolded proteins: a Monte Carlo study supports the random-coil nature of the chemically denatured state**
Z.S. Wang, K. W. Plaxco, D. E. Makarov, 2004, submitted to *Protein Science*

9. **Nanosecond dynamics of single polypeptide molecules revealed by photoemission statistics of fluorescence resonance energy transfer: a theoretical study**
Z.S. Wang and D.E. Makarov, 2003, *The Journal of Physical Chemistry* **B107** (2003) 5617-5622

10. **Reply to the comment on 'On the interpretation of force extension curves of single protein molecules'**
D.E. Makarov, Z.S. Wang, J. Thompson and H. Hansma
The Journal of Chemical Physics **118** (2003) 2966-2967

11. **Rate of intramolecular contact formation in peptides: the loop length dependence**
Z.S. Wang and D. E. Makarov, *The Journal of Chemical Physics*, **117** (2002) 4591-4593

12. **On the interpretation of force extension curves of single protein molecules**

D.E. Makarov, Z.S. Wang, J. Thompson and H. Hansma, *The Journal of Chemical Physics* **116** (2002) 7760-7764

13. **Vibration-rotational coupling of H_2 molecules scattering from a Cu(111) surface**
Z.S.Wang, G.R.Darling and S.Holloway, *Surface Science* **504** (2002) 66-74

14. **Energy exchange in reactive scattering of hydrogen molecules from a Cu surface**
G.R.Darling, Z.S.Wang and S. Holloway, *Chemical Physics Letters* **365** (2002) 157-163

15. **Test of approximations to surface thermal motion in gas-surface dynamics: linear *versus* quadratic coupling**
Z.S.Wang, G.R.Darling, B. Jackson and S. Holloway, *The Journal of Physical Chemistry* **B 106** (2002) 8422-8428 (Invited article for the Tully Festschrift)

16. **Surface temperature dependence of the inelastic scattering of hydrogen molecules from metal surfaces**
Z.S.Wang, G.R.Darling and S. Holloway, *Physical Review Letters 87* (2001) 6102-6105

17. **Dissociation dynamics from a *de Broglie*-Bohm perspective**
Z.S.Wang, G.R.Darling and S. Holloway, *The Journal of Chemical Physics* **115** (2001) 10373-10381

18. **Translation-to-rotational energy transfer of H_2 molecules scattering on Cu(111) surface**
Z.S.Wang, G.R.Darling and S.Holloway, *Surface Science* **458** (2000) 63-70

19. **Exploring the applicability of classical mechanics in H_2 scattering and reaction at metal surfaces**
G.R.Darling, Z.S.Wang and S.Holloway, *Phys. Chem. Chem. Phys* **2** (2000) 911-917

20. **Lambda collective flow in heavy ion reactions**
Z.S.Wang, Amand Faessler, C.Fuchs and T.Waindzoch
Nuclear Physics **A645**, (1999) 177-188, Erratum-ibid. **A648** (1999) 281

21. **Kaon squeeze-out in heavy ion reactions**
Z.S.Wang, C.Fuchs, Amand Faessler and T.Waindzoch
European Physical Journal **A 5** (1999) 275-283

22. **Chiral kaon dynamics in heavy ion collisions**
C.Fuchs, Amand Faessler, Z.S.Wang, T.Gross-Boelting,
Progress in Particle and Nuclear Physics **42** (1999) 197-206

23. **J/Ψ normal and anomalous suppressions in a hadron and string cascade model**
Sa Ben-Hao, Amand Faessler, Tai An, T.Waindzoch, C.Fuchs, Z.S.Wang and Wang Hui
Journal of Physics **G25** (1999) 1123-1133

24. **Role of the Coulomb interaction in the flow and the azimuthal distribution of kaons from heavy ion reactions**
Z.S.Wang, Amand Faessler, C.Fuchs, V.S.Uma Maheswari and D.Kosov
Nuclear Physics **A628** (1998) 151-160

25. **Radial flow of kaon mesons in heavy ion reactions**
Z.S.Wang, Amand Faessler, C.Fuchs, V.S.Uma Maheswari and D.Kosov
Physical Review **C57** (1998) 3284-3291

26. **Consequences of covariant kaon dynamics in heavy ion reactions**
C.Fuchs, D.Kosov, Amand Faessler, Z.S.Wang and T.Waindzoch
Physics Letters **B434** (1998) 245-250

27. **Role of isospin dependent mean field in pion production in heavy ion reactions**
V.S.Uma Maheswari, C.Fuchs, Amand Faessler, Z.S.Wang and D.Kosov
Physical Review **C57** (1998) 922-926

28. **In-medium dependence and Coulomb effects of the pion production in heavy ion reactions**
V.S.Uma Maheswari, C.Fuchs, Amand Faessler, D.Kosov and Z.S.Wang
Nuclear Physics **A628** (1998) 669-685

29. **Anisotropy of subthreshold K^+ emission in heavy ion reactions**
Z.S.Wang, Amand Faessler, C.Fuchs, V.S.Uma Maheswari and D.Kosov
Physical Review Letters **79** (1997) 4096-4099

30. **Origin of subthreshold K^+ production in heavy ion collisions**
C.Fuchs, Z.S.Wang, L.Sehn, Amand Faessler, V.S.Uma Maheswari and D.Kosov
Physical Review **C56** (1997) **R**606-**R**609

31. **Effects of triple scattering in heavy ion reactions**
Z.S.Wang and Y.K.Ho, *Physical Review* **C51** (1995) 182-186

32. **Enhanced emissions of hard photons in heavy ion reactions by particle correlation effect**
Z.S.Wang, Y.K.Ho and Z.Y.Pan, *Physical Review* **C49** (1994) 2104-2108

33. **Comparison between BUU and IRS models for nucleus-nucleus collisions in the Fermi domain**
Z.S.Wang and Y.K.Ho, *Journal of Physics* **G20**, (1994) 159-167

34. **Enhanced subthreshold productions of pions in heavy ion reactions by particle correlation effect**
Z.S.Wang and Y.K.Ho, *Journal of Physics* **G20** (1994) 1901-1906

35. **Particle correlation and energy boost of emitted nucleons in heavy-ion reactions**
Y.K. Ho, Z.S.Wang and Z.Y. Pan, *Journal of Physics* **G19** (1993) 1045-1051