

Curriculum Vitae

PERSONAL INFORMATION

Name : Paraskevas
Surname : Tzallas
Place and date of birth : Grevena-Greece, Feb. 4, 1974.
Position : Researcher C in FORTH-IESL
Office address : Foundation for Research and Technology - Hellas
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ACADEMIC STUDIES

1992-1996 : Diploma degree in Physics, Univ. of Ioannina-Greece
1996-2002 : Post graduate student in Atomic and Molecular Physics, Department of Physics, University of Ioannina.
2002-2004 : Post-Doc position in MAX-PLANCK-INSTITUT FÜR QUANTENOPTIK in Garching (Germany)
Other working places and collaborations:
- Rutherford Appleton Laboratory (UK)
- Department of Physics and Astronomy, University of Glasgow, Glasgow, Scotland-UK.
- Max Planck Institute for Quantum Optic (MPQ) in Garching (Germany),
- Institute of Carnot de Bourgogne in Dijon (France).

RESEARCH ACTIVITIES

- Atomic Molecular and Optical physics
- Molecular spectroscopy and mass spectrometry
- Attosecond and strong field physics
- Coherent XUV sources and attosecond pulse generation
- Short pulse and attosecond pulse metrology
- Coherent phenomena and spectroscopy

DEVELOPMENT OF SPECIALIZED INSTRUMENTATION

- Dispersionless XUV autocorrelator
- Visible-UV light synthesizer
- Interferometric Polarization Gating device for the generation of intense single attosecond pulses by many-cycle pulses

RESEARCH HIGHLIGHTS

- First direct observation and quantitative measurement of attosecond light bursts.
- First observation of atomic direct double ionization by harmonic superposition.
- Generation of intense continuum XUV radiation by many-cycle fields.

STUDENT SUPERVISION

1. E. Papalazarou (Master thesis)
2. E. Skantzakis (Master thesis)
3. G. Maravelias (Master thesis)
4. G. Katsandredakis (Diploma thesis)

BOARD MEMBER

- o Member of the Local Organizing Committee of the 9th European Conference on Atoms Molecules and Photons (ECAMP 9).

PUBLICATIONS IN INTERNATIONAL REFEREED JOURNALS

(The number in brackets indicates the citations of each publication at the moment (total number 313))

(26 published papers, including 1 *Nature*, 1 *Nature Phys.* and 3 *Phys. Rev. Lett.*)

1. **Laser induced ionization/dissociation of cyclopentanone in the 320-370 nm region.**
C. Kosmidis, J.G. Philis, **P. Tzallas**, *Phys. Chem. Chem. Phys.*, **1999**, *1*, 2945. [2]
2. **Multiply charged intact ions of polyatomic cyclic molecules generated by strong laser field.**
C. Kosmidis, **P. Tzallas**, K.W.D. Ledingham, T. McCanny, R.P. Singhal, P.F. Taday, A.J. Langley, *J. Phys. Chem. A*, **1999**, *103*, 6950. [22]
3. **The onset of coulomb explosions in polyatomic molecules.**
D. J. Smith, K. W. D. Ledingham, R. P. Singhal, T. McCanny, P. Graham, H. S. Kilic, **P. Tzallas**, C. Kosmidis, A. J. Langley, P. F. Taday, *Rapid Commun. Mass Spectrom.*, **1999**, *13*, 1366. [12]
4. **An investigation of the angular distributions of fragment ions arising from the linear CS₂ and CO₂ molecules.**
P. Graham, K.W.D Ledingham, R.P. Singhal, T. McCanny, S.M. Hankin, X. Fang, D.J. Smith, C. Kosmidis, **P. Tzallas**, A.J. Langley, P.F. Taday, *J. Phys. B: At. Mol. Opt. Phys.*, **1999**, *32*, 5557. [23]
5. **Unusual fragmentation patterns from the dissociation of some small molecules.**
P. Graham, X. Fang, K.W.D. Ledingham, R.P. Singhal, T. McCanny, D.J. Smith, C. Kosmidis, **P. Tzallas**, A.J. Langley, P.F. Taday, *Laser and Particle beams*, **2000**, *18*, 417. [3]
6. **The angular distributions of fragment ions from labelled and unlabelled N₂O in intense laser fields.**
P. Graham, K.W.D Ledingham, R.P. Singhal, T. McCanny, S.M. Hankin, X. Fang, **P. Tzallas**, C. Kosmidis, P.F. Taday, A.J. Langley, *J. Phys. B: At. Mol. Opt. Phys.*, **2000**, *33*, 3779. [10]
7. **Coulomb explosion in aromatic molecules and their deuterated derivatives.**
P. Tzallas, C. Kosmidis, P. Graham, K.W.D. Ledingham, T. McCanny, S.M. Hankin, R.P. Singhal, P.F. Taday, A.J. Langley, *Chem. Phys. Lett.*, **2000**, *332*, 236. [18]
8. **On the multielectron dissociative ionization of some cyclic aromatic molecules induced by strong laser fields.**

- P. Tzallas, C. Kosmidis, K.W.D Ledingham, R.P. Singhal, T. McCanny, P. Graham, S.M. Hankin, P.F. Taday, A.J. Langley, *J. Phys. Chem. A*, **2001**, *105*, 529. [20]
9. **Ionization/dissociation of Thiazole and Thiazolidine induced by strong laser fields.**
P. Tzallas, C. Kosmidis, J.G. Philis, K.W.D Ledingham, T. McCanny, R.P. Singhal, S.M. Hankin, P.F. Taday, A.J. Langley, *Chem. Phys. Lett.*, **2001**, *343*, 91. [12]
10. **On the fragment ion angular distributions arising from the tetrahedral molecule CH₃I.**
P. Graham, K.W.D. Ledingham, R.P. Singhal, S.M. Hankin, T. McCanny, X. Fang, C. Kosmidis, P. Tzallas, P.F. Taday, A.J. Langley, *J. Phys. B: At. Mol. Opt. Phys.*, **2001**, *34*, 4015. [19]
11. **Ultrafast laser analysis of nitro-PAHs using laser desorption/femtosecond ionization mass spectrometry.**
A.D. Tasker, L. Robson, S.M. Hankin, K.W.D Ledingham, R.P. Singhal, X. Fang, T. McCanny, C. Kosmidis, P. Tzallas, A.J. Langley, P.F. Taday, E.J. Divall, *Laser and Particle Beams*, **2001**, *19*, 205. [4]
12. **Femtosecond laser time-of-flight mass spectrometry of labile molecular analytes: laser-desorbed nitro-aromatic molecules.**
S.M. Hankin, A.D. Tasker, L. Robson, K.W.D Ledingham, X. Fang, P. McKenna, T. McCanny, R.P. Singhal, C. Kosmidis, P. Tzallas, D.A. Jaroszynski, D.R. Jones, R.C. Issac, S. Jamison, *Rapid Commun. Mass Spectrom.*, **2002**, *16*, 111. [10]
13. **Ionization and fragmentation dynamics of laser desorbed polyatomic aromatic hydrocarbons using femtosecond and nanosecond post ionization.**
L. Robson, A.D. Tasker, K.W.D. Ledingham, P. McKenna, T. McCanny, C. Kosmidis, P. Tzallas, D.A. Jaroszynski, D.R. Jones, R.C. Issac, S. Jamison, *Int. J. Mass Spectrom.*, **2002**, *220*, 69. [7]
14. **Two XUV-photon ionization of He through a superposition of higher harmonics**
N.A. Papadogiannis, L. A. A. Nikolopoulos, and D.Charalambidis and G. D. Tsakiris, P. Tzallas and K. Witte, *Phys. Rev. Lett.*, **2003**, *90*, 133902. [26]
15. **Recent Developments in Attosecond Pulse Train Metrology**
D. Charalambidis, N. A. Papadogiannis, P. Tzallas, G. D. Tsakiris and K. Witte, *Physica Scripta*, 2003, *T105*, 23. [2]
16. **On the feasibility of performing non-linear autocorrelation with attosecond pulse trains**
N.A. Papadogiannis, L. A. A. Nikolopoulos, and D.Charalambidis and G. D. Tsakiris, P. Tzallas and K. Witte, *Appl. Phys. B*, **2003**, *76*, 721. [12]
17. **Direct observation of attosecond light bunching**
P. Tzallas, D. Charalambidis, N. A. Papadogiannis, K. Witte, G. D. Tsakiris, *Nature*, **2003**, *426*, 267. [88]
18. **Extending optical fs metrology to XUV attosecond pulses**
P. Tzallas, K. Witte, G. D. Tsakiris, N. A. Papadogiannis, D. Charalambidis, *Appl. Phys. A*, **2004**, *79*, 1673 [1].
19. **Second-order autocorrelation measurements of attosecond XUV pulse trains**

- P. Tzallas**, D. Charalambidis, N. A. Papadogiannis, K. Witte, G. D. Tsakiris, *J. Mod. Opt.*, **2005**, *52*, 321. [4]
- 20. Second Order Autocorrelation of an XUV Attosecond pulse train**
L. A. A. Nikolopoulos, E. P. Benis, **P. Tzallas**, D. Charalambidis, K. Witte, G. D. Tsakiris, *Phys. Rev. Lett.*, **2005**, *94*, 113905 (Selected for the April 2005 issue of Virtual Journal of Ultrafast Science). [11]
- 21. Attosecond pulse trains: Generation, Metrology and Application Perspectives**
P. Tzallas, E. P. Benis, D. Charalambidis, G. D. Tsakiris, K. Witte, L. A. A. Nikolopoulos, *Laser Physics*, **2005**, *15*, 821
- 22. The attosecond-science frontiers: generation, metrology and path of applications**
P. Tzallas, G. D. Tsakiris, K. Witte, L. A. A. Nikolopoulos, E. P. Benis, D. Charalambidis, *J. Elect. Spec. Rel. Phenomena*, **2005**, *144*, 1129.
- 23. Spectral phase distribution retrieved through coherent control of harmonic generation.**
E. Papalazarou, M. Kovacev, **P. Tzallas**, E. P. Benis, C. Kalpouzos, G. D. Tsakiris and D. Charalambidis, *Phys. Rev. Lett.*, **2006**, *96*, 163901. [1]
- 24. Frequency resolved photoelectron spectra of two-photon ionization of He by an attosecond pulse train.**
E. P. Benis, **P. Tzallas**, L. A. A. Nikolopoulos, M. Kovacev, C. Kalpouzos, D. Charalambidis and G. D. Tsakiris *New J. Phys.*, **2006**, *8*, 92. [2]
- 25. Comment on “Photoionization of helium atoms irradiated with intense vacuum ultraviolet free-electron laser light. Part I. Experimental study of multiphoton and single-photon processes”**
D. Charalambidis, **P. Tzallas**, N. A. Papadogiannis, L. A. A. Nikolopoulos, E. P. Benis and G. D. Tsakiris *Phys. Rev. A*, **2006**, *74*, 037401. [2]
- 26. Two-XUV-photon direct double ionization of rare gases by harmonic superposition**
E. P. Benis, D. Charalambidis, T. N. Kitsopoulos, G. D. Tsakiris and **P. Tzallas** *Phys. Rev. A*, **2006**, *74*, 051402(R) (Selected for the December 2006 issue of Virtual Journal of Ultrafast Science). [2]
- 27. Full temporal reconstruction of a lower order harmonic superposition.**
P. Tzallas, E. Skantzakis, E. P. Benis, A. Bonarou, C. Kitsopoulos, G. D. Tsakiris and D. Charalambidis *New J. Phys.*, **2007**, *9*, 232.
- 28. Generation of intense continuum XUV radiation by many cycle laser fields**
P. Tzallas, E. Skantzakis, C. Kalpouzos, E. P. Benis, G. Tsakiris and D. Charalambidis *Nature Phys.* **2007**, *3*, 846.
- 29. Laser-induced field-free alignment of OCS molecule**
V. Lorient, **P. Tzallas**, E. P. Benis, E. Hertz, B Lavorel, D. Charalambidis and O. Faucher *J. Phys. B*, **2007**, *40*, 2503.
- 30. Exploring intense attosecond pulses**
D. Charalambidis, **P. Tzallas**, E. P. Benis, E. Skantzakis, G. Maravelias, L. A. A. Nikolopoulos, A. P. Conde, G. D. Tsakiris *New J. Phys.*, **2007** (*accepted*)
- 31. Attosecond scale multi-XUV-photon processes**
D. Charalambidis, **P. Tzallas**, E. P. Benis and G. D. Tsakiris *Progress in Ultrafast Intense Laser Science* (Invited chapter in review book)

SPECIAL CITATIONS IN THE INTERNATIONAL PRESS

- Laser Focus World, issue March 2004: "Attosecond pulses are measured by autocorrelation"

http://lfw.pennnet.com/Articles/Article_Display.cfm?Section=ARTCL&ARTICLE_ID=201571&VERSION_NUM=1

CONFERENCE PROCEEDINGS

- 1. Attosecond science: Present status and prospects (SPIE Optical Engineering, Proc. 2002)**
N. A. Papadogiannis, G. Nersisyan, E. Goulielmakis, M. Decros, M. Tatarakis, E. Hertz, L. A. A. Nikolopoulos, D. Charalambidis, G. D. Tsakiris, **P. Tzallas** and K. Witte *SPIE Optical Engineering*, (2002).
- 2. Extending fs pulse metrology to attosecond XUV pulses (Proc. HILAP 5th Conf. 2004)**
P. Tzallas, G. D. Tsakiris, K. Witte, L. A. A. Nikolopoulos, E. P. Benis, M. Kovačev and D. Charalambidis, *SPIE Int. Soc. Opt. Eng.* **2005**, 538, 5445.
- 3. On the second order autocorrelation of an XUV attosecond pulse train (Proc. XXIV ICPEAC)**
E. P. Benis, L. A. A. Nikolopoulos, **P. Tzallas**, D. Charalambidis, K. Witte and G. D. Tsakiris, *Photonic Electronic and Atomic Collisions*, Rosario, Argentina 20 - 26 July 2005.

CONTRIBUTION TO CONFERENCES AND WORKSHOPS

1. New Laser Technologies and Applications, The Second GR-I International Conference, Olympia, Greece **1997**.
2. Resonance Ionization Spectroscopy (RIS), The Ninth International Symposium, Manchester UK **1998**.
3. Ultraintense Laser Interactions and Applications-1 (ULIA), Euroconference, Elounda, Crete, Greece, May **1999 (poster)**.
4. RIS-2000, Laser Ionization and Applications Incorporating RIS, The Tenth International Symposium on Resonance Ionization Spectroscopy & Its Applications, Knoxville, Tennessee USA **2000**.
5. ATTO Meeting, Elounda, Crete, Greece **2002 (poster)**.
6. International Conference On Multiphoton Processes (ICOMP), Elounda, Crete, Greece **2002 (poster)**.
7. Femto and Attosecond Phenomena in Materials Symposium, Boston, US **2002**
8. The XIV International Symposium On Gas Flow & Chemical Lasers and High Power Laser Conference, Wroclaw, Poland **2002**.
9. ATTO Midterm Review Meeting, Vienna, Austria **2003. (oral)**
10. ATTO Meeting, Biarritz, France **2003. (oral)**
11. Applications of High Field Short Wavelength Sources X, HFSW Biarritz, France **2003 (oral)**.
12. XTRA Meeting, Santorini, Greece, **2004. (oral)**
13. WorkShops on Ultra-high Intensity Interaction Plasma Emission Diagnostic (LASERLAB-EUROPE) and Laser and Plasma Interferometric Diagnostics (LASERNET), CCLRC Rutherford Appleton Lab., UK, **2005 (poster)**.
14. XXI International Symposium on Molecular Beams, Hersonissos, Crete, Greece, **2005 (poster)**.

15. XXIV International Conference on Photonic and Atomic Collisions (ICPEAC, Rosario, Argentina, 20-26 July **2005**).
16. X International Conference On Multiphoton Processes (ICOMP), Megog, Canada, 9-14 October **2005**. (**oral**)
17. International Conference on the interaction of Atoms, Molecules and Plasmas with Intense ultrashort laser pulses (IAMPI), Szeged, Hungary, 1-5 October **2006 (invited lecture)**
18. XTRA-Network meeting, Padova, Italy, 26 Feb. **2007 (oral)**
19. 9th European Conference on Atoms, Molecules and Photons (ECAMP 9), Hersonissos (Crete), Greece 6-11 May, 2007 (**poster**)

PARTICIPATION IN EUROPEAN PROJECTS

1. Marie Curie Research and Training Network Contr. Nr. HPRN-CT-2000-00133
Title: "Generation and Characterization of Attosecond pulses in Strong Laser-Atom Interactions" (ATTO)
2. Marie Curie Research and Training Network Contr. Nr. MRTN-CT-2003-505138
Title: "Ultrashort XUV pulses for Time Resolved and Non -linear Applications" (XTRA)
3. Marie Curie Transfer of Knowledge Grant Contr. Nr. MTKD-CT-2004-517145
Title: XUV-High Order Harmonic Metrology Tools for Novel Spectroscopic Applications (X-HOMES)
4. Marie Curie "Joint Research Activities" Grant
Title: Frontiers of Optical Science: Controlling Intense Light (FOSCIL)