

Curriculum Vitae

(with full publication list)

Daw-Wei Wang

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EDUCATION:

1995-2000 **Ph.D.** in Theoretical Physics, **University of Maryland**, College Park, MD

Thesis Advisor: Professor S. Das Sarma

1991-1995 **B.S.** in Physics, **National Tsing-Hua University**, Hsinchu, Taiwan

RESEARCH APPOINTMENT:

2010-present Professor, Department of Physics, National Tsing-Hua University,
Hsinchu, Taiwan, ROC

2009 Fall Visiting Scholar, Joint Quantum Institute of University of Maryland,
College Park, USA

2005-2010 Associate Professor, Department of Physics, National Tsing-Hua University,
Hsinchu, Taiwan, ROC

2004-2005 Visiting Scientist, National Center for Theoretical Science, Hsinchu, Taiwan, ROC

2002-2004 Postdoctoral Fellow, Harvard University, Cambridge, MA, USA

2000-2002 Postdoctoral Research Associate, University of Maryland, College Park, MD

TEACHING EXPERIENCE:

2010-present Professor, Department of Physics, National Tsing-Hua University,
Hsinchu, Taiwan, ROC

2005-2010 Associate Professor, Department of Physics, National Tsing-Hua University,
Hsinchu, Taiwan, ROC

1995-1996 Teaching Assistant, Department of Physics, University of Maryland, College Park

ACADEMICAL AWARD:

2014 Scholarship for Young Taiwan Visiting Researcher, Chinese Academy of Science, Beijing, China

2012 Scholarship for Young Taiwan Visiting Researcher, Chinese Academy of Science, Beijing, China

2011 NSC Project for Outstanding Young Scholars (2011-2015)

2008 2008 Daniel Tsui Fellowship, Center for Theoretical and Computational Physics,
Hong Kong University, Hong Kong

2008 Ta-You Wu Memorial Award, National Science Council, Taiwan

2008 Research Award for Junior Research Investigators, Academia Sinica, Taiwan

2007 Junior Faculty Research Award 2008, National Tsing-Hua University, Taiwan

2007 Young Theorist Award 2007, National Center for Theoretical Science, Taiwan

1996 Secured the highest grade in the physics Ph.D. qualifying exam at University of Maryland,
College Park

1992-1993 The Dr. Samuel J. J. Ding Physics Scholarship, National Ministry of Education, Taiwan

RESEARCH INTERESTS:

My research is mainly to develop theories in different strongly correlated many-body systems, including ultracold atoms/molecules, quantum Hall systems, one dimensional systems, and (high T_c) superconductivity, etc. In recent years I am mostly working in the many-body theory of ultracold atoms, especially about the ground state properties, low energy excitations, localization effects, Bose-Fermi mixture, and quantum dynamics. The dipolar interaction induced many-body phases as well as the finite temperature effects in the systems of polar molecules is my research focus in the next few years. This new systems of ultracold (below mK) polar molecules is expected to be experimentally realized very soon in the next couple of years, and shall bring important and new understanding in strongly correlated physics.

INVITED PRESENTATION IN INTERNATIONAL CONFERENCES and WORKSHOPS:

April 2015	April 2015, 13th National workshop on Low Temperature Physics, Hanzhou, China
Sep. 2014	Ultracold Rydberg Physics, Granada, Spain
July 2014	The 13th Conference on Condensed Matter Theory and Computational Material, Chendu, China
March 2014	Emergence 2014 - Shedding Light on Emergence Quantum Phenomena, Heidelberg, Germany
Aug. 2013	Quantum Condensation 13, National Center for Theoretical Sciences, Tainan, Taiwan
Jun. 2013	The 7th Cross-Trait and International Conference on Quantum Manipulation, Chinese Academy of Sciences, Beijing, China
Oct. 2012	the 10th Asian International Seminar on Atomic and Molecular Physics, Institute of Atomic and Molecular Sciences, Taipei
Aug. 2011	the 7th Joint Meeting of Chinese Physicists Worldwide, Oversea Chinese Physics Association, Kaohsiung, Taiwan
Jan. 2011	Conference on Research Frontiers in Ultra-Cold Atomic and Molecular Gases, Goa, India (hosted by Abdus Salam International Center for Theoretical Science, Italy)
Sep. 2010	the 34th Conference of Theoretical Physics, Ustron, Poland
Sep. 2009	International Workshop on Dipolar Gases, University of Stuttgart, Stuttgart, Germany
Aug. 2009	the 6th Joint Meeting of Chinese Physicists Worldwide, Oversea Chinese Physics Association, Lanzhou, China
Dec. 2008	Hong Kong Forum of Physics, Center for Computational and Theoretical Physics, Hong Kong University, Hong Kong
Jun. 2007	First International Conference on Quantum Manipulation of Photons and Atoms, Chinese Academy of Sciences, Beijing, China
May 2005	4th Asia-Pacific Workshop on Strongly Correlated Systems, Institute of Theoretical Physics, Chinese Academy of Sciences, Beijing, China
Mar. 1998	Invited Talk, March Meeting of American Physics Society, Los Angeles, USA

FULL PUBLICATION LIST

H index: > 20 (updated in Aug. 2014, from Google scholar)

[1] D.-W. Wang, Y.C. Chou and T.M. Hong, “Possible Origin of Convection Flow in Granular Systems”, *Europhys. Lett.*, **35**, 333 (1996).

[2] S. Das Sarma and D.-W. Wang, “Resonant Raman Scattering by Elementary Electronic Excitations in Semiconductor Structures”, *Phys. Rev. Lett.* **83**, 816 (1999).

- [3] S. Das Sarma and D.-W. Wang, “Many-Body Renormalization of Semiconductor Quantum Wire Excitons: Absorption, Gain, Binding, and Unbinding”, *Phys. Rev. Lett.* **84**, 2010 (2000).
- [4] D.-W. Wang, A.J. Millis, and S. Das Sarma, “Where Is the Luttinger Liquid in One Dimensional Semiconductor Quantum Wire Structures?”, *Phys. Rev. Lett.* **85**, 4570 (2000).
- [5] D.-W. Wang, A.J. Millis, and S. Das Sarma, “Coulomb Luttinger Liquid”, *Phys. Rev. B* **64**, 193307 (2001).
- [6] D.-W. Wang and S. Das Sarma, “Many-body Effects on Excitonic Optical Properties of Photoexcited Semiconductor Quantum Wire Structures”, *Phys. Rev. B* **64**, 195313 (2001).
- [7] D.-W. Wang and S. Das Sarma, “Elementary Electronic Excitations in One-dimensional Continuum and Lattice Systems”, *Phys. Rev. B* **65** 035103 (2002).
- [8] D.-W. Wang and S. Das Sarma, “Resonant Raman Scattering by Charge Density and Single Particle Excitations in Semiconductor Nanostructures: A Generalized Interband-Resonant Random-Phase-Approximation Theory”, *Phys. Rev. B* **65**, 125322 (2002).
- [9] D.-W. Wang, E. Demler, S. Das Sarma, and B.I. Halperin, “Magnetoplasmon Excitations and Spin Density Instabilities in an Integer Quantum Hall Systems with a Tilted magnetic Field”, *Phys. Rev. B* **66**, 195334 (2002).
- [10] E. Demler, D.-W. Wang, S. Das Sarma, and B.I. Halperin, “Quantum Hall Stripe Phases at Integer Filling Factors”, *Solid State Commun.* **123**, 243 (2003).
- [11] D.-W. Wang, E. Demler, and S. Das Sarma, “Spontaneous Symmetry Breaking and Exotic Quantum Orders in Integer Quantum Hall systems under a Tilted Magnetic Field”, *Phys. Rev. B* **68**, 165303 (2003).
- [12] D.-W. Wang, A.J. Millis, and S. Das Sarma, “Comment on “Dynamic correlations of the spinless Coulomb Luttinger liquid [Phys. Rev. B **65**, 125109 (2002)]” ”, *Phys. Rev. B* **69**, 167101 (2004).
- [13] D.-W. Wang, E. Demler, and M. Lukin, “Disordered Bose-Einstein condensates in quasi-one-dimensional magnetic microtraps”, *Phys. Rev. Lett.* **92**, 076802 (2004). (This paper has been selected for the March 1, 2004 issue of *Virtual Journal of Nanoscale Science and Technology*.)
- [14] D.-W. Wang, A.J. Millis, and S. Das Sarma, “Theory of resonant Raman scattering in one-dimensional electronic systems”, *Phys. Rev. B* **70**, 165101 (2004).
- [15] D.-W. Wang, A.J. Millis and S. Das Sarma, “Collective modes and Raman scattering in one dimensional electron systems”, *Solid State Commun.* **131**, 637-645 (2004). (Invited review article for *New Advances on Collective Phenomena in One-dimensional Systems*.)
- [16] L. Mathey, D.-W. Wang, W. Hofstetter, M.D. Lukin, and E. Demler, “Luttinger liquid of polarons in one-dimensional boson-fermion mixtures”, *Phys. Rev. Lett.* **93**, 120404 (2004).
- [17] A. Polkovnikov and D.-W. Wang, “Effect of quantum fluctuations on the dynamics of Bose-Einstein condensates in optical lattices”, *Phys. Rev. Lett.* **93**, 070401 (2004).
- [18] D.-W. Wang, M.D. Lukin, and E. Demler, “Engineering Superfluidity in Bose-Fermi Mixtures of Ultracold Atoms”, *Phys. Rev. A*, **72**, R051604 (2005).
- [19] D.-W. Wang, E.G. Mishchenko, and E. Demler, “Pseudospin ferromagnetism in coupled quantum wires”, *Phys. Rev. Lett.* **95**, 086802 (2005).

- [20] D.-W. Wang, “Strong coupling theory of superfluidity in Bose-Fermi mixtures”, *Phys. Rev. Lett.* **96**, 140404 (2006).
- [21] D.-W. Wang, M.D. Lukin and E. Demler, “Quantum fluids of self-assembled chains of polar molecules”, *Phys. Rev. Lett.* **97**, 180413 (2006).
- [22] D.-W. Wang, “Quantum phase transitions of polar molecules in bilayer system”, *Phys. Rev. Lett.* **98**, 06043 (2007).
- [23] L. Mathey, D.-W. Wang, “Phase diagrams of one-dimensional Bose-Fermi mixtures of ultra-cold atoms”, *Phys. Rev. A* **75**, 013612(2007).
- [24] D.-W. Wang, “Magnetic disorder and dynamical properties of a Bose-Einstein condensate in atomic waveguides”, *cond-mat/0605691*.
- [25] G. Pupillo, A. Griessner, A. Micheli, M. Ortner, D.-W. Wang, and P. Zoller, “Cold Atoms and Molecules in Self-Assembled Dipolar Lattices”, *Phys. Rev. Lett.* **100**, 050402 (2008).
- [26] D.-W. Wang, “An effective many-body theory for strongly interacting polar molecules”, *New J. Phys.* **10**, 053005 (2008).
- [27] Yi-Ya Tian, Pochung Chen, and D.-W. Wang, “Universal dynamics of quantum spin decoherence in a spin bath”, *Phys. Rev. B* **77**, 174434 (2008).
- [28] Chi-Ming Chang, Wei-Chao Shen, Chen-Yen Lai, Pochung Chen, and Daw-Wei Wang, “Interaction-induced first-order correlation between spatially separated one-dimensional dipolar fermions”, *Phys. Rev. A* **79**, 053630 (2009).
- [29] Sheng-Min Shih and Daw-Wei Wang, “Pseudopotential of an interaction with a power-law decay in two-dimensional systems”, *Phys. Rev. A* **79**, 065603 (2009).
- [30] Yi-Ping Huang, Daw-Wei Wang, “Quantum phase diagrams of fermionic dipolar gases in a planar array of one-dimensional tubes”, *Phys. Rev. A* **80**, 053610 (2009).
- [31] Daw-Wei Wang, “Momentum distribution of noncondensate particles near the superfluid-to-Mott-insulator transition of bosonic atoms in a uniform optical lattice”, *Phys. Rev. A* **80**, 063620 (2009).
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- [33] Bin Wang, Daw-Wei Wang, and S. Das Sarma, “Bose-Fermi solid and its quantum melting in a one-dimensional optical lattice”, *Phys. Rev. A* **82**, 021602(R) (2010).
- [34] Shiang Fang, Ray-Kuang Lee, and Daw-Wei Wang, “Quantum fluctuations and condensate fraction during the time-of-flight expansion”, *Phys. Rev. A* **82**, 031601(R) (2010).
- [35] Yi-Ya Tian and Daw-Wei Wang, “Confinement induced quantum melting and polarization cooling for a 2D dipolar crystal”, *Euro. Phys. Lett.*, **91**, 66006 (2010).

- [36] Andrew C. Potter, Erez Berg, Daw-Wei Wang, Bertrand I. Halperin, Eugene Demler, "Superfluidity and dimerization in a multilayered system of fermionic polar molecules", Phys. Rev. Lett. **105**, 220406 (2010).
- [37] Shiang Fang, Chia-Ming Chung, Ping Nang Ma, Pochung Chen, and Daw-Wei Wang, "Quantum Criticality from in-situ Density Imaging", Phys. Rev. A **83**, 031605(R) (2011).
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- [39] N. T. Zinner, B. Wunsch, I. B. Mekhov, S.-J. Huang, D.-W. Wang, and E. Demler, "Few-Body Bound Complexes in One-dimensional Dipolar Gases and Non-Destructive Optical Detection", Phys. Rev. A **84**, 063606 (2011).
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- [41] S.-J. Huang, Y. - T. Hsu, H. Lee, Y.-C. Chen, A.G. Volosniev, N.T. Zinner, and D.-W. Wang, "Field-induced long-lived supermolecules", Phys. Rev. A **85**, 013603 (2012).
- [42] C.-H. Wang, T.-M. Hong, R.-K. Lee, and D.-W. Wang, "Particle-wave duality in quantum tunneling of a bright soliton", Optics Express, **20**, 22675 (2012).
- [43] J.-S. You, H. Li, S. Fang, M.A. Cazalilla, and D.-W. Wang, "Tuning the Kosterlitz- Thouless transition to zero temperature in Anisotropic Boson Systems", Phys. Rev. A **86**, 043612 (2012).
- [44] H.-H. Jen and Daw-Wei Wang, "Theory of electromagnetically induced transparency in strongly correlated quantum gases", Phys. Rev. A **87**, 061802(R) (2013).
- [45] H.-H. Jen, B. Xiong, Ite Yu, and Daw-Wei Wang, "Electromagnetic induced transparency and slow light in interacting quantum degenerate atomic gases", J. of the Optical Society of America B **30**, 2855 (2013).
- [46] Jhih-Shih You* and Daw-Wei Wang, "Many-body formation and dissociation of a dipolar chain crystal", New J. of Phys. **16**, 073041 (2014).
- [47] Bo Xiong*, H.-H. Jen, and Daw-Wei Wang, "Topological superfluid by blockade effects in a Rydberg-dressed Fermi gas", Phys. Rev. A **90**, 013631 (2014).
- [48] H.-H. Jen*, and Daw-Wei Wang, "Extracting Dynamical Greens Function of Ultracold Quantum Gases via Electromagnetically Induced Transparency", J. of the Optical Society of America B **31**, 2931 (2014).
- [49] Bo Xiong*, Junhui Zheng, and Daw-Wei Wang, "Nonadiabatic multichannel dynamics of a spin-orbit coupled condensate", Phys. Rev. A **91**, 063602 (2015).
- [50] Jhih-Shih You*, Daw-Wei Wang, and Miguel A. Cazalilla, "Electron-spin to phonon coupling in graphene decorated with heavy adatoms", Phys. Rev. B **92**, 035421 (2015).
- [51] Junhui Zheng*, Bo Xiong, Gediminas Juzelinas, and Daw-Wei Wang, "Topological condensate in an interaction-induced gauge potential", Phys. Rev. A **92**, 013604 (2015).