Curriculum Vitae - Peter Engels

Department of Physics and Astronomy
Washington State University (WSU)
Pullman, WA 99164-2814

Phone: (509) 335 4674
Fax: (509) 335 7816
Email: engels@wsu.edu
WWW: https://labs.wsu.edu/engels/

Education

- PhD Physics, University of Hannover, Germany, 2000, "with distinction"
- Diplom (M.S. equivalent), Physics, University of Bonn, Germany, 1996
- Vordiplom (B.S. equivalent), Physics, University of Bonn, Germany, 1993

Experience

- WSU, Department of Physics and Astronomy, Professor, 2015 - present
- WSU, Department of Physics and Astronomy, Associate Professor with tenure, 2009 - 2015
- WSU, Department of Physics and Astronomy, Assistant Professor, 2004 - 2009
- JILA / University of Colorado, Post-doctoral Research Associate, 2001 - 2004
- University of Hannover, Germany, Institute for Quantum Optics, Graduate Student Researcher, 1997 - 2001
- Princeton University, Chemistry Department, Visiting graduate researcher, 1996 - 1997

Dissertation

- Title: *Lithography and matter wave optics with laser cooled atomic beams*
- Committee: Prof. Wolfgang Ertmer and Klaus Sengstock (chairs), Prof. Maciej Lewenstein and Prof. Rolf Haug

Professional Societies

- American Physical Society (APS)
- Deutsche Physikalische Gesellschaft (DPG)

Honors and Awards

- APS fellow, 2016
- WSU College of Sciences Young Faculty Performance Award, one awarded, 2007
- Alexander-von-Humboldt foundation, Feodor-Lynen scholarship, 2001
- University of Hannover, Germany, book prize for excellence of PhD work, 2000
- German National Academic Foundation, Foreign Exchange scholarship, 1996
- Member of "Studienstiftung des deutschen Volkes" (German National Academic Foundation), 1991

Student awards

- Justin Niedermeyer, Pass With Distinction award for Honors College thesis, 2016, WSU
- Amin Khamehchi, Leon J. and Barbara W. Radziemski Graduate Fellowship in the Sciences. This fellowship was founded to reward academic excellence for graduate students in the maths and physical sciences.
- Justin Niedermeyer, Fulbright award, 2016. This award allows Justin to spend a 10 month research stay at the University of Heidelberg, Germany.
- Maren Mossman, NASA Space Grant Scholarship. This scholarship was awarded for her current research project entitled "Few-body systems in microgravity".
- Justin Niedermeyer, Barry Goldwater award, 2015. This is the most prestigious undergraduate award for the sciences in the US.
- Justin Niedermeyer, RISE (Research Internship in Science and Engineering) scholarship by DAAD (German Academic Exchange Service), 2014.
- JiaJia Chang, First Prize WSU Wiley Research competition, poster presentation in engineering and physical sciences category.
- Collin Atherton, First Prize WSU College of Sciences Undergraduate Research Poster Competition, Physical Sciences Category, 2007.

External funding

- Quantum Phases and Dynamics of Bose-Einstein Condensates with Artificial Gauge Fields, NSF, $586,630, 9/1/2016 - 8/31/2019
- Zero-G Studies of Few-Body and Many-Body Physics (PI: Cornell, JILA / University of Colorado, Co-PIs: Jin, Ho, Engels), NASA, total amount $3,750,000, Engels' portion $1,237,000, 2/1/2014 – 1/31/2019
- Quantum hydrodynamics with multicomponent and dispersion-managed degenerate gases, NSF, $354,800, 9/1/2013 – 8/31/2016
- Nonlinear Dynamics and Disorder Effects in Bose-Einstein Condensates, Degenerate Fermi Gases and Mixtures, NSF, $405,435, 06/01/10 - 05/31/14
- Quantum Entanglement in Optical Lattice Systems (PI: Blume, Co-PIs: Zhang, Engels), ARO, total amount $739,998, Engels' portion $246,666, 05/16/09 - 05/15/13
- Nonlinear Quantum Hydrodynamics in Ultracold Bose and Fermi Gases, NSF, $330,000, 06/15/07 - 05/31/11
- REU Site: Extreme Matter (faculty participant), NSF, total amount $240,000, 5/16/07 – 5/15/10

Synergistic activities

- Session organizer and session chair of AMO session, NWAPS meeting, Penticton, CA, 2016
- WSU Tenure and promotion guideline committee, 2015
- Graduate student advisor for all first year graduate students in the Department of Physics and Astronomy, Fall 2012- 2014
- WSU Prelim Exam Committee, Fall 2005 – Spring 2012

- WSU Technical Services Advisory Committee, since Fall 2005
- WSU physics colloquium chair, Fall 2005 and Spring 2006
- Member of several search committees

Graduate and Postdoctoral Advisors

- Ph.D. advisors: W. Ertmer (Institute for Quantum Optics, University of Hannover, Germany) and K. Sengstock (now at Institute for Laser Physics and Center for Optical Quantum Technologies, University of Hamburg, Germany)
- Research advisors at Princeton: G. Scoles (Chemistry department, Princeton University), and K. Lehmann (now at University of Virginia)
- Postdoctoral advisor: E. A. Cornell (JILA and University of Colorado, Boulder)

Refereeing

- Reviewer for Science Magazine, Physical Review Letters, Physical Review A, New Journal of Physics
- Reviewer for BSF foundation (US-Israel Binational Science Foundation)
- Reviewer for NSF (National Science Foundation)

Courses taught

- Physics 102 (General Physics), 9 semesters
- Physics 415 (Quantum Physics Laboratory), 10 semesters
- Physics 450 (Undergraduate Quantum Mechanics), 2 semester
- Physics 514 (Optoelectronics Laboratory), 4 semesters
- Physics 590 (Colloquium), 2 semesters

Instructional innovations

- Developed completely new curriculum and lectures for Physics 415
- Introduced new experiments to Physics 415 laboratory, including
  - single-photon interference,
  - fluorescence of quantum dots,
  - bifurcations and chaos in driven electronic resonators, combined with digital/analog oscilloscope tutorial
  - speed of pulse propagation in transmission lines, etc.
- Developed hands-on tutorials for software including Origin and Mathematica for Physics 415
- Assembled large multimedia library with instructional videos and applets for Physics 102

Undergraduate research supervision

Collin Atherton, Gunnar Skulason, Demetrious Wilson, David Dawson, Shen Wei, Justin Niedermeyer.
Justin Niedermeyer received a “Pass With Distinction” award for his honors college thesis.

Graduate student supervision (not including thesis committee service)

JiaJia Chang, PhD thesis “Quantum hydrodynamics in one- and two-component Bose-Einstein condensates”, 2013

Chris Hamner, PhD thesis “Experiments with dispersion engineered Bose-Einstein condensates: Raman dressing and novel optical lattices”, 2014

Adam Goler (2011-2012), Ted Delikatny (2013-2014), Michael Pope (2013), Chunde Huang (since 2013), Amin Khamehchi (since 2014), Maren Mossman (since 2014), Thomas Bersano (since 2016)

List of publications

Peter Engels

JOURNAL PUBLICATIONS

I. Danaila, M.A. Khamehchi, V. Gokhroo, P. Engels, P.G. Kevrekidis, "Vector Dark-Antidark Solitary Waves in Multi-Component Bose-Einstein condensates", submitted, available on arXiv: 1606.05607

Yongping Zhang, Maren Elizabeth Mossman, Thomas Busch, Peter Engels, & Chuanwei Zhang, "Properties of spin-orbit-coupled Bose-Einstein condensates", Frontiers of Physics 11: 118103 (2016)

M. A. Khamehchi, C. Qu, M. E. Mossman, C. Zhang, and P. Engels, "Spin-momentum coupled Bose-Einstein condensates with lattice band pseudospins", Nature Communications **7**: 10867 (2016)

C. Hamner, Y. Zhang, M. A. Khamehchi, M. Davis, and P. Engels, "Spin-orbit coupled Bose-Einstein condensates in a one-dimensional optical lattice", Phys. Rev. Lett. **114**, 070401 (2015)

M. A. Khamehchi, Y. Zhang, C. Hamner, Th. Busch, P. Engels, "Measurement of collective excitations in a spin-orbit-coupled Bose-Einstein condensate", Phys. Rev. A **90**, 063624 (2014)

C. Hamner, C. Qu, Y. Zhang, J.J. Chang, M. Gong, C. Zhang, and P. Engels, "Dicke-type phase transition in a spin-orbit coupled Bose-Einstein condensate", Nature Communications **5** (2014), doi: 10.1038/ncomms5023

C. Hamner, Y. Zhang, J.J. Chang, C. Zhang, and P. Engels, "Phase Winding a Two-Component BEC in an Elongated Trap: Experimental Observation of Moving Magnetic Orders and Dark-bright Solitons", Phys. Rev. Lett. **111**, 264101 (2013)

C. Qu, C. Hamner, M. Gong, C. Zhang, and P. Engels, "Observation of Zitterbewegung in a spin-orbit-coupled Bose-Einstein condensate", Phys. Rev. A **88**, 021604 (2013)

A. Álvarez, J. Cuevas, F. R. Romero, C. Hamner, J. J. Chang, P. Engels, P. G. Kevrekidis, and D. J. Frantzeskakis, "Scattering of atomic dark-bright solitons from narrow impurities", J. Phys. B: At. Mol. Opt. Phys. **46**, 065302 (2013)

D. Yan, J. J. Chang, C. Hamner, M. Hoefer, P. G. Kevrekidis, P. Engels, V. Achilleos, D. J. Frantzeskakis and J. Cuevas, "Beating dark-dark solitons in Bose-Einstein condensates", J. Phys. B: At. Mol. Opt. Phys. **45**, 115301 (2012)

D. Yan, J.J. Chang, C. Hamner, P.G. Kevrekidis, P. Engels, V. Achilleos, D. J. Frantzeskakis, R. Carretero-Gonzalez, P. Schmelcher, "Multiple dark-bright solitons in atomic Bose-Einstein condensates", Phys. Rev. A **84**, 053630 (2011)

M.A. Hoefer, J.J. Chang, C. Hamner, and P. Engels, "Dark-dark solitons and modulational instability in miscible two-component Bose-Einstein condensates", Phys. Rev. A **84**, 041605 (2011)

C. Hamner, J.J. Chang, P. Engels, and M. A. Hoefer, "Generation of Dark-Bright Soliton Trains in Superfluid-Superfluid Counterflow", Phys. Rev. Lett. **106**, 065302 (2011)

S. Middelkamp, J.J. Chang, C. Hamner, R. Carretero-Gonzalez, P.G. Kevrekidis, V. Achilleos, D.J. Frantzeskakis, P. Schmelcher, and P. Engels, Dynamics of Dark-Bright Solitons in Cigar-Shaped Bose-Einstein Condensates, Physics Letters A **375**, 642 (2011)

P. Engels, Observing the dance of a vortex-antivortex pair, step by step, Physics **3**, 33 (2010), doi: 10.1103/Physics.3.33

M. A. Hoefer, P. Engels, and J.J. Chang, Matter-Wave Interference in Bose-Einstein Condensates: a dispersive hydrodynamic perspective, Physica D **238**, 1311 (2009)

J.J. Chang, P. Engels, and M. A. Hoefer, Formation of Dispersive Shock Waves by Merging and Splitting Bose-Einstein Condensates, Phys. Rev. Lett. **101**, 170404 (2008)

M. A. Hoefer, M. J. Ablowitz, and P. Engels, Piston Dispersive Shock Wave Problem, Phys. Rev. Lett. **100**, 084504 (2008)

P. Engels and C. Atherton, Stationary and Nonstationary Fluid Flow of a Bose-Einstein Condensate Through a Penetrable Barrier, Phys. Rev. Lett. **99**, 160405 (2007)

P. Engels, C. Atherton, and M. A. Hoefer, Observation of Faraday Waves in a Bose-Einstein Condensate, Phys. Rev. Lett. **98**, 095301 (2007)

M. A. Hoefer, M. J. Ablowitz, I. Coddington, E. A. Cornell, P. Engels, and V. Schweikhard, Dispersive and classical shock waves in Bose-Einstein condensates and gas dynamics, Phys. Rev. A **74**, 023623 (2006)

T. P. Simula, P. Engels, I. Coddington, V. Schweikhard, E. A. Cornell, and R. J. Ballagh, Observations on Sound Propagation in Rapidly Rotating Bose-Einstein Condensates, Phys. Rev. Lett. **94**, 080404 (2005)

V. Schweikhard, I. Coddington, P. Engels, S. Tung, and E. A. Cornell, Vortex-Lattice Dynamics in Rotating Spinor Bose-Einstein Condensates, Phys. Rev. Lett. **93**, 210403 (2004)

I. Coddington, P. C. Haljan, P. Engels, V. Schweikhard, S. Tung, and E. A. Cornell, Experimental studies of equilibrium vortex properties in a Bose-condensed gas, Phys. Rev. A **70**, 063607 (2004)

V. Schweikhard, I. Coddington, P. Engels, V. P. Mogendorff, and E. A. Cornell, Rapidly Rotating Bose-Einstein Condensates in and near the Lowest Landau Level, Phys. Rev. Lett. **92**, 040404 (2004)

I. Coddington, P. Engels, V. Schweikhard, and E. A. Cornell, Observation of Tkachenko Oscillations in Rapidly Rotating Bose-Einstein Condensates, Phys. Rev. Lett. **91**, 100402 (2003)

P. Engels, I. Coddington, P. C. Haljan, V. Schweikhard, and E. A. Cornell, Observation of Long-lived Vortex Aggregates in Rapidly Rotating Bose-Einstein Condensates, Phys. Rev. Lett. **90**, 170405 (2003)

A. Callegari, R. Pearman, S. Choi, P. Engels, H. K. Srivastava, M. Gruebele, K.K. Lehmann, and G. Scoles, Intramolecular Vibrational Relaxation in aromatic molecules II: An experimental and computational study of pyrrole and triazine, Molecular Physics **101**, 551-568 (2003).

P. Engels, I. Coddington, P. C. Haljan, and E. A. Cornell, Nonequilibrium Effects of Anisotropic Compression Applied to Vortex Lattices in Bose-Einstein Condensates, Phys. Rev. Lett. **89**, 100403 (2002)

P. Engels, W. Ertmer, and K. Sengstock, Magnetic guiding of a slow metastable Ne* beam, Optics Communications **204**, 185 (2002)

P. C. Haljan, I. Coddington, P. Engels, and E. A. Cornell, Driving Bose-Einstein-condensate vorticity with a rotating normal cloud, Phys. Rev. Lett. **87**, 210403/1 (2001)

A. Callegari, U. Merker, P. Engels, H. K. Srivastava, K. K. Lehmann, and G. Scoles, Intramolecular vibrational redistribution in aromatic molecules. I. Eigenstate resolved CH stretch first overtone spectra of benzene, J. Chem. Phys. **113**, 10583 (2000)

P. Engels, S. Salewski, H. Levsen, K. Sengstock, and W. Ertmer, Atom lithography with a cold metastable neon beam, App. Phys. B **69**, 407(1999)

U. Merker, P. Engels, F. Madeja, M. Havenith, and W. Urban, High-resolution CO-laser sideband spectrometer for molecular-beam optothermal spectroscopy in the 5-6.6 μm wavelength region, Rev. Sci. Instrum. **70**, 1933 (1999)

INVITED TALKS / INVITED SEMINAR PRESENTATIONS

Few-body studies in microgravity, invited seminar in Quantum Systems Unit, OIST (Okinawa Institute of Science and Technology), Japan, March 2016

Experimental methods of ultracold quantum gases, guest lecture for graduate class at OIST, Okinawa, Japan, March 15, 2016

Spin-orbit coupled Bose-Einstein condensates: Raman dressing and lattice-band pseudospins, invited seminar talk at OIST, Japan, March 9, 2016

Experiments with Raman dressed BECs and Floquet Bloch systems, invited talk at the conference Bose-Einstein Condensation 2015 - Frontiers in Quantum Gases, Sant Feliu de Guixols, Spain, September 5-11, 2015

Artificial gauge fields in dilute-gas Bose-Einstein condensates, invited talk at the workshop Dispersive Hydrodynamics ~ The Mathematics of Dispersive Shock Waves and Applications, Banff International Research Station, Banff, CA, May 17-22, 2015

Quantum mechanics near absolute zero: Experiments with Bose-Einstein condensates, invited seminar talk at the University of Puget Sound, Tacoma, WA, April 24, 2015

Simulating condensed matter with ultracold atoms: Artificial gauge fields and spin-orbit coupling in dilute-gas BECs, invited talk at the physics colloquium, University of Idaho, Moscow, ID, April 20, 2015

Engineering dispersion relations with a spin-orbit coupled Bose-Einstein condensate, invited talk at the Ninth IMACS International Conference on Nonlinear Evolution Equations and Wave Phenomena: Computation and Theory, Athens, GA, April 1-4, 2015

Experimental methods of ultracold atoms, guest lecture for graduate class at OIST, Okinawa, Japan, March 10, 2015

Artificial gauge fields and spin-orbit coupling in dilute-gas BECs, invited seminar talk at OIST, Okinawa, Japan, March 5, 2015

Experiments with Bose-Einstein Condensates in a Spin-Orbit Coupled Optical Lattice, invited talk at Frontiers in Optics / Laser Science (FiO/LS) 2014, Tucson, Arizona, October 19-23, 2014

Experimental investigation of spin-orbit coupled BECs, invited talk at DAMOP 2014, Madison, Wisconsin, June 2-4, 2014

Experiments with spin-orbit coupled Bose-Einstein condensates: Simulating condensed matter Hamiltonians with ultracold atoms, invited colloquium talk at UT Dallas, April 23, 2014

Novel dynamics in superfluid-superfluid counterflow – quantum hydrodynamics with dilute-gas Bose-Einstein condensates, group colloquium of the Quantum Systems Unit, OIST, Okinawa, Japan, March 17-21, 2014

Quantum mechanics near absolute zero – Bose-Einstein condensates and Degenerate Fermi gases, guest lecture for Advanced Condensed Matter class at OIST, Okinawa, Japan, March 17-21, 2014

Experiments with BEC's in a spin-orbit coupled lattice, invited OIST seminar talk, OIST, Okinawa, Japan, March 17-21, 2014

Experimental investigation of spin-orbit coupled BECs, invited talk at the APS March meeting, Denver, CO, March 3-7, 2014

Experiments with BECs in a spin-orbit coupled lattice, invited talk at the CIFAR Cold Atoms Workshop, Banff, Canada, February 19-21, 2014

Investigating quantum dynamics with Bose-Einstein Condensates, invited talk at the Eighth IMACS International Conference on Nonlinear Evolution Equations and Wave Phenomena: Computation and Theory, University of Georgia, Athens, GA, March 25-28, 2013

New trends in BEC hydrodynamics: novel types of solitons and dispersion engineering, invited talk at AMO Physics seminar, Stony Brook University, February 4, 2013

Superfluid hydrodynamics with Bose-Einstein condensates: engineering quantum dynamics, invited talk at The School of Natural Sciences physics seminar, University of Merced, California, November 30, 2012

Plenary talk: Quantum hydrodynamics in dilute-gas Bose-Einstein condensates, invited plenary talk at the 14th Annual Meeting of the Northwest Section of the APS, Vancouver, BC, Canada, October 18-20, 2012

Quantum hydrodynamics with Bose-Einstein condensates: Quantum shocks, counterflow, and novel types of solitons, invited talk at Cold Atom Seminar, University of Birmingham, UK, July 20, 2012

From Superfluid Counterflow to Novel Types of Solitons: Quantum Hydrodynamics with Dilute-gas Bose-Einstein Condensates, invited talk at the SIAM Conference on Nonlinear Waves and Coherent Structures, University of Washington, Seattle, June 13-16, 2012

Novel dynamics in superfluid-superfluid counterflow, invited talk at the Physics Colloquium, North Carolina State University, April 16, 2012

From superfluid-superfluid counterflow to novel types of solitons: Quantum hydrodynamics with dilute-gas Bose-Einstein Condensates, invited talk at AMO seminar, Yale University, January 12, 2012

From superfluid counterflow to novel types of solitons ~ Quantum hydrodynamics with dilute-gas Bose-Einstein Condensates, invited talk at Condensed Matter Seminar, Purdue University, November 11, 2011

Nonlinear hydrodynamics in binary Bose-Einstein Condensates: Superfluid counterflow and novel types of solitons, invited talk at the Seventh IMACS International Conference on Nonlinear Evolution Equations and Wave Phenomena: Computation and Theory, Athens, GA, April 4-7, 2011

Nonlinear quantum hydrodynamics – shocks, superfluid-superfluid counterflow and novel types of solitons, invited talk at KITP workshop "Beyond standard optical lattices", UCSB, December 7, 2010, KITP

Quantum hydrodynamics in ultracold atomic gases, invited talk at The Second International Conference: Nonlinear Waves--Theory and Applications, Beijing, China, June 26-29, 2010

Matter-wave Interference in Bose-Einstein Condensates: a dispersive hydrodynamics perspective, invited talk at March Meeting 2010, Portland, Oregon, March 15-19, 2010

Soliton formation during the cooling, merging and splitting of BECs, invited talk at the 39th Annual Meeting of the APS Division of Atomic, Molecular and Optical Physics (DAMOP 2008), State College, Pennsylvania, May 27-31, 2008

Nonlinear Dynamics in BECs ~ Quantum Shocks, Solitons, and Farady Waves, invited talk at the James Franck Institute, University of Chicago, May 20, 2008

Nonlinear Dynamics in BECs ~ Faraday waves, solitons and quantum shock, invited talk at the Quantum Lunch seminar, Los Alamos National Lab, March 6, 2008

Quantum hydrodynamics in BECs: From soundwaves to quantum shock, invited talk at the 38th Winter Colloquium on the Physics of Quantum Electronics, Snowbird, Utah, January 6-10, 2008

Faraday waves and solitons in a BEC, invited talk given at the conference "Bose-Einstein Condensation 2007, Frontiers in Quantum Gases", Sant Feliu de Guixols, Spain, September 15-20, 2007

Quantum Hydrodynamics - the peculiar superflow of BECs, invited talk given at the Australian National University (ANU), Canberra, Australia, July 4, 2007

Quantum Hydrodynamics of Dilute-Gas Bose-Einstein Condensates, invited talk given in at the quantum turbulence tutorial at the APS March meeting, Denver, CO, March 4, 2007

Nonlinear quantum hydrodynamics in Bose-Einstein Condensates, invited talk in the Condensed Matter and Atomic Physics seminar series, University of Washington, Seattle, November 14, 2006

Quantum Hydrodynamics in Bose-Einstein Condensates, invited talk at NWAPS meeting, University of Puget Sound, Tacoma, May 20, 2006

Views beyond the classical world - Probing Quantum Mechanics with Bose-Einstein condensates, colloquium in the Department of Applied Mathematics, University of Washington, Seattle, February 28, 2006

Hot topics in the ultracold, seminar talk given to Nonlinear Waves seminar in the Department of Applied Mathematics, University of Washington, Seattle, February 28, 2006

Experiencing the Quantum World - Modern Experiments with Bose-Einstein Condensates, physics seminar at the University of Idaho, Moscow, ID, October 24, 2005

Quantum Hydrodynamics - the peculiar superflow of Bose-Einstein Condensates, invited talk at the University of Otago, Dunedin, New Zealand, June 13, 2005.

Experiments with Rotating Bose-Einstein Condensates, Nanophysics seminar, University of Hawaii at Manoa, April 30, 2004

Physics with Rotating Bose-Einstein Condensates - Exploring a Spinning Quantum World, physics seminar at CCNY, New York, March 29, 2004

Spinning up a BEC: from irrotational superfluid to crystal-like vortex matter, seminar of the NIST ion storage group, March 5, 2004

Probing Quantum Mechanics with Rotating Bose-Einstein Condensates, CAMP Seminar, Penn State University, Feb. 24, 2004

Rotating Bose-Einstein Condensates - Views on a Spinning Quantum World, physics colloquium, Washington State University, Pullman, Feb. 9, 2004

Experiments in Quantum Fluid Dynamics - Vortex Lattice Dynamics and Shock Waves in a Bose-Einstein Condensate, SIAM Nonlinear Waves and Coherent Structures conference, Orlando, Florida, October 2-5, 2004

Nonlinear dynamics with matter waves - experiments with Bose-Einstein condensates, invited talk at the 2003 Joint Central and Western Section Meeting of the American Mathematical Society, Boulder, Colorado, October 2-4, 2003

Experiments with large vortex lattices in BECs, invited talk at the Institute for Laser Physics, Hamburg, Germany, June 19, 2003

Experiments with rapidly rotating BECs, invited talk at the Second International Workshop: Theory of Quantum Gases and Quantum Coherence, Levico (Trento, Italy), June 12-14, 2003

Vortex lattices in Bose Gases Under High Rotation Speeds, invited talk at the APS March Meeting, Austin, Texas, March 4, 2003

Experiments with rotating Bose-Einstein Condensates - a macroscopic window into nature's peculiar quantum mechanical behavior, invited talk at the Physics Colloquium, Auburn University, February 7, 2003

Superfluidity, BEC and beyond, invited talk at the Institute for Laser Physics, Hamburg, Germany, October 4, 2002

Vortex lines, lattices and vortex rings in a Bose-Einstein Condensate, invited talk at the 2002 AAAS Annual Meeting and Science Innovation Exposition, Boston, USA, February 14-19, 2002

Quantized kinks and twists - topological structures in Bose-Einstein Condensates, invited talk at the CSU Physics Colloquium, Fort Collins, USA, October 15, 2001

Experimental wavefunction engineering with BECs, invited talk at the conference "Soliton Equations: Applications and Theory", Colorado Springs, USA , August 10-12, 2001

Intrinsic Nucleation of Vortices, invited talk at the workshop "Fundamental Issues in Quantum Gases", Aspen Center for Physics, Aspen, USA, 2001

FURTHER PRESENTATIONS AT CONFERENCES AND WORKSHOPS

Maren Mossman, Peter Engels, Jose D'Incao, Deborah Jin, and Eric Cornell, Efimov studies of an ultracold cloud of K-39 atoms in microgravity: Numerical modelling and experimental design, poster presented by Peter Engels at the 47th Annual DAMOP Meeting, Providence, RI, 25 May 2016

M. A. Khamehchi, M. E. Mossman, and Peter Engels, Spin-orbit coupled lattice band psuedospins, presentation given at the 47th Annual DAMOP Meeting, Providence, RI, 24 May 2016

Peter Engels, M. A. Khamehchi, Chunlei Qu, Maren Mossman, and Chuanwei Zhang, Spin-orbit coupled Bose-Einstein condensates with lattice-band psuedospins, talk presented at the 17th Annual Meeting of the APS Northwest section, Penticton, BC Canada, 14 May 2016

Chunde Huang, Vandna Gokhroo, and Peter Engels, Optical dipole potentials using a digital micromirror device, poster presented at the 17th Annual Meeting of the APS Northwest section, Penticton, BC Canada, 13 May 2016

Maren Mossman, Peter Engels, Jose D'Incao, Deborah Jin, and Eric Cornell, Investigation of few-body physics with NASA's CAL: A precision measurement of Efimov physics in microgravity, poster displayed at the NASA Fundamental Physics Workshop, 12 April 2016

M. Mossman, M. A. Khamehchi, and P. Engels, Excitation spectrum of Bose-Einstein Condensates with modified dispersion, poster presented at the 46th Annual DAMOP Meeting, June 8-12, 2015, Columbus, Ohio

M. A. Khamehchi, M. Mossman, and P. Engels, Bragg spectroscopy of spin-orbit coupled BEC, talk given at the 46th Annual DAMOP Meeting, June 8-12, 2015, Columbus, Ohio

M. E. Mossman, M. A. Khamehchi, and P. Engels, Engineering dispersion relations: Floquet-Bloch States in a Bose-Einstein Condensate, talk given at the 16th Annual Meeting of the Northwest Section of the APS, Pullman, WA, May 14-16, 2015

M. A. Khamehchi, M. E. Mossman, and P. Engels, Roton minimum-like excitations in a Bose-Einstein condensate, talk given at the 16th Annual Meeting of the Northwest Section of the APS, Pullman, WA, May 14-16, 2015

M. A. Khamehchi, M. E. Mossman, and P. Engels, Measurement of Collective Excitations in a spin-orbit coupled Bose-Einstein condensate, poster presented at the 2015 WSU Showcase, Pullman, WA, March 27, 2015

P. Engels, Quantum quenches and spin dynamics in spin-orbit coupled Bose-Einstein condensates, poster presented at the conference Bose-Einstein Condensation 2013 – Frontiers in Quantum Gases, Sant Feliu de Guixols, Spain, September 7-13, 2013

P. Engels and C. Hamner, Quantum quenches and spin dynamics in spin-orbit coupled Bose-Einstein condensates, talk given at DAMOP 2013, Quebec City, Canada, June 3-7, 2013

C. Hamner and P. Engels, Experimental investigation of dynamics in spin-orbit coupled BECs, poster presented at DAMOP 2013, Quebec City, Canada, June 3-7, 2013

C. Hamner, P. Engels, C. Qu, M. Gong, and C. Zhang, Non-equilibrium spin dynamics in spin-orbit coupled BECs, poster presented at the Symposium on Novel Topological Quantum Matter, UT Dallas, February 25-26, 2013

C. Hamner, J.J. Chang, and P. Engels, Spin orbit coupling in a dilute gas Bose-Einstein condensate, talk given at the 14th Annual Meeting of the Northwest Section of the APS, Vancouver, BC, Canada, October 18-20, 2012

J.J. Chang, C. Hamner, and P. Engels, On the dynamics of dark-bright and dark-dark solitons in two-component BECs, talk given at DAMOP 2012, Orange County, California, June 4-8, 2012

P. Engels, C. Hamner, and J.J. Chang, Towards the observation of a Dicke type phase transition in spin-orbit coupled BECs, talk given at DAMOP 2012, Orange County, California, June 4-8, 2012

C. Hamner, J. J. Chang, and P. Engels, Nonlinear dynamics and solitonic structures of two-component BECs, poster presented at DAMOP 2012, Orange County, California, June 4-8, 2012

P. Engels, J.J. Chang, and C. Hamner, Harnessing modulational instability for the generation of vector solitons, poster presented at DAMOP 2011, Atlanta, Georgia, June 13-17, 2011

J.J. Chang, C. Hamner, and P. Engels, Exploring novel solitonic structures in two-component BECs, poster presented at DAMOP 2011, Atlanta, Georgia, June 13-17, 2011

P. Engels, C. Hamner, and J. J. Chang, Nonlinear hydrodynamics in single-component and binary Bose-Einstein condensates, talk given at 12th Annual Meeting of the Northwest Section of the APS, Walla Walla, Washington, October 1-2, 2010

J. J. Chang, C. Hamner, and P. Engels, Intercomponent dispersive shock in counterflowing BECs, talk given at 12th Annual Meeting of the Northwest Section of the APS, Walla Walla, Washington, October 1-2, 2010

C. Hamner, J. J. Chang, and P. Engels, Counterflow induced modulational instability in miscible, two-component BECs, talk given at 12th Annual Meeting of the Northwest Section of the APS, Walla Walla, Washington, October 1-2, 2010

P. Engels, J. J. Chang, and C. Hamner, Quantum hydrodynamics of binary BECs, talk given at DAMOP 2010, Houston, Texas, May 25-29, 2010

J.J. Chang, C. Hamner, and P. Engels, Nonlinear dynamics in the mixing and demixing of a two component BEC, poster presented at DAMOP 2010, Houston, Texas, May 25-29, 2010

C. Hamner, J.J. Chang, and P. Engels, Phase winding a BEC into a soliton train, poster presented at DAMOP 2010, Houston, Texas, May 25-29, 2010

P. Engels, Formation of solitons during the BEC phase transition, poster presented at Bose-Einstein Condensation 2009 Frontiers in Quantum Gases, Sant Feliu de Guixols, Spain, September 5-11, 2009

J.J. Chang, Chris Hamner, and Peter Engels, Formation of Solitons During the BEC Phase Transition, poster presented at DAMOP 2009, Charlottesville, Virginia, May 19-23, 2009

J.J. Chang and Peter Engels, Quantum shock and soliton dynamics in the splitting and merging of BECs, poster presented at DAMOP 2008, State College, Pennsylvania, May 27-31, 2008

Peter Engels and C. Atherton, Observation of Faraday Waves in a Bose-Einstein Condensate, talk given at DAMOP 2007, Calgary, Canada, June 5-9, 2007

P. Engels and C. Atherton, Observation of stationary and non-stationary flow past an obstacle in a Bose-Einstein condensate, poster presentation at DAMOP 2007, Calgary, Canada, June 5-9, 2007

P. Engels and C. Atherton, Observation of Faraday Waves in a Dilute-Gas Bose-Einstein Condensate, talk given at the 2007 APS March Meeting, Session W32, Denver, CO, March 5-9, 2007

P. Engels, presentation on current status of my work at the "Workshop on Quantum analog simulations of quantum condensed-matter models", Arlington, VA, April 4, 2005

S.-K. Tung, I. Coddington, P. Engels, V. Schweikhard, and E. A. Cornell: Vortex Dynamics in and around the Lowest Landau Level, DAMOP 2004, Tucson, Arizona, May 25-29, 2004

P. Engels, I. Coddington, V. Schweikhard, and E. A. Cornell: Experimental investigation of Vortex Lattice Dynamics in a Dilute-gas Bose-Einstein Condensate, QFS 2003 - Quantum Fluids and Solids, Albuquerque, New Mexico, USA, August 3 - 8, 2003

P. Engels, I. Coddington, P. C. Haljan, and E. A. Cornell: Nonequilibrium effects in large vortex lattices, 7th Workshop on Atom Optics and Atom Interferometry, Lunteren, Netherlands, September 28 - October 2, 2002

P. Engels, I. Coddington, P. C. Haljan, and E. A. Cornell: Vortex lattice dynamics in a rotating Bose-Einstein condensate, ICAP 2002 (Eighteenth International Conference on Atomic Physics), Cambridge, Massachusetts, USA, July 28 - August 2, 2002

P. Engels, I. Coddington, P. C. Haljan, und E. A. Cornell: Driving BEC vorticity with a rotating normal cloud, Euresco-conference "Bose-Einstein Condensation / EuroConference on the Physics of Atomic Gases at Low Temperatures", Sant Feliu, Spain, September 15-20, 2001

P. Engels, W. Ertmer, and K. Sengstock: Magnetic guiding of a cold metastable Neon* beam, 6th Workshop on Atom Optics and Atom Interferometry, Cargese, France, July 25-28, 2000

P. Engels, W. Ertmer, and K. Sengstock: Atom lithography with cold metastable Ne* atoms, CLEO/QELS 2000, San Francisco, USA, May 7-12, 2000

P. Engels, W. Ertmer, and K. Sengstock: Kohaerente Atomstrahlstrukturierung in stehenden Lichtfeldern (coherent atomic beam structuring in standing light fields), 64. Physikertagung der DPG, Bonn, Germany, April 3-7, 2000

P. Engels, S. Salewski, K. Sengstock, and W. Ertmer: Atom lithography with cold metastable neon atoms, 1999 OSA Annual Meeting and ILS-XV, Santa Clara, USA, September 26-30, 1999

P. Engels, S. Salewski, K. Sengstock, and W. Ertmer: Patterning surfaces with a slow metastable Ne* beam, 43rd EIPBN'99, Marco Island, USA, June 1-4, 1999

P. Engels, S. Salewski, K. Sengstock, and W. Ertmer: Atomlithographie mit metastabilen Neonatomen (atom lithography with metastable neon atoms), 63. Physikertagung der DPG, Heidelberg, Germany, March 15-19, 1999

A. Callegari, H. K. Srivastava, P. Engels, U. Merker, S. Choi, K. K. Lehmann, and G. Scoles: Regular vs. chaotic intramolecular dynamics in the first CH stretching overtone of aromatic molecules, 53rd International Symposium on Molecular Spectroscopy at Ohio State University, USA, June 15-19, 1998

G. Pietraperzia, P. Engels, A. Callegari, H. K. Srivastava, K. K. Lehmann, and G. Scoles: Eigenstate resolved infrared spectrum of the CH stretching first overtone region of s-tetrazine, 52nd International Symposium on Molecular Spectroscopy at Ohio State University, USA, June 16-20, 1997

S. Choi, A. Callegari, H. K. Srivastava, P. Engels, K. K. Lehmann, and G. Scoles : Eigenstate resolved infrared spectroscopy of pyrrole in the C-H stretch overtone region, 52nd International Syhmposium on Molecular Spectroscopy at Ohio State University, USA, June 16-20, 1997

A. Callegari, H. K. Srivastava, P. Engels, K. K. Lehmann, and G. Scoles, A. Heyl and P. Botschwina: High resolution molecular beam spectroscopy of the HCN dimer in the 1.5 m region. Reinvestigation of the 1 + 2 band and comparison with theory, 52nd International Symposium on Molecular Spectroscopy at Ohio State University, USA, June 16-20, 1997

A. Callegari, H. K. Srivastava, P. Engels, K. K. Lehmann, and G. Scoles: Eigenstate resolved double resonance study of benzene intramolecular vibrational energy redistribution in the C-H stretch first overtone region: a good candidate for a successful tier model analysis, 52nd International Symposium on Molecular Spectroscopy at Ohio State University, USA, June 16-20, 1997