

VINCENT BOYER

Lecturer in Physics, University of Birmingham

Midlands Ultracold Atom Research Centre
School of Physics & Astronomy
University of Birmingham
Edgbaston
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EDUCATION

| | | |
|--|--------------------------|------|
| PhD Quantum Physics "Bose-Einstein Condensation with an iron core electromagnet: cooling strategies in high magnetic fields" | University of Paris 6 | 2000 |
| Magistère Interuniversitaire of Physics , Paris 6/ENS, composed of: | | |
| DEA of Quantum Physics | Ecole Normale Supérieure | 1996 |
| MS Physics | | 1994 |
| BS Physics | | 1994 |

RESEARCH EXPERIENCE

Guest researcher June 2005 – February 2009
National Institute of Standards and Technology

Nonlinear and Quantum Optics in the group of William Phillips
Generated strongly squeezed light with 4-wave mixing in an atomic vapor, a goal that had been elusive for 20 years
Characterized the multimode character of the squeezing and produced the first entangled images

Marie Curie Fellow July 2002 – June 2005
University of Oxford

Bose-Einstein Condensation in the group of Christopher Foot
Manipulated Bose-Einstein condensates in dynamics arbitrary optical potentials created by diffractive optics
Studied cold 3-body collisions near a Feshbach resonance

Guest researcher April 2000 – May 2002
National Institute of Standards and Technology

Advanced laser cooling in the group of William Phillips
Used 2D Raman cooling to cool a cloud of Cesium atoms down to 30 nK, as part of the space clock program PARCS

Graduate student Sept 1996 – Jan 2000
Institut d'Optique, Orsay

Bose-Einstein condensation in the group of Alain Aspect
Studied magnetic trapping in a novel type of ferromagnetic trap, and developed techniques of evaporative cooling to reach quantum degeneracy in this type of trap

Student intern
Ohio State University

Jan – Jun 1997

Participated in the prototyping of a particle detector based on the Cherenkov effect

TEACHING EXPERIENCE

Teaching assistantship University of Paris 7 2004 – 2007
Recitations and laboratory classes
Full teaching training

Tutor University of Oxford 2004 – 2005
Classes and tutorials in atomic and laser physics

FELLOWSHIPS AND SCHOLARSHIPS

Marie Curie Fellowship (European Union) 2002 – 2004

French Ministry of Education scholarship (PhD) 1996 – 1999

MISCELLANEOUS

Member of the organizing committee of the European conference “Young Atom Opticians”, Orsay 1998.

Member of the American Physical Society and the Optical Society of America

PUBLICATIONS

- “Low-Noise Amplification of a Continuous-Variable Quantum State”
R. C. Pooser, A. M. Marino, **V. Boyer**, and P. D. Lett
Physical Review Letters **103**, 010501 (2009).
- “Entangling Light in its Spatial Degrees of Freedom with Four-Wave Mixing in an Atomic Vapor”
V. Boyer, A. M. Marino, R. C. Pooser, and P. D. Lett
ChemPhysChem **10**, 755 (2009).
- “Tunable delay of Einstein-Podolsky-Rosen entanglement”
A. M. Marino, R. C. Pooser, **V. Boyer**, and P. D. Lett
Nature **457**, 859 (2009).
- “Delocalized correlations in twin light beams with orbital angular momentum”
A. M. Marino, **V. Boyer**, R. C. Pooser, P. D. Lett, K. Lemons, and K. M. Jones
Physical Review Letters **101**, 093602 (2008).
- “Production of entangled images by four-wave mixing”
V. Boyer, A. M. Marino, R. C. Pooser, and P. D. Lett
Science **321**, 544 (2008).
- “Generation of spatially broadband twin beams for quantum imaging”
V. Boyer, A. M. Marino, and P. D. Lett
Physical Review Letters **100**, 143601 (2008).
- “Violation of the Cauchy-Schwarz inequality in the macroscopic regime”
A. M. Marino, **V. Boyer**, and P. D. Lett
Physical Review Letters **100**, 233601 (2008).
- “Strong low-frequency quantum correlations from a four-wave mixing amplifier”
C. F. McCormick, A. M. Marino, **V. Boyer**, P. D. Lett
Physical Review A **78**, 043816 (2008).
- “Ultraslow propagation of matched pulses by four-wave mixing in an atomic vapor”
V. Boyer, C. F. McCormick, E. Arimondo, P. D. Lett
Physical Review Letters **99**, 143601 (2007).
- “Strong relative intensity squeezing by 4-wave mixing in Rb vapor”
C. F. McCormick, **V. Boyer**, E. Arimondo, P. D. Lett
Optics Letters **32**, 178 (2007).
- “Collisional relaxation of Feshbach molecules and three-body recombination in 87Rb Bose-Einstein condensates”
G. Smirne, R. M. Godun, D. Cassettari, **V. Boyer**, C. J. Foot, T. Volz, N. Syassen, S. Dürr, G. Rempe, M. g D. Lee, K. Goral, T. Koehler
Physical Review A **75**, 020702 (2007).
- “Dynamic manipulation of Bose-Einstein condensates with a spatial light modulator”
V. Boyer, R. M. Godun, G. Smirne, D. Cassettari, C. M. Chandrashekar, A. B. Deb, Z. J. Laczik, C. J. Foot
Physical Review A **73**, 031402 (2006).

- “Deeply subrecoil two-dimensional Raman cooling”
V. Boyer, L. J. Lising, S. L. Rolston, W. D. Phillips
Physical Review A **70**, 043405 (2004).
- “Dynamic optical trap generation using FLC SLMs for the manipulation of cold atoms”
V. Boyer, C. M. Chandrashekar, C. J. Foot, Z. J. Laczik,
Journal of Modern Optics **51**, 2235 (2004).
- “Understanding the production of dual Bose-Einstein condensation with sympathetic cooling”
G. Delannoy, S. G. Murdoch, **V. Boyer**, V. Josse, P. Bouyer, A. Aspect
Physical Review A **6305**, 1602 (2001).
- “Multifrequency evaporative cooling to Bose-Einstein condensation in a high magnetic field”
V. Boyer, S. Murdoch, Y. Le Coq, G. Delannoy, P. Bouyer, A. Aspect
Physical Review A **6202**, 1601 (2000).
- “Interrupted evaporative cooling of Rb-87 atoms trapped in a high magnetic field”
B. Desruelle, **V. Boyer**, S. G. Murdoch, G. Delannoy, P. Bouyer, A. Aspect,
M. Lécivain
Physical Review A **60**, R1759 (1999).
- “Trapping cold neutral atoms with an iron-core electromagnet”
B. Desruelle, **V. Boyer**, P. Bouyer, G. Birkl, M. Lécivain, F. Alves, C. I. Westbrook, A. Aspect
European Physical Journal D **1**, 255 (1998).

RECENT ORAL COMMUNICATIONS

- “Generation of entangled images with a four-wave mixer”
Vincent Boyer, Alberto Marino, Raphael Pooser, Paul Lett
Workshop on Entanglement and Quantum Decoherence (EQD)
Nara, Japan - January 28-30, 2008
- “Slow light and matched pulses in 4-wave mixing”
Vincent Boyer, Colin McCormick, Ennio Arimondo, Paul Lett
CLEO/QELS 07
Baltimore, MD - May 6-11, 2007
- “Generation of narrowband twin beams for atomic manipulation”
Vincent Boyer, Colin McCormick, Ennio Arimondo, Kevin Jones, Paul Lett
Frontier in Optics 2006
Rochester, NY - October 8-12, 2006
- “EIT enhancement of 4-wave mixing for correlated photon generation”
Vincent Boyer, Colin F. McCormick, Kevin M. Jones, Paul D. Lett
CLEO/QELS 06
Long Beach, CA - May 21-26, 2006