

# CURRICULUM VITAE

## (April 2016)

**Dr. Kyriaki Kosma**

**Tel.** +30 6974953508

**Email:** [kosma@iesl.forth.gr](mailto:kosma@iesl.forth.gr)

**Date of birth:** 03-07-1982

**Place of Birth:** Thessaloniki, Greece

**Citizenship:** Greek, Cypriot

### EDUCATION

---

**May 2005 – July 2008:**

Ph.D. in experimental physics:

*“UV-pump IR-probe spectroscopy of molecules with time-resolution reaching the 10-fs range”*

Laboratory for Attosecond Physics, Max-Planck-Institut für Quantenoptik, Garching, Germany

Ludwig-Maximilians-Universität, Munich, Germany

Supervising Professor: Prof. Ferenc Krausz, Supervising Researcher: Dr. Werner Fuss

**November 2004 – April 2005:**

Diploma thesis:

*“Ultrabroad white-light continuum generated by focusing few-cycle pulses at 800 nm into argon”*

Laboratory for Attosecond Physics, Max-Planck-Institut für Quantenoptik, Garching, Germany

Ludwig-Maximilians-Universität, Munich, Germany

Supervising Professor: Prof. Ferenc Krausz, Supervising Researcher: Dr. Werner Fuss

**October 2000 – July 2004:**

First (4-year) degree in Physics (8.27/10)

Undergraduate studies, Physics Department, University of Ioannina, Greece

**August 2003 – October 2003:**

Project on design and construction of Cu/Co Nanowires

International Summer Student Program, Material Science group

GSI Helmholtzzentrum für Schwerionenforschung, Darmstadt, Germany

### RESEARCH AND WORK EXPERIENCE

---

**February 2010 – present:**

Post-doctoral fellow

Institute of Electronic Structure and Laser

Foundation for Research and Technology – Hellas, Heraklion, Greece

**August 2008 – January 2010:**

Post-doctoral fellow

Laboratory for Free Clusters and Molecules

Max-Born-Institut für Nichtlineare Optik und Kurzzeitspektroskopie, Berlin, Germany

**Referee in international scientific journals:**

Journal of Physics B: Atomic, Molecular & Optical Physics, Sensors, Optics Letters, Chemical Physics

### TEACHING EXPERIENCE

---

**October 2013 – January 2016:**

Acoustics and Optics Laboratory, Department of Music Technology and Acoustics Engineering,

School of Applied Sciences (Rethymnon), Technological & Educational Institute of Crete

**Co-organization of Meetings/ Workshops:**

## RESEARCH FIELDS AND INTERESTS

---

- Fiber Optics / Photonics:

Optical properties of photonic devices that combine optical fibers with integrated microsphere resonators of different materials (polymeric materials, glasses), of some micrometers in size (1 micrometer =  $10^{-6}$  m), and their applications in switching devices, refractive index sensors etc. Microsphere resonators integrated in isolated or coupled schemes of two or more microcavities, investigation and analysis of Whispering Gallery Mode patterns in terms of Q-factors and intensity yields, resonant wavelength shifts, and mode splitting.

- Optical Physics/ Laser Physics:

Ultrashort (femtosecond,  $1 \text{ fs} = 10^{-15} \text{ sec}$ ) pulse generation in the near infrared (near-IR) and ultraviolet (UV and vacuum UV/ XUV) spectral regions, by means of self-phase modulation in filamentation and supercontinuum generation or by producing harmonics/ high-order harmonics in noble gases, for applications in molecular spectroscopy.

Spectral broadening, due to self-phase modulation in filamentation during propagation in a nonlinear medium, and subsequent pulse compression with appropriate optical elements results in near-IR pulses of about 10 fs at 800 nm. A supercontinuum spectrum then emerges from the spectral broadening of the ultrashort and intense near-IR pulses in optical filaments, while the resulting spectra span the range of 250 to 1500 nm; with subsequent filtering and temporal compression UV pulses of 20 to 30 fs can be obtained.

- Molecular Spectroscopy:

Dynamics of ultrafast photophysical and photochemical reactions of molecules in the gas phase after electronic excitation, completed within a few tens to hundreds of femtoseconds. The study of molecular dynamics refers to the direct measurement of the transition times of excited molecular systems, as well as the characterization of the intermediate electronic states and/ or structures of the system during the reaction. The pump-probe technique, used to study the evolution of the dynamics of the molecules in real time, employs multiphoton ionization at 800/400/200 nm (probe) after absorption in the UV/ VUV region (pump), combined with the analysis of the corresponding mass and photoelectron spectra as a function of the delay time between the pump and the probe.

Such processes include photo-dissociations, isomerizations, and non radiative decays to the ground state, important for applications in physics, chemistry and biology, as well as for understanding the physical mechanisms governing fundamental problems of molecular physics.

Processes and systems that have been studied:

- Photo-dissociation of transition metal carbonyls  $M(\text{CO})_6$ ,  $M = \text{Cr}, \text{Mo}, \text{W}$ : elimination of one CO ligand after absorption in the region 267 to 360 nm.
- Ring opening of cyclohexadiene,  $\text{C}_6\text{H}_8$ , after absorption at 267 nm and excitation in the  $\pi\pi^*$  state.
- Isomerisation of ethylene,  $\text{C}_2\text{H}_4$  (and ethylene- $d_4$ ,  $\text{C}_2\text{D}_4$ ), after absorption at 162 nm and excitation in the  $\pi\pi^*$  state.
- Excited state dynamics and radiationless deactivation of cytosine tautomers, after absorption in the region 260 to 290 nm and population of the bright  $\pi\pi^*$  state.
- Ground-state rotational constants and fragmentation channels in carbon disulfide,  $\text{CS}_2$ , by combining pump-probe spectroscopy with ground-state rotational alignment.
- Ultrafast photodissociation of  $\text{O}_2$ , after absorption at 160 nm and population of the Schumann-Runge band.
- Excited state dynamics and radiationless deactivation of cyclooctatriene,  $\text{C}_8\text{H}_{10}$ , after absorption at 267 nm and population of the bright  $\pi\pi^*$  state.

## SCHOLARSHIPS AND DISTICTIONS

---

**2000 – 2003:** Prize for best ratings for the academic years 1999-2000, 2000-2001, 2001-2002

Institute of National Fellowships (I.K.Y.), Greece

**2000 – 2003:** Undergraduate scholarship for the academic years 1999-2000, 2000-2001, 2001-2002

Institute of National Fellowships (I.K.Y.), Greece

## FUNDED PROJECTS

---

### January 2014-December 2015:

IKY Fellowships of Excellence for Postgraduate Studies in Greece- Siemens Program:

“Photonic devices of microstructured optical fibers with embedded spherical micro-resonators for sensor applications and optical switches”

## PUBLICATIONS IN INTERNATIONAL REFEREED JOURNALS

---

1. Kyriaki Kosma, Kay Schuster, Jens Kobelke, George Nikolopoulos, Stavros Pissadakis, **A tunable, in-fibre, whispering gallery mode photonic molecule**, *in preparation*
2. Maria-Georgia Konstantinou, Karolina Milenko, Kyriaki Kosma, Walter Margulis, Stavros Pissadakis **Light coupling and routing using a microsphere attached on the endface of a microstructured optical fiber**, *in preparation*
3. Kyriaki Kosma, Sergei A. Trushin, Werner Fuß, Wolfram E. Schmid, **Branching and competition of ultrafast photochemical reactions of cyclooctatriene and bicyclooctadiene** *Chem. Phys.* **463** (2015) 111
4. Kyriaki Kosma, Ioannis Konidakis, Stavros Pissadakis **Photorefractive tuning of whispering gallery modes of a spherical resonator integrated inside a microstructured optical fibre** *The Europ. Phys. J.- Special Topics* **223** (2014) 2035
5. Kyriaki Kosma, Gianluigi Zito, Kay Schuster and Stavros Pissadakis **Whispering gallery mode microsphere resonator integrated inside a microstructured optical fiber** *Opt. Lett.* **38** (2013) 1301
6. Christian Schröter, Kyriaki Kosma and Thomas Schultz **CRASY: Correlated Rotational Alignment Spectroscopy** *Science* **333** (2011) 1011
7. Kyriaki Kosma, Sergei A. Trushin, Werner Fuß, Wolfram E. Schmid and Brigitte Schneider **Photodissociation of group-6 hexacarbonyls: Observation of coherent oscillations in an antisymmetric (pseudorotation) vibration in Mo(CO)<sub>5</sub> and W(CO)<sub>5</sub>** *Phys. Chem. Chem. Phys.* **12** (2010) 13197
8. Kyriaki Kosma, Christian Schröter, Elena Samoylova, Ingolf V. Herlet, Thomas Schultz **Excited-state dynamics of cytosine tautomers** *J. Am. Chem. Soc.* **131** (2009) 16939
9. Kyriaki Kosma, Sergei A. Trushin, Werner Fuß, Wolfram E. Schmid **Cyclohexadiene ring opening observed with 13 fs resolution: Coherent oscillations confirm the reaction path** *Phys. Chem. Chem. Phys.* **11** (2009) 172
10. Kyriaki Kosma, Sergei A. Trushin, Werner Fuß and Wolfram E. Schmid **Ultrafast dynamics and coherent oscillations in ethylene and ethylene-d<sub>4</sub> excited at 162 nm** *J. Phy. Chem. A* **112** (2008) 7514
11. Kyriaki Kosma, Sergei A. Trushin, Wolfram E. Schmid and Werner Fuß **Vacuum ultraviolet pulses of 11 fs from fifth-harmonic generation of a Ti:sapphire laser** *Opt. Lett.* **33** (2008) 723
12. Kyriaki Kosma, Sergei A. Trushin, Werner Fuß and Wolfram E. Schmid **Characterization of the supercontinuum radiation generated by self-focusing of few-cycle 800-nm pulses in argon** *J. Mod. Opt.* **55** (2008) 2141
13. Sergei A. Trushin, Kyriaki Kosma, Werner Fuß and Wolfram E. Schmid **Wavelength-independent ultrafast dynamics and coherent oscillation of a metal – carbon stretch vibration in photodissociation of Cr(CO)<sub>6</sub> in the region of 270 – 345 nm** *Chem. Phys.* **347** (2008) 309
14. Sergei A. Trushin, Kyriaki Kosma, Werner Fuß, and Wolfram E. Schmid **Sub-10-fs supercontinuum radiation generated by filamentation of few-cycle 800 nm pulses in argon**

*Opt. Lett.* **32** (2007) 2432

15. Neset Aközbeke, Sergei A. Trushin, Andrius Baltuska, Werner Fuss, Eleftherios Goulielmakis, Kyriaki Kosma, Ferenc Krausz, Subhasis Panja, Matthias Uiberacker, Wolfram E. Schmid, Andreas Becker, Michael Scalora, Mark Bloemer **Extending the supercontinuum spectrum down to 200 nm with few-cycle pulses** *New J. Phys.* **8** (2006) 177

16. Sergei A. Trushin, Werner Fuß, Kyriaki Kosma, Wolfram E. Schmid  
**Widely tunable ultraviolet sub-30-fs pulses from supercontinuum for transient spectroscopy** *App. Phys. B* **85** (2006)

17. Sergei A. Trushin, Subhasis Panja, Kyriaki Kosma, Wolfram E. Schmid, Werner Fuß  
**Supercontinuum extending from >1000 to 250 nm, generated by focusing 10-fs laser pulses at 805 nm into Ar** *Appl. Phys. B* **80** (2005) 399

## **PUBLICATIONS IN CONFERENCE PROCEEDINGS**

---

1. Kyriaki Kosma, Kay Schuster, Jens Kobelke and Stavros Pissadakis **In-fibre whispering gallery mode resonators: From isolated microspheres to coupled systems** 16th International Conference on Transparent Optical Networks, ICTON 2014 Article number 6876327

2. Kyriaki Kosma, Gianluigi Zito, Kay Schuster and Stavros Pissadakis **Whispering-gallery modes excitation in microspheres integrated inside microstructured optical fibers** Proceedings of SPIE - The International Society for Optical Engineering **Volume 8960** (2014) **Article number 896017** Laser Resonators, Microresonators, and Beam Control XVI

3. Christian Schröter, Kyriaki Kosma and Thomas Schultz **Correlated Rotational Alignment Spectroscopy of Isolated Molecules and Molecular Mixtures** EPJ Web of Conferences, XVIIIth International Conference on Ultrafast Phenomena **Volume 41** (2013) 12013

4. Sergei A. Trushin, Kyriaki Kosma, Werner Fuß, and Wolfram E. Schmid  
**Supercontinuum from a few-cycle filament in argon: characterization and UV spectroscopic application** International Conference on Lasers, Applications, and Technologies 2007: Environmental Monitoring and Ecological Applications; Optical Sensors in Biological, Chemical, and Engineering Technologies; and Femtosecond Laser Pulse Filamentation *SPIE*, **Volume 6733** (2007) 67332W

## **CONTRIBUTIONS TO CONFERENCES AND MEETINGS**

---

Kyriaki Kosma, W. Fuss, E. Goulielmakis, F. Krausz, S. Panja, M. Uiberacker, W. E. Schmid, S. A. Trushin  
**Supercontinuum extending from 200 to 2000 nm generated by self-focusing in argon**  
Poster presentation: XTRA Summer School, XTRA Research Training Network, Ultra short XUV Pulses for Time-Resolved and Non-Linear Applications, Porquerolles Island, France, 25-28 May 2005

Kyriaki Kosma, S. A. Trushin, W. Fuß, W. E. Schmid  
**Generation of short near-UV pulses and applications to pump-probe spectroscopy**  
Oral presentation: IV XTRA Network meeting, Imperial College London, 09-11 April 2006

Kyriaki Kosma, S. A. Trushin, W. Fuß, W. E. Schmid  
**Widely tunable ultraviolet sub-30 fs pulses from supercontinuum for transient spectroscopy**  
Poster presentation: IAMPI 2006, International Conference on the Interaction of Atoms, Molecules and Plasmas with Intense Ultrashort Laser Pulses, Szeged, Hungary, 01-05 October 2006

Kyriaki Kosma, S. A. Trushin, W. Fuß, W. E. Schmid  
**Pump-probe experiments for investigation of ultrafast reactions: towards 10-fs time resolution in the UV**  
Oral presentation: VI XTRA Network meeting, Padua, Italy, 26-27 February 2007

Kyriaki Kosma, S. A. Trushin, W. Fuß, W. E. Schmid, B. Schneider  
**Ultrafast dissociation of M(CO)<sub>6</sub>: wavelength-independent coherent oscillations exclude a triplet path**  
Poster presentation: ECAMP 9 2007, European conference in Atoms, Molecules and Photons, Crete, Greece,

06-11 May 2007

Werner Fuß, K. Kosma, W. E. Schmid, S. A. Trushin

**Ring opening of cyclohexadiene studied with 10 fs resolution: Coherent oscillations indicate the reaction coordinate**

Poster presentation: Femtochemistry and Femtobiology 8, Oxford, UK, 22-27 July 2007

Kyriaki Kosma, S. A. Trushin, W. Fuß, W. E. Schmid, B. Schneider:

**Femtosecond time-resolved study of  $M(\text{CO})_6$  ( $M=\text{Cr}, \text{Mo}, \text{W}$ ): Photodissociation in the 270-350 nm region reveals no triplet path**

Poster presentation: XXIII International Conference on Photochemistry ICP, Köln, Germany, 29 July-03 August 2007

Kyriaki Kosma, C. Schröter, I. V. Herlet, T. Schultz

**Excited-state dynamics of cytosine tautomers**

Poster presentation: DPG Frühjahrstagung der Sektion AMOP, Hamburg, Germany, 2 - 6 March 2009

Kyriaki Kosma, S. A. Trushin, W. Fuß, W. E. Schmid

**Supercontinuum generation through filamentation in argon**

Invited talk: Workshop, Nonlinear Optics in Guided Geometries, WIAS Berlin, Germany, 18 – 20 May 2009

Kyriaki Kosma, C. Schröter, T. Schultz

**Photochemistry of Cytosine Tautomers**

Poster presentation: ACU IV Symposium, Analysis and Control of ultrafast photoinduced reactions, Berlin, Germany, 8 – 10 October 2009

Kyriaki Kosma, C. Schröter, T. Schultz

**Electronic structure and dynamics of cytosine**

Poster presentation: DPG Frühjahrstagung der Sektion AMOP, Hannover, Germany, 8 - 12 March 2010

Christian Schröter, K. Kosma, I. V. Hertel, T. Schultz

**CRASY: Correlated Rotational Alignment Spectroscopy Resolves Isotopic Structure**

Poster presentation: DPG Frühjahrstagung der Sektion AMOP, Hannover, Germany, 8 - 12 March 2010

Paolo A. Carpeggiani, K. Kosma, P. Tzallas, D. Charalambidis

**Ultrafast dynamics of the photo-dissociation of  $\text{O}_2$**

Poster presentation: ATTOFEL Summer School, Ultrafast Dynamics using ATTosecond and XUV Free Electron Laser Sources, Crete, Greece, 02 – 06 May 2011

Kyriaki Kosma, Gianluigi Zito, Kay Schuster, Stavros Pissadakis

**Whispering gallery mode microsphere resonator integrated inside a microstructured optical fiber**

Poster Presentation: 5<sup>th</sup> Technical Meeting, COST Action TD1001 “OFSeSa” NOVEL AND RELIABLE OPTICAL FIBRE SENSOR SYSTEMS FOR FUTURE SECURITY AND SAFETY APPLICATIONS, Padua, Italy, 7 – 10 April 2013

Kyriaki Kosma, Gianluigi Zito, Kay Schuster, Stavros Pissadakis

**Microsphere resonator integrated inside a microstructured optical fiber**

Oral Presentation: CLEO-EUROPE, Conference on Lasers and Electrooptics, Munich, Germany, 12 – 16 May 2013

Kyriaki Kosma, Gianluigi Zito, Kay Schuster, Stavros Pissadakis

**Microsphere resonators integrated inside microstructured optical fibers: studies and optimization**

Invited talk: 6<sup>th</sup> Mediterranean Conference on Nano-Photonics MediNano-6, Lyon, France, 30-31 October 2013

Kyriaki Kosma, Gianluigi Zito, Kay Schuster, Stavros Pissadakis

**Whispering-gallery modes excitation in microspheres integrated inside microstructured optical fibers**

Invited talk: SPIE Photonics West, San Francisco, USA, February 2014, 8960-42

Kyriaki Kosma, Gianluigi Zito, Kay Schuster, Stavros Pissadakis

**Whispering Gallery Mode microsphere resonators inside microstructured optical fibers**

Poster presentation: 560. WE-Heraeus-Seminar: Taking Detection to the Limit -Biosensing with Optical Microcavities Bad Honnef, Germany, 14-18 April 2014

Kyriaki Kosma, Gianluigi Zito, Kay Schuster, Stavros Pissidakis,

**Integration and excitation of microsphere optical resonators inside microstructured optical fibers**

Invited Talk: SPIE Photonics Europe, Brussels, Belgium, April 2014, 9128-2

Ioannis Konidakis, Mary Konstantaki, Kyriaki Kosma, Stavros Pissidakis

**All-optical Optofluidic Switching in a ZnO overlaid Microstructured Optical Fiber,**

Oral presentation: Bragg Gratings, Photosensitivity and Poling in Glass Waveguides, BGPP-2014, Barcelona, Spain, July 2014

Kyriaki Kosma, Kay. Schuster, Jens Kobelke, George Nikolopoulos, Stavros Pissidakis

**In-fibre whispering gallery mode microresonator: a two-sphere coupled system**

Poster presentation: Optical wave and waveguide theory and numerical modelling workshop OWTNM 2015, London, United Kingdom, 16-18 April 2015

Maria-Georgia Konstantinou, K. Kosma, W. Margulis, and S. Pissidakis

**A microspherical resonator embedded inside a microstructured optical fiber taper**

Poster presentation: Workshop on Specialty Optical Fibers and their Applications 2015, Hong Kong, China, 4-6 November 2015

Maria-Georgia Konstantinou, K. Milenko, K. Kosma, W. Margulis, and S. Pissidakis

**Light coupling and routing using a microsphere attached on the endface of a microstructured optical fibre**

Invited talk: SPIE Photonics Europe, Brussels, Belgium, 3-7 April 2016

**LANGUAGES**

---

Greek (native)

English (Cambridge Certificate of Proficiency in English, Level C2)

German (Goethe-Zertifikat Deutsch, Level B2)

**COMPUTER SKILLS**

---

Origin, data analysis and graphics software

Mathematica, computational software program

Optiwave, design software for photonics