

Dr. Paul Constantine Condylis (PhD, MPhys)

Birth date: 29/06/1979

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Qualifications

Current: **Marie Curie Post-Doctoral Researcher** (IESL-FORTH)

Past: **PhD. Experimental Physics** (Imperial College)

The electron's permanent electric dipole moment (EDM) is predicted to be non-zero by various particle theories. If the electron were found to have a non-zero EDM it would constitute a violation of time reversal symmetry. The standard model predicts a value well below the current experimental limit, therefore a search for the electron EDM is a search for physics beyond the standard model. The EDM measurement uses an interferometric technique on the hyperfine structure of the YbF molecule. These molecules are produced by laser ablation of Yb, which is mixed into a supersonically expanding carrier gas jet of Ar and SF₆. This technique produces a rotationally cold YbF beam which can be sensitively probed by laser induced fluorescence.

Past: **MPhys Physics, 1st class** (University of Salford, 06/02)

My final year project was to analytically find solutions to Fresnel diffraction problems from non-standard apertures. This has applications to unstable laser cavities, which produce complex output modes displaying fractal characteristics.

Academic Achievements

Joules Physics Laboratory Head of Physics Prize (2002)

Fareham College Engineering Student of the Year (1998)

Languages

English (native), Greek (fluent), German (beginner), Turkish (beginner), Italian (beginner)

Skills

During my PhD I learnt many new skills and worked with a variety of experimental equipment. The EDM experiment uses the techniques of atomic and molecular physics. I have gained a great deal of experience using Dye, YAG, Ti:Saph, and Ar Ion lasers. I have experience building and fixing electronic devices, performing data analysis, and writing computer programs to perform various tasks such as data acquisition. I am able to program in C#, Java, Pascal, Mathematica, and LabView. I am also able to design in AutoDesk AutoCAD and Inventor.

Publications

Stark shift of the $A^2\Pi_{1/2}$ state in ^{174}YbF ,

P. C. Condylis, J. J. Hudson, M. R. Tarbutt, B. E. Sauer, and E. A. Hinds.
J. Chem. Phys. **123**, 231101 (2005)

Towards a new measurement of the electron's electric dipole moment,

J. J. Hudson, P. C. Condylis, H. T. Ashworth, M. R. Tarbutt, B. E. Sauer, and E. A. Hinds.

Proceedings of the 17th Conference on Laser Spectroscopy, p.116-123, World Scientific, Singapore (2005)

Conference Posters

Time-Averaged Adiabatic Potentials (TAAP) for Matter-wave Interferometry,

M. Baker, V. Bolpasi, P. C. Condylis, G. Konstantinidis, N. Lagos, A. Lazoudis, I. Lesanovsky, O. Morizot, M. Pappa, A. Protopapadakis, D. Sanchez, W. von Klitzing,
9th European Conference on Atoms, Molecules, and Photons, May 2007, Crete Greece

Doughnuts, Double Cigars, and Accelerators, for BEC Matter-wave Interferometers,

V. Bolpasi, P. C. Condylis, A. Laszoudis, I. Lesanovsky, W. von Klitzing,
XX International Conference on Atomic Physics, July 2006 Innsbruck Austria

Measurement of the Electron Electric Dipole Moment Using Supersonic YbF Molecules,

P. C. Condylis, J. J. Hudson, M. R. Tarbutt, B. E. Sauer, and E. A. Hinds,
Institute of Physics, Physics 2005, A Century After Einstein

Invited Talks

Quantum Optics Group, Institute d'Optique, Paris France, 10/2005

Institute of Electronic Structure and Lasers, Forth, Heraklion Crete, 09/2005

Cold Molecules Group, Laboratoire Aimé Cotton, University Paris-Sud 11, Orsay, Paris France, 08/2005

Quantum Optics Group, Institute for Experimental Physics, Heinrich-Heine-Universität,
Düsseldorf Germany, 07/2005