

AMO Journal Club

Presented Articles

September 25, 2009

T. Horrom: H. Ott et al., "Experimental Demonstration of Single-Site Addressability in a Two-Dimensional Optical Lattice", *Phys. Rev. Lett.* **103**, 080404 (2009).

I. Novikova: N. Papasimakis and N. I. Zheludev, "Metamaterial-Induced Transparency", *OPN* **20**, 23 (2009).

S. Aubin: M.M. Vogel, M. Abdou-Ahmed, A. Voss, and T. Graaf, "Very-large-mode-area, single-mode multicore fiber", *Opt. Lett.* **34**, 2876 (2009).

July 30, 2009

S. Aubin: S. A. Ellingsen, S. Y. Buhmann, and S. Scheel, "Dynamics of thermal Casimir-Polder forces on polar molecules", *Phys. Rev. A* **79**, 052903 (2009).

A. Ziltz & A. Madden: E. A. L. Henn, J. A. Seman, G. Roati, K. M. F. Magalhães, and V. S. Bagnato, "Emergence of Turbulence in an Oscillating Bose-Einstein Condensate", *Phys. Rev. Lett.* **103**, 045301 (2009).

B. Sofka: J. F. Clément, J. P. Brantut, M. Robert-de-Saint-Vincent, R. A. Nyman, A. Aspect, T. Bourdel, and P. Bouyer, "All-optical runaway evaporation to Bose-Einstein condensation", *Phys. Rev. A* **79**, 061406 (2009).

J. Eldred: H. Maeda, J. H. Gurian, T. F. Gallagher, "Nondispersing Bohr Wave Packets", *Phys. Rev. Lett.* **102**, 103001 (2009).

N. Phillips: H. Tanji *et al.*, "Heralded Single-Magnon Quantum Memory for Photon Polarization States", *Phys. Rev. Lett.* **103**, 043601 (2009).

July 23, 2009

S. Aubin: D. Sofikitis, S. Weber, A. Fioretti, R. Horchani, M. Allegrini, B. Chatel, D. Comparat, and P. Pillet, "Molecular vibrational cooling by optical pumping with shaped femtosecond pulses", *New Jour. Phys.* **11**, 055037 (2009).

P. Xu: A. Rousse et al., "Non-thermal melting in semiconductors measured at femtosecond resolution", *Nature* **410**, 65 (2001).

I. Novikova: M. Roth, L. Guyon, J. Roslund, V. Boutou, F. Courvoisier, J.-P. Wolf, and H. Rabitz, "", *Phys. Rev. Lett.* **102**, 253001 (2009).

E. Mikhailov: I. Reidler, Y. Aviad, M. Rosenbluh, and I. Kanter, "Ultrahigh-Speed Random Number Generation Based on a Chaotic Semiconductor Laser", *Phys. Rev. Lett.* **103**, 024102 (2009).

M. Simons: N. F. Johnson et al., "Human group formation in online guilds and offline gangs driven by a common team dynamic", *Phys. Rev. E* **79**, 066117 (2009).

M. Ivory: J. Horvat and R. A. Lewis, "Peeling Adhesive Tape emits Electromagnetic Radiation at THz Frequencies", *Opt. Lett.* **34**, 2195 (2009).

July 16, 2009

T. Horrom: G. Widera et al., "Quantum Walk in Position Space with Single Optically Trapped Atoms", *Science* **325**, 174 (2009).

A. Ziltz: J. D. Close et al., "Pulsed Pumping of a Bose-Einstein Condensate", *Phys. Rev. A* **79**, 063630 (2009).

J. Field: N. Fabbri et al., "Excitations of BECs in a One-Dimensional Periodic Potential", *Phys. Rev. A* **79**, 043623 (2009).

S. Aubin: N. J. Fitch, C. A. Weidner, L. P. Parazzoli, H. R. Dullin, and H. J. Lewandowski, "Experimental Demonstration of Classical Hamiltonian Monodromy in the 1:1:2 Resonant Elastic Pendulum", *Phys. Rev. Lett.* **103**, 034301 (2009).

July 9, 2009

E. Mikhailov: K. Koda et al., "Serial time-encoded amplified imaging for real-time observation of fast dynamic phenomena," *Nature* **458**, 1145 (2009).

N. Phillips: R. C. Poose et al., "Low noise amplification of a continuous-variable quantum state," *Phys. Rev. Lett.* **103**, 010501 (2009).

C. Carlin: Moeda et al., "Chemical compass model at avian magnetoreception," *Nature* **453**, 387 (2008); *E. Rieper et al.*, "Quantum coherence and entanglement in the avian compass," *arXiv:0906.3725* (2009).

M. Ivory: G. K. Campbell et al., "Probing interaction between ultracold

fermions," *Science* **324**, 360 (2009).

S. Aubin: M. Cui *et al.*, "High-accuracy long-distance measurements in air with a frequency comb laser," *Opt. Lett.* **34**, 1982 (2009).

I. Novikova: K. Tsigutkin *et al.*, "Observation of a large atomic parity violation effect in Ytterbium," *arXiv*:0906.3039 (2009).

July 2, 2009

B. Sofka: Han Seb Moon, Won-Kyu Lee, and Ho Suhng Suh, "Hyperfine-structure-constant determination and absolute-frequency measurement of the Rb 4D_{3/2} state", *Phys. Rev. A* **79**, 062503 (2009).

A. Madden: K. J. Hughes, J. H. Burke, and C. A. Sackett, "Suspension of Atoms Using Optical Pulses, and Application to Gravimetry", *Phys. Rev. Lett.* **102**, 150403 (2009).

S. Aubin: X. Du, Y. Zhang, J. Petricka, and J. E. Thomas, "Controlling Spin Current in a Trapped Fermi Gas", *Phys. Rev. Lett.* **103**, 010401 (2009).

J. Eldred: H. Tsuchiya, T. Enoto, T. Torii, K. Nakazawa, T. Yuasa, S. Torii, T. Fukuyama, T. Yamaguchi, H. Kato, M. Okano, M. Takita, and K. Makishima, "Observation of an Energetic Radiation Burst from Mountain-Top Thunderclouds", *Phys. Rev. Lett.* **102**, 255003 (2009)

M. Simons: Eleonora Nagali, Fabio Sciarrino, Francesco De Martini, Lorenzo Marrucci, Bruno Piccirillo, Ebrahim Karimi, and Enrico Santamato, "Quantum Information Transfer from Spin to Orbital Angular Momentum of Photons", *Phys. Rev. Lett.* **103**, 013601 (2009).

P. Xu: Markus Greiner, Olaf Mandel, Tilman Esslinger, Theodor W. Hänsch, and Immanuel Bloch, "Quantum phase transition from a superfluid to a Mott insulator in a gas of ultracold atoms" *Nature* **415**, 39-44 (2002) .

June 25, 2009

A. Ziltz: A. Szczepkowicz *et al.*, "Optimal Geometry for Efficient Loading of an Optical Dipole Trap." *Phys. Rev. A* **79**, 013408 (2009).

T. Horrom & L.Paradis: Y. Lai *et al.*, "Illusion Optics: The Optical Transformation of an Object in Another Object", *Phys. Rev. Lett.* **102**, 253902 (2009).

J. Field: Hufnagel *et al.*, "Stability of a superconducting atom chip with persistent currents", *Phys. Rev. A* **79**, 053641 (2009).

M. Ivory: Roth et al., "Quantum Control of Tightly Competitive Product Channels", *Phys. Rev. Lett.* **102**, 253001 (2009).

June 18, 2009

S. Aubin: A. V. Ponomarev, S. Denisov, and P. Hänggi, "ac-Driven Atomic Quantum Motor" *Phys. Rev. Lett.* **102**, 230601 (2009).

I. Novikova: Giorgio Brida, Lucia Caspani, Alessandra Gatti, Marco Genovese, Alice Meda, and Ivano Ruo Berchera, "Measurement of Sub-Shot-Noise Spatial Correlations without Background Subtraction" *Phys. Rev. Lett.* **102**, 213602 (2009).

E. Mikhailov: Andrea Alù and Nader Engheta, "Cloaking a Sensor" *Phys. Rev. Lett.* **102**, 233901 (2009).

M. Simons: B. Weber, H. P. Specht, T. Müller, J. Bochmann, M. Mücke, D. L. Moehring, and G. Rempe, "Photon-Photon Entanglement with a Single Trapped Atom" *Phys. Rev. Lett.* **102**, 030501 (2009).

N. Phillips: M. Raizen "Comprehensive Control of Atomic Motion" *Science* **324**, 1403 (2009).

March 27, 2009

I. Novikova: P. K. Vadyasetu et al., "All optical waveguiding in a coherent atomic rubidium vapor," *Phys. Rev. Lett.* **102**, 123602 (2009).

S. Aubin: K. Beloy et al., "Micromagic clock: Microwave clock based on atoms in an engineered optical lattice," *Phys. Rev. Lett.* **102**, 120801 (2009).

T. Horrom: H. Maeda et al., "Nondispersing Bohr wave packets," *Phys. Rev. Lett.* **102**, 103001 (2009).

A. Ziltz: H. Chen et al., "Relativistic positron creation using ultra-intense short pulse laser," *Phys. Rev. Lett.* **102**, 105001 (2009).

M. Ivory: J.E. Debs et al., "A two-stage Raman coupler for coherent atom optics," *Opt. Express* **2319** (2009).

P. Xu: F. Stefani et al., "Beyond quantum jumps: blinking nanoscale light emitters," *Phys. Today* **62**(2), 34-39 (February 2009).

February 27, 2009

I. Novikova: E. Urban et al., "Observation of Rydberg blockade between two atoms," *Nature Physics* **5**, 110-114 (2009).

M. Simons: J. Dressel et al., "Gravitational redshift and deflection of slow light," *Phys. Rev. A* **79**, 013834 (2009).

T. Harrison: D. T. Reid et al., "Light-emitting diodes as measurement devices for femtosecond pulses," *Opt. Lett.* **22**, 233-235 (1997).

S. Aubin: Y.-L. Qi, R. Li, J. Zhang, and S.-C. Zhang, "Inducing a magnetic monopole with topological surface states," *Science* **323**, 1184 (2009).

W. Ames: I. Mercer et al., "Instantaneous mapping of Coherently coupled electronic transitions and energy transfers in a photosynthetic complex using angle-resolved coherent optical wave-mixing," *Phys. Rev. Lett.* **102**, 057402 (2009).

C. Carlin: P. Sekatski et al., "Quantum experiments with human eyes as detectors based on cloning via stimulated emission," *arXiv:0902.2896* (2009).

January 30, 2009

E. Mikhailov: B. L. Higgins, D. W. Berry et al., "Entanglement-free Heisenberg limited phase estimation", *Nature* **450**, 393 (2008).

M. Simons: A. Fukumoto, "Coaxial Holographic Data Recording," *Optics and Photonics News* **19**(11) (November 2008).

M. Ivory: M. Hung-Yu, C. Hua-Dong, W. Yu-Zhu, L. Liang, "Light induced evaporative cooling in a magneto-optical trap," *Chinese Phys. B* **17**, (2008).

S. Aubin: V.V. Flambaum, V. A. Dzuba and A. Derevianko, "Magic Frequency for Cesium Primary-Frequency Standard," *PRL* **101**, 220801 (2008).

N. Phillips: M. Shukar et al., "Ramsey-like measurements of the decoherence rate between Zeeman sublevels," *PRA* **78**, 063818 (2008).

I. Novikova: B. Murphy, L. Hau "Nanotraps for neutral atoms," *PRL* **102**, 033003 (2009).

July 15, 2008

G. Roati, M. Zaccanti, C. D. D'Errico, J. Catani, M. Modugno, A. Simoni, M. Inguscio, and G. Modugno, "³⁹K Bose-Einstein Condensate with Tunable Interactions", *Phys. Rev. Lett.* **99**, 010403 (2007).

Z. D. Blount, C. Z. Borland, and R. E. Lenski, "Historical contingency and the evolution of a key innovation in an experimental population of *Escherichia coli*", *PNAS* **105**(23), 7899-7906 (2008) (Chris)

J. Morales, M. Apatiga, V. M. Castano, "Growth of Diamond Films from Tequila," <http://arxiv.org/abs/0806.1485> (Meghan Ivory)

S. Pronk, P. L. Geissler, and D. A. Fletcher, "Limits of Filopodium Stability," *Phys. Rev. Lett.* **100**, 258102 (2008). (Justin Winkler)

I. Sainz and G. Bjork, "Quantum error correction may delay, but also cause, entanglement sudden death," *Phys. Rev. A* **77**, 052307 (2008) (Matt Simons)

July 8, 2008

R. Meyers, K.S. Deacon, and Y. Shin, "Ghost-imaging experiment by measuring reflected photons," *Phys. Rev. A* **77**, 041801(R) (2008).

Alternative classical description of the ghost imaging: B. I. Erkmen and J. H. Shapiro, "Unified Theory of Ghost Imaging with Gaussian-State Light," *Phys. Rev. A* **77**, 043809 (2008). (Novikova)

N. Fang, H. Lee, C. Sun, and X. Zhang, "Sub-Diffraction-Limited Optical Imaging with a Silver Superlens," *Science* **308**, 534 – 537 (2005). (Will Ames)

S. Sallon et al. "Germination, Genetics, and Growth of an Ancient Date Seed," *Science* **320**, 1464 (2008). (Tom Noel)

J.R. Jokipii, "A shock for Voyager 2," *Nature* **454**, 38-39 (2008) (Nathan Belcher)

D. Salart et al. " Spacelike Separation in a Bell Test Assuming Gravitationally Induced Collapses," *Phys. Rev. Lett.* **100**, 220404 (2008). (Martha Roseberry)

June 24, 2008

M. T. Murphy, V. V. Flambaum, S. Muller, and C. Henkel, "Strong Limit on a Variable Proton-to-Electron Mass Ratio from Molecules in the Distant Universe", *Science* **320**, 1611 (2008). (Aubin)

Z. Günnur Dikmen, G. Gellert, P. Doğan, R. Mason, P. Antich, E. Richer, W. E. Wright, J. W. Shay, "A New Diagnostic System in Cancer Research: Bioluminescent Imaging (BLI)", *Turk. J. Med. Sci.* **35**, 65 (2005). (Meghan Ivory)

L. Smilowitz, B. F. Henson, J. J. Romero, B. W. Asay, C. L. Schwartz, A. Saunders, F. E. Merrill, C. L. Morris, K. Kwiatkowski, G. Hogan, P. Nedrow, M. M. Murray, T. N. Thompson, W. McNeil, P. Rightley, M. Marr-Lyon, and pRad Collaboration, "Direct Observation of the Phenomenology of a Solid Thermal Explosion Using Time-Resolved Proton Radiography", *Phys. Rev. Lett.* **100**, 228301 (2008). (Justin Winkler)

R. R. Nair, P. Blake, A. N. Grigorenko, K. S. Novoselov, T. J. Booth, T. Stauber, N. M. R. Peres, and A. K. Geim, "Fine Structure Constant Defines Visual Transparency of Graphene", *Science* **320**, 1308 (2008). (Mikhailov)

George S. Bakken and Aaron R. Krochmal, "The imaging properties and sensitivity of the facial pits of pitvipers as determined by optical and heat-transfer analysis", *J. Exp. Biol.* **210**, 2801 (2007). (Nate Phillips)

June 10, 2008

M. Prakash, D. Quéré, and J. W. M. Bush, "Surface Tension Transport of Prey by Feeding Shorebirds: The Capillary Ratchet", *Science* **320**(5878), 931 - 934 (2008). (Tom Noel)

T. G. Philbin et al., "Fiber-Optical Analog of the Event Horizon," *Science* **319**(5868), 1367 - 1370 (2008). (Martha Roseberry)

X. Zhang, and Z. Liu, "Superlenses to overcome the diffraction limit," *Nature Materials* **7**, 435 - 441 (2008). (Nathan Belcher)

R A J Matthews, "Tumbling toast, Murphy's Law and the fundamental constants," *Eur. J. Phys.* **16**, 172-176 (1995). (Will Ames)

T. Haist and W. Osten, "An Optical Solution For The Traveling Salesman Problem," *Opt. Express* **15**, 10473-10482 (2007). (Chris Carlin)

June 3, 2008

1. Thalhammer et al. "Double species condensate with tunable interspecies interactions", *Phys. Rev. Lett.* **100**, 210402 (2008). (Aubin)

2. Ch.-H. Li et al. "A laser frequency comb that enables radial velocity measurements with precision of 1 cm/s", *Nature* **452**, 610-612 (2008). (Novikova)

3. Neder et al., "Unexpected Behavior in a Two-Path Electron Interferometer", *Phys. Rev. Lett.* 96, 016804 (2006). (Mikhailov)
4. D. Lathrop "Liquid sodium model of geophysical core convection," <http://complex.umd.edu/dynamo/index.html> (Nate Phillips)
5. Vigneron et al. "Natural layer-by-layer photonic structure in the squamae of *Hoplia coerulea*", *Phys. Rev. E* **72**, 061904 (2005). (Kelly Kluttz)