

# CURRICULUM VITAE

Dr Ioannis (*Yannis*) KOURAKIS

## 1. PERSONAL INFORMATION

Citizenship: Hellenic (Greek) and Belgian (dual citizenship).

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Live research metrics at [www.researcherid.com/rid/B-7885-2010](http://www.researcherid.com/rid/B-7885-2010);

ResearcherID: B-7885-2010; ORCID: 0000-0002-4027-0166.

## 2. EDUCATION, ACADEMIC QUALIFICATIONS & AWARDS

- **Doctor of Science** (*Doctorat en Sciences*), Theoretical Physics, Université Libre de Bruxelles (ULB), Brussels, Belgium, 16 Oct. 2002.  
Thesis title: “*Kinetic theory for a test-particle weakly coupled to a heat-bath – Application in magnetized plasmas*”. Thesis supervisors: Alkis Grecos & Léon Brenig.
- **Postgraduate Certificate in Higher Education Teaching (PGCHET)**.  
Queen's University Belfast (QUB), School of Education, Belfast, UK; awarded 4 July 2013.
- **DEA en Sciences (Belgian equiv. MPhil.)**, Université Libre de Bruxelles (ULB), Brussels, Belgium; 13 September 2001. Field: “*Statistical Mechanics and Nonlinear Phenomena*”.  
Thesis: “*Kinetic theory for a test-particle weakly-coupled to a large heat-bath in equilibrium*”; Supervisor: Léon Brenig.
- **DEA de Physique (French equiv. MSc. in Physics)**.  
Université de Bourgogne, Dijon, France; 1 July 1991.  
Field: “*Molecular Spectroscopy and Materials for Optical and Electronic Applications*”.  
Thesis title: “*Modulational Instability in Hydrogen-Bonded Systems*”.  
Thesis supervisors: R. Boesch & M. Peyrard.
- “**Ptychio**” (Greek 4-year equiv. BSc degree) in Physics; University of Crete, Heraklion, Greece; Awarded 16 November 1989. Grade: 7.46/10.

## FURTHER TRAINING / SKILLS / PERSONAL DEVELOPMENT

### — *Language Skills:*

- *Greek*: fluent (mother tongue).
- *English*: fluent (read/spoken/written); “*Certificate of Proficiency in English*”, issued by the University of Cambridge, Athens Examination Board; awarded in June 1982.
- *French*: fluent (read/spoken/written); “*Diplôme d’Etudes Supérieures en Langue Française*”, issued by the “Institut Français d’Athènes”; awarded in 30 Nov. 1987.

- *Spanish*: excellent working level (read/spoken/written).
- *German*: good level (read), fair (spoken, written).
- *Portuguese*: basic level (read, mainly).

— ***IT/Computing Skills:***

- Operating environments: Windows XX, Unix/Linux, Mac OS.
- Expertise in symbolic/numerical computation software (Wolfram Mathematica);
- Data processing tools (Origin ,...).
- Word-/text-processing software: LaTeX, MS Office tools.
- Electronic communication software: standard web (WWW, email), FTP protocol, ...

— **PROFESSIONAL DEVELOPMENT**

- **UK Higher Education Academy (HEA) Fellow**, since 4 July 2013.
- *Academic Staff Training*: I have attended and completed a series of training sessions, courses and seminars offered by Queen’s University’s Staff Training and Development Unit (STDU), since 2007. These included: Academic Leadership Skills; Developing for Success: Emotional Intelligence and Leading Others; Management of Difficult Communication; Research supervision; Coaching as Management Skill; Plagiarism; ...
- *Teaching Quality Review*: participation to teaching assessment scheme, as part of standard university policy, both actively (as peer reviewer) and passively (as reviewed lecturer).
- *Academic Appraisal*: Participation to Queen’s University staff appraisal scheme.
- Commitment to observing the University’s Equal Opportunities policy at all times.

**3. CAREER OVERVIEW**

**3.1 EMPLOYMENT HISTORY**

- Current occupation: *Associate Professor* (UK equiv. *Lecturer/AC3–Grade 8*; highest spine point), Queen’s University Belfast, School of Mathematics and Physics; since 10/2007 (tenured since 02/2009).

— **Visiting appointments, secondments:**

- *Visiting Researcher*, Institute of Theoretical Physics, UNESP – State University of Sao Paulo, Brazil; supported by the State of Sao Paulo Research Fund (FAPESP) via the *UK Academies/CONFAP - Fellowship and Research Mobility* program; Aug.-Dec. 2017.
- *Special Visiting Researcher (Pesquisador Visitante Especial - PVE)* status, Universidade Federal do Rio Grande do Sul (UFRGS), Porto Alegre, Brazil; supported by the Brazilian Research Fund (CNPq - Conselho Nacional de Desenvolvimento Científico e Tecnológico - Brasil); Aug. 2013 - Jan. 2017.
- *Visiting Researcher*, School of Physics, Department of Complex Systems, University of Sydney; Dec. 2010 - Jan. 2011; also, Feb.-Mar. 2009.

— **Postdoctoral appointments:**

- 2006-2007: Research Associate (*Wissenschaftlicher Mitarbeiter*); Ruhr Universität Bochum, Germany; German Research Society (*Deutsche Forschungsgemeinschaft*), *Emmy Noether* Programme (grant SH 93/3-1): *Cosmic Ray Diffusion*; PI: Dr. A. Shalchi.
- 2006: Research Associate, Universiteit Gent, Sterrenkundig Observatorium, Ghent, Belgium; FWO (Flemish Research Fund); coll. w/ Prof. F. Verheest on Space plasmas.
- 2004 - 2005: Research Associate (*Wissenschaftlicher Mitarbeiter*); Ruhr Universität Bochum, Germany; *Sonderforschungsbereich 591 – Universelles Verhalten gleichgewichtsferner Plasmen: Heizung, Transport und Strukturbildung*, *Deutsche Forschungsgemeinschaft (DFG)*; coll. with Prof. P. K. Shukla & Prof. R. Schlickeiser.
- Sept. 2005 & Aug. 2006: Guest Lecturer (in the context of Plasma Physics related activities), Abdus Salam International Center for Theoretical Physics, Trieste, Italy.
- 2005: Research Fellow of the Max-Planck-Institut für extraterrestrische Physik (Max Planck Institute for Extraterrestrial Physics), Garching, Germany; Project: “*Komplexe Plasmen*”; collaboration with Prof. G. E. Morfill.
- 2003 - 2004: Post-doctorate Research Fellow (E.U. funding), Ruhr-Universität Bochum, School of Physics and Astronomy, Theoretical Physics IV, Bochum, Germany (address above). Research work on theoretical Plasma Physics: nonlinear wave propagation in dusty plasmas; collaboration with Prof. P. K. Shukla.

— **Pre-PhD appointments & secondments:**

- 2002: Research visit (Euratom mobility grant), Euratom - Hellenic Republic Association, at: University of Thessaly, Laboratory of Fluid Dynamics & Turbomachinery, Volos, Greece; collaboration with Prof. A. Grecos.
- 1999 - 2005: Teaching and Research Assistant, Université Libre de Bruxelles (ULB), Faculté des Sciences Appliquées (Engineering School), Brussels, Belgium; formally on leave from Feb. 2003 on; Physics & Mathematics: tutoring classes and laboratory courses.
- 1995 - 2002: Doctoral Researcher (EU Euratom fellowship), Université Libre de Bruxelles & Euratom-Belgian State Association, CP 231 Physique Statistique et Plasmas, Brussels, Belgium. Research in Non-Equilibrium Statistical Physics and Plasma Kinetic Theory, Fusion Theory; collaboration with Prof. A. Grecos & L. Brenig.
- 1992: Laboratory Instructor (*Agent Temporaire Vacataire*), Biophysics (DEUG degree, 2nd year), Université de Bourgogne, School of Pharmacy, Dijon, France.
- 1991 - 1992: Research Fellow, Université de Bourgogne, Dijon, France, Laboratoire Ondes et Structures Cohérentes (Waves & Coherent Structures). Research in Nonlinear Physics as applied in Solid State Physics; collaboration with Prof. M. Peyrard & Dr. R. Boesch.
- 1990 - 1992: Teaching Assistant, Université de Bourgogne, Faculté des Sciences (School of Sciences), Dijon, France; Physics (laboratory courses), mainly Optics & Electromagnetism.
- 1987 - 1990: Teaching Assistant, University of Crete, Heraklion, Greece; Physics (laboratory courses), mainly Optics, Mechanics, Electromagnetism and Radioactivity.

### 3.2 CONSULTANCY, COMMITTEES, PROFESSIONAL BODIES

— *Committee Membership:*

- UK EPSRC (Engineering and Physical Sciences Research Council): Associate Peer Review College membership, since 10/2016.
- **Evaluation Committee membership**, upon nomination: Natural Sciences and Engineering Research Council of Canada (NSERC), Discovery Grants Program, Physics Evaluation Group; three-year term, July 1, 2014 to June 30, 2017.

— *Editorial Activity:*

- **Editorial Board Member (EBM):** *Scientific Reports* (Nature Publishing; EBM for Fluids and Plasma Physics), Impact Factor: ?4.259 (2016); EBM since 05/2014.
- EBM: *Plasma* (MDPI AG; Switzerland), EBM since 03/2017.
- EBM: *Nucleus* (PINSTECH, Nilore Islamabad, Pakistan), since 04/2017.
- EBM: *Open Plasma Physics Journal*, 2009 to 2016.

— *Reviewer for Funding Agencies:*

- Engineering and Physical Sciences Research Council (EPSRC), UK: 2011 - today;
- Royal Society (UK): 2012 - ;
- Flemish Research Fund (FWO), Belgium, 2015 - today;
- National Center of Science and Technology Evaluation, Kazakhstan; 2014 - today;
- Rustaveli Foundation, Georgia, 2013;

— *Institutional/professional assessment - Academic reviewer:*

- National Research Foundation (NRF), South Africa (2014 & 2015);
- *Technical Review Panel* member for academic staff promotion (2017), Institute for Space Technology (IST), Islamabad, Pakistan.
- *External Panel member for academic staff promotion at professorial level* (open-ended appointment, 2012 -), Quaid-i-Azam University, Islamabad, Pakistan.

— **External Examiner:**

- PhD thesis examination (panel membership); *17 (seventeen) PhD assignments to date; + 1 MSc* (details in page 11): two in UK (Nottingham University 2009, Strathclyde University 2016), Sweden 1 (KTH - Royal Institute of Technology, Stockholm 2014), Australia 1 (University of Sydney 2013), S. Africa 2 (University of Kwazulu Natal, Durban 2015), Pakistan 11 (Gomal University 2014, COMSATS 2010 & 2013, QAU Quaid-i-Azam University 2013 & 2017, Peshawar 2013, Lahore 2015 & 2017, PIEAS 2015, 2016, 2017, Kohat 2017); + 1 MSc (Australia).

— *Academic Accreditation:*

- 2007-2010: *Qualification au Concours de Maîtres de Conférences*: French Higher Education professional accreditation, awarded in 3 sections: 28-Dense Media & Materials (no.

07228137659, 9 Feb. 2007), 30-Dilute media & Optics (no. 07230137659, 31 Jan. 2007), 34-Astronomy & Astrophysics (no. 07234137659, 2 Feb. 2007).

— *Peer-Reviewer (referee)*:

- Regular assignments for scientific journals, including: Physical Review journals (PR Letters, PRA and & PRE; APS, USA), Physics of Plasmas (AIP, USA), IEEE Transactions in Plasma Science (IEEE, USA), Journal of Plasma Physics (Cambridge University Press, UK), Plasma Physics and Controlled Fusion (IoP, UK), Journal of Geophysical Research (AGU USA), Plasma Sources Science and Technology (IoP, UK), Physics Letters A (Elsevier, Holland), New Journal of Physics (IOP, UK), Nonlinear Processes in Geophysics (EGU, Germany), Chaos (AIP, USA), Journal of Ocean Engineering and Science (Elsevier), PTRSA - Philosophical Transactions of the Royal Society A, MNRAS - Monthly Notices of the Royal Astronomical Society (RAS, UK), Physica Scripta (IoP, Swedish Academy), Optics Express (OSA, USA), Journal of Optical Society of America (JOSA & JOSB, USA), Royal Society/Philosophical Transactions A (UK), Journal of Ocean Engineering and Science (Elsevier), J. of Fusion Energy (JOFE; Springer), Canadian Journal of Physics, Astrophysics and Space Science (Elsevier), Indian Journal of Physics, Brazilian Journal of Physics (Springer), Open Plasma Physics Journal (OPPJ, Bentham), Fizika B (Croatia).

— *Professional Bodies – Membership, Affiliation*:

- **UK Higher Education Academy (HEA) Fellowship**, status awarded 4 July 2013.
- APS - American Physical Society (Regular Member since 2000).
- AGU - American Geophysical Union, USA (Ordinary Member since 2013).

#### 4. RESEARCH OVERVIEW

— *In a nutshell*:

- My principal research interests lie in the field of **Applied Mathematics (Theoretical Physics)**, with applications in *Plasma Physics*, in **Soft Condensed Matter** and in *Nonlinear Science*. Nonlinear plasma physics is relevant in *technological applications* (microcircuits based on semiconductor plasmas), in *energy production* (fusion) and in *plasmonic materials* (optical metamaterials for electromagnetic waveguide design).
- I am currently investigating *extreme events (freak waves, rogue waves)* and *modulated structures (envelope solitons)*, in particular, focusing on how their properties arise from fluid models for *beam-plasma interactions*. Electrostatic waves in ultra-high density (quantum) plasmas, in Space plasmas and in non-Maxwellian plasmas, in particular, are the principal axes of my current research. Relying on multiple-scale techniques, applied to fluid models, I model the formation of nonlinear waves (solitary waves, shocks) in multi-component plasmas and investigate their structural and dynamical properties.
- I have sustained tight links with international communities active in *laser-plasma interactions*, in *dusty plasmas*, in *Space plasmas* and in *Applied Mathematics*.
- Earlier research of mine has focused on **solid state physics** (molecular crystals, colloidal plasmas) and *Many-body Systems*, and in particular on: modulational instability criteria for coupled optical systems, kinetic theory (based on a Liouville/Fokker-Planck

formulation) for long-range interacting systems, nonlinear waves in lattices (crystals) in condensed matter and in complex (dusty) plasmas, and finally on astrophysical turbulence (anomalous diffusion).

Some indicative information and indices of quality and impact (metrics) of my activity are provided in the following.

A detailed Publication List and a list of Conference Presentations is provided in the Appendix.

— ***Team leadership:***

- Five (5) PhD students supervised to date, including three (3) graduates (details in p. 12).
- Four (4) postdocs (7.5 person-years, UK EPSRC funded) supervised to date (see in p. 11).

— ***Publication record:***

- **150+ original articles published in refereed journals;**
- 60+ papers in Conference Proceedings.
- 10+ papers in Collective Volumes and peer-reviewed Conference Proceedings;
- A detailed List of Publications is appended to this CV; my publication list (+ preprints) is also available online at: [www.kourakis.eu](http://www.kourakis.eu) (under link publications);

— ***Impact/citations:***

- **Citation H-index: 32;** 3,291 (2,834\*) citations to-date in 1,912 (1,778\*) citing articles (\* within parenthesis, excluding self-citations); data from *Web of Science*, accessed on 2 November 2017; alternatively: **Citation H-index: 37** and **Citation i10-index = 107;** 4233 citations; data from *Google Scholar* (as of 2 November 2017).
- Citation metrics: [www.researcherid.com/rid/B-7885-2010](http://www.researcherid.com/rid/B-7885-2010); ORCID: 0000-0002-4027-0166.

— ***Conference participation & dissemination of results:***

- 40+ Invited Talks in International Conferences and Advanced Schools;
- 45+ Contributed Talks and Poster presentations, at international conferences and scientific events/workshops;
- A detailed List of Conferences attended and of papers presented is appended to this CV.

— ***Conference Administration***

- Member of Organizing Committee: *45th IoP Plasma Physics Group Conference*, Belfast, April 9-12th 2018.
- Member of Scientific Program Committee for Special Session D3.3 (Role of nonthermal distributions in wave generation, particle heating and acceleration in space plasmas) in *42nd COSPAR Scientific Assembly (COSPAR2018)*, Pasadena, California, USA, 14-22 July 2018.
- Member of the International Advisory Committee: *International Scientific Spring (ISS-2018)*, 12-16 March 2018, Islamabad, Pakistan.
- Member of the Advisory Committee: *SigmaPhi2017 - International Conference on Statis-*

*tical Physics*, 10-14 July 2017, Corfu, Greece.

- Member of the International Scientific Committee: *10th Chaotic Modeling and Simulation International Conference (CHAOS2017)*, Barcelona, Spain (30 May - 2 June, 2017).
- Member of the International Scientific Committee: *9th Chaotic Modeling and Simulation International Conference (CHAOS2016)*, London, UK (23-26 May 2016).
- Member of the International Scientific Committee: *8th Chaotic Modeling and Simulation International Conference (CHAOS2015)*, Institut Henri Poincar'e, Paris, France (26-29 May 2015).
- Member of the International Scientific Committee: *7th Chaotic Modeling and Simulation International Conference (CHAOS2014)*, Madrid, Spain (7-10 June 2014).
- Member of the International Advisory Committee: *International Scientific Spring (ISS-2014)*, Islamabad, Pakistan (10-14 March 2014).
- Member of the International Scientific Committee: *6th Chaotic Modeling and Simulation International Conference (CHAOS2013)*, Istanbul, Turkey (11-14 June 2013).
- Member of the International Advisory Committee: *International Scientific Spring (ISS-2013)*, Islamabad, Pakistan (11-15 March 2013).
- Member of the International Scientific Committee: *5th Chaotic Modeling and Simulation International Conference (CHAOS2012)*, Athens, Greece (12-15 June 2012).
- Member of the International Advisory Committee: *International Scientific Spring (ISS-2012)*, Islamabad, Pakistan (5-9 March 2012).
- Member of the Local Organizing Committee: *30th International Conference on Phenomena in Ionized Gases (ICPIG2011)*, Belfast, Northern Ireland, UK (28 Aug.-2 Sept. 2011).
- Member of the International Advisory Committee: *XII Latin-American Workshop on Plasma Physics (XII LAWPP)*, Caracas, Venezuela (September 17-21, 2007).

— *Conferences - Session Convener*

- AGU (American Geophysical Union) Fall Meeting 2014 (<http://fallmeeting.agu.org/2014/>), held in San Francisco USA, 15-19 December 2014 (special sessions "*SH43C: Implications and Applications of Kappa Distributions in Space Plasma Physics*" I & II, org. George Livadiotis, I. Kourakis & Jacob Heerikhuisen).

## 5. NATIONAL & INTERNATIONAL RECOGNITION / AWARDS / HONOURS

- 2017: I was one of only eleven (11) referees chosen from over 1,400 worldwide, for special recognition as **distinguished reviewer**(s) from *Physics of Plasmas* journal (AIP, USA); Editor (M.E. Mauel), in their 03/2017 edition [Phys. Plasmas **24**, 039801 (2017)] cited us "*(for offering) extraordinary service to the authors and readers of Physics of Plasmas*".
- 2016: EPSRC Associate Peer Review College membership status awarded.
- 2014-2017: Invitation to join the (top ranking) Physics Evaluation Group of the Natural Sciences and Engineering Research Council of Canada (NSERC), Discovery Grants Program; four-year term.
- 2014: Invitation to join the Editorial Board of prestigious journal *Scientific Reports* (Nature Publishing; EBM for Fluids and Plasma Physics).

- 2013: *Special Visiting Researcher (Pesquisador Visitante Especial - PVE)* status, awarded by the Brazilian Research Fund (CNPq - Conselho Nacional de Desenvolvimento Científico e Tecnológico - Brasil); three-year term.
- 2007: *Professor Harry Messel Fellowship*, University of Sydney, School of Physics, Australia (awarded, then declined, due to overlapping professional appointments).
- 2005: *Fellowship* of the Max-Planck-Institut für extraterrestrische Physik (Max Planck Institute for Extraterrestrial Physics), Garching, Germany; Project: “*Complex Plasmas*”; collaboration with G E Morfill and P K Shukla.
- 2003-2005: EU *Post-doctoral fellowship*; Human Potential Research and Training Network (Contract No. HPRN-CT-2000-00140): “*Complex Plasmas: The Science of Laboratory Colloidal Plasmas & Mesospheric Charged Aerosols*” Ruhr-Universität Bochum, Germany.
- 2000-01: *Doctoral Prize* of the David & Alice Van Buuren Foundation, Brussels, Belgium.
- 1995 - 1997: *Training & Research Fellowship*, Commission of the European Communities (Direction General RDT - Fusion Programme); Euratom - Belgian State Association & Université Libre de Bruxelles, C.P. 231 Physique Statistique et Plasmas, Brussels, Belgium; Project: *Kinetic Theory of Magnetically Confined Plasmas*.
- 1990 - 1991: *Erasmus Scholarship* of the E.U.; Université de Bourgogne, Dijon, France.
- 1989 - 1990: *Postgraduate Fellowship* of the Research Center of Crete and the University of Crete, for postgraduate studies at the University of Crete (Greece).
- 1984 - 1986: *Training Fellowship* of the Greek scholarship Foundation (IKY).

## 6. FUNDING – SUPPORT GRANTS and CONTRACTS

- FAPESP (Sao Paulo State Research Fund) & The UK Academies **Research Fellowship**; Visiting Researcher status awarded at UNESP (State University of Sao Paulo), Aug.-Dec. 2017.
- I have created and currently lead, as principal coordinator, an EU-funded international mobility network, combining 5 universities from 4 countries (UK, Sweden, Portugal, Brazil): “*Complex ideal and non-ideal quantum plasmas*” (612506 QUANTUM PLASMAS FP7-PEOPLE-2013-IRSES), EU-FP7 IRSES Programme; PI & Project Coordinator: IK; Jan. 2014 - Dec. 2017.
- “*Waves and Instabilities in Quantum Plasmas*”, Brazilian Research Council (CNPq - Conselho Nacional de Desenvolvimento Científico e Tecnológico - Brasil; *Science without Borders* Programme, processo: 400624/2013-3), R\$ 233K (approx. 73K euros, or GBP 60K); awarded (2014); duration: 36 months, starting 01 October 2013.
- NITheP - National Institute of Theoretical Physics (South Africa), travel grant (10K ZAR).
- 2013-2014: HIPOLIN - European Erasmus IP on “*An Introduction to high power light-matter interactions (HIPOLIN)*” (an intense training course funded by the Erasmus IP action): <http://hipolin.chania.teicrete.gr/>; IK: partner and local (node) coordinator.
- 11/2011-06/2012: EPSRC research grant EP/I031766/1; *Fluid theory for laser plasma interactions*; GBP 125 K; PI: I Kourakis.
- 2009-2012: APPEPLA - 3rd European Erasmus IP on “*Applications of Electronics in Plasma Physics (APPEPLA)*” (training course funded by the Erasmus IP action); IK: partner and local (node) coordinator.



- 10/2007-05/2012: Support from EPSRC Science and Innovation grant (EP/D06337X/1) awarded to CPP, QUB, UK; *Queen's University Belfast Plasma Physics*; PI Prof WG Graham, participation as researcher (own salary covered 10/2007-05/2012), group leader (3 PDRAs & 1 PhD covered) and supported via equipment funding.
- 10/2010-09/2012: EU LLP Curriculum Development grant (EU 51 0587-LLP-1-2010-1-GR-ERASMUS-ECDSP: PLAPA - Plasma Physics and Applications): Participating node; IK: local coordinator & PI (13 K allocated to QUB);
- 01/2010: International Travel Grant 2010/R2, Royal Society, UK; *Nonlinear Wave Dynamics and Modulational Interactions in Plasmas*; PI: IK.
- 02/2008: International Outgoing Short Visit 2008/R2, Royal Society, UK; *Nonlinear Processes and Structures in Multi-component and Dusty Plasmas*; PI: IK.
- German government program: *SFB 591 - Sonderforschungsbereich 591: Universelles Verhalten gleichgewichtsferner Plasmen: Heizung, Transport und Strukturbildung, Deutsche Forschungsgemeinschaft*; participation as Research Associate (Wissenschaftlicher Mitarbeiter).
- Project: "*Komplexe Plasmen*" (Complex Plasmas); *MPIeP: Max-Planck-Institut für extraterrestrische Physik* (Max Planck Institute for Extraterrestrial Physics), Garching, Germany; Individual post-doctoral fellowship; collaboration with Prof. Gregor Morfill; 1 Jan.-31 Mar. 2005.
- *Complex Plasmas: The Science of Laboratory Colloidal Plasmas and Mesospheric Charged Aerosols*, Commission of the European Community, Human Potential Research and Training Network; Contract No. HPRN-CT-2000-00140 (Ruhr-Universität Bochum, Germany; 2003 - 2004); participation as Researcher (PI: PK Shukla).
- *Kinetic Theory of Magnetically Confined Plasmas*, Commission of the European Community, Fusion Programme (Euratom - Belgian State Association, Université Libre de Bruxelles, Belgium, 1/2/1995 - 31/1/1997); Individual Research and Training Fellowship.

## 7. TEACHING OVERVIEW: pedagogical activity, supervision, mentoring

I have long experience in academic teaching and supervision.

Academic courses (undergraduate & postgraduate) that I have taught are listed below.

**A more detailed Teaching Statement (including teaching evaluation statistics) is appended at the end of this Vitae.**

— *Courses taught, as principal coordinator/lecturer:*

- Undergraduate (UG):
  - *Computer Algebra*, Pure Mathematics (PMA 3008, QUB - Queen's University Belfast); taught in 2016/17 - SEM2 (Spring Semester).
  - *Synoptic Physics* (PHY4029, QUB) Part 4 - Introduction to Nonlinear Physics; years 2015-16-17 (SEM2, Spring Semester course).
  - *Mathematical Modelling in Biology and Medicine*, Applied Mathematics (AMA3014, QUB); 2014/15 & 2015/16 (SEM - Spring Semester course).
  - *Calculus of Variations and Hamiltonian Dynamics*, Applied Mathematics (AMA3013, QUB); year(s) 2009-10 through 2012-13 (SEM2, Spring Semester course).

- Postgraduate (PG):
  - *Introductory Plasma Modelling* (PHY9013, QUB); course coordinator (75 %), 2008-2013 (SEM1, Fall Semester).
  - *Laser Produced Plasmas* (Module PHY9016, QUB); 25%, 2009-2013 (Spring Semester course).

— **Courses/tutorials taught, as secondary lecturer/tutor:**

- AMA1021 *Mathematical Modelling* (Applied Mathematics), 2016/17 (SEM2, QUB);
- PMA1021 *Mathematical Reasoning* (level 1 tutorials, Pure Mathematics), 2016/17 (SEM1, QUB);
- PHY1004 *Foundation Physics* (tutoring classes); 2010 – 2013, both semesters; QUB.
- Level 2 *Physics laboratory*; 2010-11-2012 & 2014-15, both semesters; QUB.

— **Project supervision**

I have supervised a total of 15 long projects (= 7 PGT/MSc long research projects + 8 UG/MSci Level 4 projects) and 30 short pedagogical projects (12 PGT/MSc + 18 UG/MSci Level 3) to date (05/2017). Breakdown as follows:

- *PGT/MSc Dissertation-Projects* (QUB MSc Module PHY9019; MSc in Plasma Physics, Queen’s U. Belfast): seven (7) research projects supervised in total, 2007-2011;
- *PGT/MSc Short Projects* (QUB MSc Module PHY9014; MSc in Plasma Physics, Queen’s U. Belfast): supervision of 12 short pedagogical/training projects; 2007-08 through 2012-13 (Spring Semester);
- *UG/MSci Projects*: eight (8) 4th year MSci projects supervised at Queen’s U. Belfast (MSci in Physics, Physics PHY4030 and Applied Mathematics Module AMA4005; 2012-today;
- *UG/MSci 3rd year short projects* (QUB Module Long Investigations): thirty (30) short training projects supervised; 2011-today;
- +: *PGR/research projects (PhD level)*: currently **supervising two (2) PhD students** at QUB (Belfast); 3 PhD students have successfully graduated in the past. (See page 12.)

— **International teaching activity:**

Lectures delivered at international Summer Schools (for details, see: Appendix - *Invited Talks*):

- *Guest Lecturer* at the (UNESCO) International Centre for Theoretical Physics, Trieste, Italy (2004, -05, -07);
- Lecturer at *Int. Summer School on Nuclear Fusion and Technology*, EURATOM-Hellenic State Association (2002 & 2004);
- Guest Lecturer at APPLEPLA & HIPOLIN summer schools (2010, -11, -12, -13 and -14).

— **Course & Curriculum development**

- *MSc in Plasma Physics* (QUB); Web-based Postgraduate Curriculum: participation in the Curriculum design, setup, organization and operation, 2007-13.

- *PLAPA - Physics of Lasers and Plasmas*; Intra-EU Web-based Postgraduate Master's, currently under development: Curriculum design, setup, organization, local coordination, web-based course development, 2018-13 (EU-funded Erasmus Lifelong-Programme).
- *Introductory Plasma Modelling* (Module PHY9013, QUB); course coordinator, year(s) 2007-08 through 2012-13 (Autumn Semester course).
- *Laser Produced Plasmas* (Module PHY9016, QUB); 25%, year(s) 2007-08 through 2012-13 (Spring Semester course).

— **Student mentoring/advising activity**

- **Adviser of Studies (AoS)**: student enrolment, supervision, advising, guidance to local administration:
  - Undergraduate AoS: 60 UG students approx. each year, 2010-13 (3 years);
  - Postgraduate AoS: 10 UG students approx. each year, 2007-13 (6 years);
- **Personal Tutor**, undergraduate students (advising/coaching, guidance); approx. 6 students each year; 2010-13 & 2014-today.

**8. ACADEMIC SERVICE & TEACHING-RELATED ADMINISTRATION**

- **Examinations Liaison Officer (ELO)**, Queen's University Belfast, School of Mathematics and Physics, Department of Physics: 2014-15.
- **Postgraduate Admissions Officer**, *MSc in Plasma Physics* at Queen's University Belfast: student recruitment & entry selection, entirely in charge of streamlining and short-listing applications from prospective stage through final admission; also, funding matters (selection, shortlisting and interviews for studentship award); 2007-13 (6 years).
- **Vice-Coordinator**, *MSc in Plasma Physics* at Queen's University Belfast; local organisation tasks, MSc publicity/outreach, internationalisation activities; 2007-13 (6 years).
- **Student Progress Support Committee (SSPC)** membership: 2010-13 (3 years) as UG AoS, 2014-15 as ELO.
- Member of PhD examination committees as Chair (*Independent Convener*): 4 (four) appointments to date (Queen's University Belfast, UK): Mr Peter Keys (May 2013), Mr Jonathan Whyte (Oct. 2014), Mr Andrew Gibson (Feb. 2015), Mr Yifan Li (Feb. 2017).
- **Postgraduate Taught (PGT) student assessment panel** membership: PGT Progress Committee, Queen's University Belfast, UK (2011-2014).
- Postgraduate Research (PGR) PhD differentiation/**Progress Review Committee** membership, Queen's University Belfast, UK; approx. 3-4 assignments per year (2013-2017).
- Academic promotion reviewer for (international) academic institutions: see page 4 above.
- **Postgraduate examination committee** membership as *external examiner*:
  - (name withheld \*), Lahore University, Pakistan (2017);
  - (name withheld \*), Kohat University of Science & Technology, Pakistan (2017);
  - Mr Muhammad Naeem, Quaid-e-Azam University (QAU), Pakistan (2017);
  - Mr Hafeez ur Rehman, PIAES - Pakistan Institute of Engineering and Physical Sciences, Nilore, Islamabad, Pakistan (2017);
  - Mr Sijia Chen, Strathclyde University, Department of Physics, Glasgow, UK (2016);

- Mr Sajjad Hussain, PIAES - Pakistan Institute of Engineering and Physical Sciences, Nilore, Islamabad, Pakistan (2016);
- Mr Aaron Mugemana, UKZN - Univ. Kwazulu-Natal, Durban, S. Africa (2015, 2016);
- Mr Shaukat Ali, PIAES - Pakistan Institute of Engineering and Physical Sciences, Nilore, Islamabad, Pakistan (2015);
- Ms Sabeen Arshad, GCU - Government College University, Lahore, Pakistan (2015);
- Ms Farran Henning, UKZN - Univ. Kwazulu-Natal, Durban, S. Africa (2015);
- Mr Etienne Koen, KTH - Royal Institute of Technology, Department of Space and Plasma Physics, Stockholm, Sweden (2014);
- Mr Adnan Saeem, University of Gomal, Pakistan (2014);
- Mr Ali Ahmad, COMSATS Inst. of Information Technology (CIIT), Pakistan (2013);
- Mr Shahid Naseer, University of Peshawar, Pakistan (2013);
- Mr Jan Faiq, Quaid-e-Azam University (QAU), Pakistan (2013);
- Mr. Shabbir Khan, COMSATS Inst. of Information Tech. (CIIT), Pakistan (2010);
- Mr Zhengwei Wu, University of Sydney, Australia (2009);
- Mr Xiang Yi, Nottingham University, UK (2010);
- +: Mr Modjtaba Moaied, MSc examination, University of Sydney, Australia (2013).

## 9. RESEARCH SUPERVISION

### 9.1 Team leadership - Collaborations - Supervision

– *Overview:* My team at CPP/QUB currently consists of two (2) PhD students and two (2) MSci students, working on topics from nonlinear dynamics (soliton theory) and plasma theory/laser-plasma interactions. Past collaborators include: four (4) Postdoctoral Research Associates (PDRAs) @QUB (7.5 person-years in total: 2008-11, 2008-10, 2010-11 and 2012-13, respectively), 3 PhD students (2008-2012, 2011-2014 & 2011-17) and 10+ self/funded research visitors; details below.

– I have hosted a number of research visits by external collaborators to CPP/QUB, including: Dr Shimul Maharaj and Dr Olivier Carel (S. African National Space Agency), Dr Mark Erik Dieckmann (Linkoping University, Sweden), Prof Manfred A. Hellberg (Durban, S. Africa), Prof Frank Verheest (Gent, Belgium), D Samsonov (Liverpool, UK), Prof Myoung-Jae Lee (Taiwan).

– I have collaborated and co-authored joint publications with a number of scientists abroad; 45+ co-authors in 13+ countries worldwide.

— *Postdoctoral Research Associate(s)* at Queen’s University Belfast: supervision & collaboration (supported by EPSRC UK) at Queen’s University Belfast:

- Dr Naresh Pal Singh Saini, nonlinear plasma dynamics (03/2008-02/2010); EPSRC funding (S & I grant to CPP/QUB);
- Dr Ashutosh Sharma, laser beam profile dynamics (04/2008-03/2010); ; EPSRC funding (S & I grant to CPP/QUB);
- Dr Gianluca Sarri, dynamics of laser-plasmas (10/2010-09/2011); ; EPSRC funding (S & I grant to CPP/QUB);

- Dr Vikrant Saxena, fluid plasma simulations (11/2011 - 06/2013); EPSRC funding.

— *PhD supervision at QUB:*

- Ms Sharmin Sultana, Solitary waves in multicomponent plasmas (UK EPSRC funded, 10/2008-07/2012);
- Ms Gina Williams, Solitary Wave and Shock Dynamics in Non-Maxwellian Plasma Environments (DEL-NI/UK funded, 08/2011 - 12/2014);
- Mr Michael McKerr, Nonlinear Waves in Quantum Plasmas (DEL-NI/UK funded, 10/2011 - 11/2016; graduation 07/2017);
- Mr Spiros Thanasoulas, Computer simulations of shock dynamics in laser-plasma interactions (p/time, self/funded, 10/2011 - today).
- Mr Ibrahim Sayed Ibrahim El Kamash, Energy and Charge Transport by Localized Pulses in Renewable Energy Production Schemes: the Case of Inertial Confinement Fusion (funded by the Egyptian Cultural Bureau, 2/2015 - today).

— *Visitors hosted (in chronological order) - long term visits ( $\geq 1$  month):*

- Jafar Borhanian, honorary research visitor, Tabriz University, Iran (May - September 2008); numerical studies of laser-plasma solitons; self-funded (government fellowship);
- Mehdi Seyed Hosseini Jenab, honorary research visitor, Tehran University, Iran (October 2010 - May 2011); kinetic simulations of dusty-plasma dynamics; self-funded (government fellowship);
- Sebastien Guisset, research visit/internship, Universit'e de Bordeaux, France (June - September 2012); fluid simulations of electrostatic pulses; self-funded (Erasmus EU fellowship);
- Ata Ur-Rahman, Quaid-i-Azam University, Pakistan: 6-month visit (June 2013 - November 2013), funded by the Pakistani HEC (Higher Education Commission).
- Muhammad Adnan, University of Peshawar, Pakistan: 6-month visit (July 2013 - November 2013), funded by the Pakistani HEC (Higher Education Commission).
- Gaji Majarul Anowar, Begum Rokeya University, Rangpur, Bangladesh: 3-month visit (September 2013 - November 2013), funded by a UK Commonwealth Fellowship.
- Omar Bouzit, Faculty of Physics, University of Science and Technology Houari Boumediene (USTHB): two 1-month visits (December 2014 and November 2015), funded by an Algerian government academic fellowship.
- Dr Ebraheem Ebraheem Behery, Lecturer, Department of Physics, Damietta University, Egypt: 6-month visit (Feb.-July 2015), funded by the Egyptian Cultural Office.
- Dr Fernando Haas, UFRGS University, Porto Alegre, Brazil: 1-month visit (14/1-14/2/2015), funded by an EU IRSES grant.

— *Visitors hosted - short visits ( $< 1$  month):*

Various short incoming visits, including (in alphabetical order): Mark E. Dieckmann (Linkoping University, Sweden), Fernando Haas (Universidade Federal Rio Grande do Sul, Porto Alegre, Brazil), Manfred A. Hellberg (UKZN University, Durban, S. Africa), Myoung-Jae Lee (Hanyang University, Seoul, Korea), Shimul Maharaj and Carel Olivier (SANSA, Hermanus, S. Africa), Frank Verheest (Universiteit Gent, Belgium).

— Partial supervision of the postdoctoral research of Dr. Waleed Moslem, Von Humboldt Fellow (“*Nonlinear Structures in Active Galactic Nuclei*”), at Ruhr-Universität Bochum (2006-2007).

— Partial (co-)supervision, remote (PhD): Tom Cattaert (Universiteit Gent, Belgium) (visits in 2005 & 2006); large-amplitude solitary waves in space plasmas; partial supervision of PhD research work (principal supervisor: Prof. Frank Verheest; PhD defended in 2006 (Universiteit Gent, Belgium)).

— Partial supervision of the PhD research of Shahid Ali, DAAD (German Government) Fellow, at Ruhr-Universität Bochum (2006-2007); PhD thesis defended in 2008 (Umea U., Sweden).

## 9.2 Research visits (in reverse chronological order)

- 2007-today: Several short research visits to: Ruhr Univesität Bochum, Germany (Prof R Schlickeiser & P K Shukla†); Universiteit Gent, Belgium (Prof F Verheest); National Kapodistrian University of Athens (Department of Physics), Greece, hosted by Professor D.J. Frantzeskakis; University of Crete, Greece (Prof G Tsironis, Dr N Lazaridis).

- Universidade Federal do Rio Grande do Sul - UFRGS, Porto Alegre, Brazil; 2 monthly visits in 2014; 1 visit in 2015; 2 visits in 2016 (Special Visiting Researcher status awarded); hosted by Dr Fernando Haas.

- Nov. 2013: One month visit to University of Kwazulu-Natal, Durban, South Africa, hosted by NITheP (S.A. National Institute of Theoretical Physics) and Professor Manfred A. Hellberg.

- Dec. 2013: 1 week visit to SANSA - S. African National Space Science Agency, Hermanus, S. Africa, hosted by Dr Shimul Maharaj.

- 2010-2013: Several short visits to Max Planck Institute for Physics of Complex Systems (MPIPKS), hosted by Dr Evangelos Siminos and Dr Stefan Skupin.

- 5 week visit to Uni. Sydney (Australia) in 2010-11; host: Prof S Vladimirov (UK Royal Society travel grant).

- 6 week visit to Uni. Sydney in 2009; hosts: Prof D Melrose and Prof S Vladimirov (UK Royal Society travel grant).

- Visiting Research Associate, Universiteit Gent, Sterrenkundig Observatorium, Gent, Belgium; FWO (Flemish Research Fund) funding; collaboration with Prof. F. Verheest on Space plasmas (1 June - 30 Sept. 2006).

– Research visit (1 week) and oral presentation at: MPIPKS - Max Planck Institut für Physik komplexer Systeme, Dresden, Germany, upon invitation by Dr. S. Flach (22 - 27 Nov. 2004).

– Research visit (1 month, Euratom mobility grant) and oral talk at: Euratom - Hellenic Republic Association, University of Thessaly, Laboratory of Fluid Dynamics and Turbomachinery, Volos, Greece); invitation by (and collaboration with) Prof. A. Grecos (May 2002).

## 10. RECOGNITION: IMPACT, WIDE AUDIENCE TEXTS in the PRESS

### — Citations of published work

**Citation H-index: 32**; 3,291 (2,834\*) citations to-date in 1,912 (1,778\*) citing articles (\* within parenthesis, excluding self-citations); data from *Web of Science*, accessed on 2 November 2017; alternatively: **Citation H-index: 37** and **Citation i10-index = 107**; 4233 citations; data from *Google Scholar* (as of 2 November 2017).

### — Highlights from my research

— Pioneering article on *Freak Waves (Rogue Waves) in electromagnetic beam interactions with a plasma*: I have led, from original concept through finish, the research described in the article [2013/A03] (ref. Publication List below) by G.P. Veldes *et al* (*Journal of Optics*, 2013) was selected by the Editors to be included in the “*Highlights of 2013*” collection (Editorial certificate awarded).

— First prediction of the occurrence of *Discrete Breathers* (Intrinsic Localized Modes) in dusty plasma crystals (see paper [2005/A03] by Kourakis *et al*, in Publication List below).

— First experimental observation of electron-holes via proton imaging diagnostics (see paper [2010/A02] by Sarri *et al*, in Publication List below); my contribution was in the theoretical interpretation.

### — Publicity / Press Excerpts

A number of published press articles with reference to our research are available online at: [www.tp4.rub.de/~ioannis/misc/](http://www.tp4.rub.de/~ioannis/misc/) (original www links and .pdf reprints). Examples include:

— IoP (UK) LabTalk webpage “*Monster waves in a laser beam: myth or reality?*”: <http://iopscience.iop.org/2040-8986/labtalk-article/53714> (2013).

— Research Media Innovation article (Special Issue on Complexity Science): “*Riding the Soliton ‘Wave’*”, July 2013; accessible via <http://www.research-europe.com/magazine/ICT/EX13>.

— IoP (UK) LabTalk webpage “*Life off the Maxwellian border: nonthermal effects on plasma waves*”: [iopscience.iop.org/0741-3335/labtalk-article/54105](http://iopscience.iop.org/0741-3335/labtalk-article/54105) (2013).

— APS Physical Review Focus Story, 1 Sept. 2006: *Waves of Destruction*; online at: <http://focus.aps.org/story/v18/st7>.

— PhysOrg Sci. Site, 13 Sept. 2006: *New theory (and old equations) may explain causes of ship-sinking freak waves*; online at: <http://www.physorg.com/news77381892.html>.

— Springer, Geowissenschaften (in German): *Wie entsteht eine “Monsterwelle”*; online at: <http://www.springer.com/dal/home/geosciences?SGWID=1-10006-12-302901-0>.

— Rheinische Post (German daily), 20 Sept. 2006: *Ansage für Monsterwellen*; online at: <http://www.rp-online.de/public/article/aktuelles/wissen/erde/362683>.

— forskning.se (Swedish Uni. Network) article, 14 Aug. 2006: *Små vågsvall ger oväntade monster vågor*; online at: [http://www.forskning.se/GetDoc?meta\\_id=89716](http://www.forskning.se/GetDoc?meta_id=89716).

## 11. ACADEMIC REFERENCES

### 1. **William G. (Bill) GRAHAM**, Professor

Centre for Plasma Physics, Department of Physics and Astronomy, Queen's University Belfast, BT7 1NN Northern Ireland, UK; Tel. +44 771 3323364 ; Email b.graham@qub.ac.uk.

Note: ex-Director of Research, Centre for Plasma Physics (Queen's U. Belfast); Elected Member of the Royal Irish Academy; Fellow of the Institute of Physics; Fellow of the American Physical Society; Honorary Professorship, University of Bucharest; ICPIG Franklin - Von Engel Prize (2013); Editor Plasma Sources Science and Technology (2014- present); Member of the Council of Institute of Physics (1991-1994); Chair of the IOP Plasma Physics Group Committee (1993-1996), among other honours. Professor Graham was my line manager at Queen's University, and has actually collaborated with me in setting up our MSc in Plasma Physics in 2008.

### 2. **Manfred A. HELLBERG**, Professor Emeritus

School of Physics, University of KwaZulu-Natal, Durban 4000, South Africa; Tel: +27 31 260 2860 (office); +27 83 6608902 (mobile). Fax: +27 31 260 7795; Email: hellberg@ukzn.ac.za.

Note: Professor Hellberg is a distinguished member of the South African Academy of Sciences, a member of St John's College (Cambridge), and a Fellow of the UK Royal Society. He received the highest award conferred by the South African Institute of Physics (SAIP), the SAIP de Beers Gold Medal, in 2014.

Professor Hellberg and I have collaborated in the last 10 years on topics from Space Plasmas, in particular on solitons in plasmas with electrons obeying non-Maxwellian ( $\kappa$ ) distributions.

### 3. **Frank VERHEEST**, Professor Emeritus

Universiteit Gent, Sterrenkundig Observatorium, Krijgslaan 281, B-9000 Gent, Belgium;  
Office Phone: +32 9 26 44 799 ; Fax: +32 9 26 44 989; Email: Frank.Verheest@UGent.be.

Note: Formerly Professor at Ghent University, Belgium; Honorary Professor in the School of Physics, UKZN University Durban, S. Africa; Fellow of the Institute of Physics (UK) and of the Royal Astronomical Society (UK). First laureate in 1990 of the H.L. Vanderlinden Prize for Astronomy, bestowed by the Royal Academy of Sciences of Belgium.

Professor Verheest and I have collaborated on various projects; our most recent collaboration focuses on the KdV-Burgers description of shocks in dusty plasmas.

### 4. **Panayotis (Panos) KEVREKIDIS**, Professor

University of Massachusetts Amherst, USA

<http://www.math.umass.edu/~kevrekid> , kevrekid@math.umass.edu, kevrekid@gmail.com ;  
Mobile tel. +49 40-8998-6508 (currently, until end June); US cell. +1 413 5881882.

Note: Panos Kevrekidis has received numerous awards and distinctions, including a CAREER award in Applied Mathematics from the U.S. National Science Foundation (in 2003), a Humboldt Research Fellowship from the Humboldt Foundation, the 2008 International Stephanos Pnevmatikos Award for research in nonlinear phenomena, the 2013 J.D. Crawford Prize of the Society for Industrial and Applied Mathematics for outstanding research in nonlinear science, the 2013 A.F. Pallas award from the Academy of Athens. In 2014 he was elected a Fellow of the American Physical Society. In 2017 he was elected Fellow of the Society for Industrial and Applied Mathematics, "for fundamental contributions to the existence, stability, and dynamics of nonlinear waves with applications to atomic, optical, and materials physics".

Panos Kevrekidis and I have been collaborating recently on topic from nonlinear science, including extreme-amplitude events (freak waves, rogue waves) in plasmas.



**Ioannis Kourakis**  
www.kourakis.eu

## **Appendix A. SYNOPSIS OF RESEARCH INTERESTS & AREAS OF EXPERTISE**

My research focuses on *Nonlinear Dynamics*, *Theoretical Physics* and *Mathematical Physics*, with emphasis on applications in *Plasma Modelling*, *Laser-Plasma Interactions* and *Materials Science*. The topics below are all represented in the attached Publication List.

### **Mathematical Modeling, Nonlinear Dynamics & Applications**

- Modeling of nonlinear wave propagation in dispersive media, tracing the microscopic origin of nonlinearity & dispersion mechanisms; forcing (gain) & dissipative (loss) effects; modulational instability and wave coupling.
- Nonlinear PDEs - Soliton Theory (formal): stability, conservation properties, interactions, collective coordinate formalism, effect of perturbations. Generic paradigms include: Korteweg de Vries (KdV), nonlinear Schrödinger (NLS), Boussinesq (Bq) equations; in higher dimensionality: Kadomtsev-Petviashvili (KP), Zakharov-Kuznetsov (ZK) equation(s).
- My most recent research focuses on: i) *rogue waves (freak waves)*, i.e. extreme amplitude excitations, typically modeled by *nonlinear Schrodinger* type equations, ii) solitary waves in non-Maxwellian plasmas, and iii) nonlinear fluid models for ultradense quantum plasmas.

### **Nonlinear Waves and Instabilities in Plasmas**

- Nonlinear excitations, solitons and associated nonlinear instabilities, modulated envelope wave packets, modulational instability, ponderomotive coupling effects.
- Electrostatic and electromagnetic waves in Space and laboratory plasmas: pair plasmas, e-p-i plasmas, beam-plasma systems, two-electron temperature plasmas; laser-plasma interactions.

### **Beam Dynamics in Laser Plasmas**

- Theory and simulation of beam profile dynamics in laser plasmas; beam self-focusing and filamentation instabilities; extensive recent work on quantum effects and on non-Gaussian beam profile effects in laser beam propagation.

### **Dusty Plasmas (Complex plasmas)**

- Weakly coupled plasmas, in the presence of charge mesoscopic defects (dust particulates): wave propagation, dispersion properties, instabilities, electrostatic interaction laws.

### **Soft Condensed Matter – Colloidal Plasmas**

- Strongly coupled dusty plasmas; Debye (Yukawa) crystals: sheath dynamics, wake potentials, crystal formation and stability, nonlinear wave propagation; structural and dynamical properties.

### **Transport phenomena and EM pulse propagation in Materials Science**

- Nonlinear excitations in Soft Condensed Matter: Solitons, Intrinsic Localized Modes.
- Nonlinear effects in *Left-handed Materials (LHM)* (negative refraction index media).

## Appendix B: LIST of PUBLICATIONS

(Listed in reverse chronological order)

### B.1 Research articles: published in refereed scientific journals

154. [2017/A05] *On the Effects of Suprathermal Populations in Dusty Plasmas: the case of Dust-Ion-Acoustic Waves*, M. Lazar, I. Kourakis, S. Poedts and H. Fichtner, *Planetary and Space Science* (Elsevier), accepted, in press.
153. [2017/A04] *Ion-beam/plasma interaction effects on electrostatic solitary wave propagation in ultradense relativistic quantum plasmas*, I. S. Elkamash, I. Kourakis and F. Haas, *Physical Review E* **96**, 043206 (2017). DOI: 10.1103/PhysRevE.96.043206
152. [2017/A03] *Ion-beam/plasma modes in ultradense relativistic quantum plasmas: dispersion characteristics and beam-driven instability*, by I.S. Elkamash, F. Haas and I. Kourakis, *Physics of Plasmas*, **24**, 092119 (2017); DOI: 10.1063/1.4989777.
151. [2017/A02] *New insight in the dispersion characteristics of electrostatic waves in ultra-dense plasmas: electron degeneracy and relativistic effects*, I. Kourakis, M. McKerr, I.S. Elkamash and F. Haas, *Plasma Physics and Controlled Fusion*, **59** (10), 1050132017 (2017).
150. [2017/A01] *On the characteristics of obliquely propagating electrostatic structures in non-Maxwellian plasmas in the presence of ion pressure anisotropy*, M. Adnan, A. Qamar, S. Mahmood and I. Kourakis, *Physics of Plasmas*, **24**, 032114 (2017); DOI: <http://dx.doi.org/10.1063/1.4978613>.
149. [2016/A05] Comment on *Weakly dissipative dust-ion acoustic wave modulation* [J. Plasma Phys. **82**, 905820104 (2016)], I. Kourakis and I.S. Elkamash, *Journal of Plasma Physics*, **82** (5) 905820508, (2016); DOI: 10.1017/S0022377816000891; also, *Corrigendum, ibid*, **82** (6), 945820601 (2016); DOI: <https://doi.org/10.1017/S0022377816001033>.
148. [2016/A04] *Multi-species plasma expansion into vacuum: the role of secondary ions and suprathermal electrons*, I. S. Elkamash and I. Kourakis, *Physical Review E*, **94**, 053202 (2016); DOI: 10.1103/PhysRevE.94.053202.
147. [2016/A03] *Ion-Acoustic Envelope Modes in a Degenerate Relativistic Electron-Ion Plasma*, Michael Mc Kerr, Fernando Haas, Ioannis Kourakis, *Physics of Plasmas*, **23**, 052120 (2016); DOI <http://dx.doi.org/10.1063/1.4952774>.
146. [2016/A02] *Localized structures in complex plasmas in the presence of a magnetic field*, P. Dongmo Tsopgue, A. Mohamadou, I. Kourakis, Timoleon C. Kofane and J.P. Tanga, *Astrophys. Space Sci.* **361**, 130 (2016); DOI 10.1007/s10509-016-2712-5.
145. [2016/A01] *Weakly nonlinear ion acoustic excitations in a relativistic model for dense quantum plasma*, E. E. Behery, F. Haas and I. Kourakis, *Physical Review E* **93**, 023206 (2016); <http://dx.doi.org/10.1103/PhysRevE.93.023206>.
144. [2015/A06] *Electron-scale dissipative electrostatic solitons in multi-species plasmas*, S. Sultana and I. Kourakis, *Phys. Plasmas*, **22**, 102302/1-7 (2015); <http://dx.doi.org/10.1063/1.4932071>.
143. [2015/A05] *Laser-driven generation of electron-positron beams: a review*, G. Sarri, M. E. Dieckmann, I. Kourakis, A. Di Piazza, B. Reville, C. H. Keitel, and M. Zepf, *J. Plasma Phys.* **81** (4), 455810401/1-23 (2015); doi:10.1017/S002237781500046X.

142. [2015/A04] *Relativistic breather-like solitary waves with linear polarization in cold plasmas*, G. Sánchez-Arriaga, E. Siminos, V. Saxena and I. Kourakis, *Phys. Rev. E* **91**, 033102 (2015); DOI: <http://dx.doi.org/10.1103/PhysRevE.91.033102>; accessed on ArXiv as: arXiv:1410.1741 (<http://arxiv.org/abs/1410.1741>).
141. [2015/A03] *Electrostatic solitary waves in relativistic degenerate electron-positron-ion plasma*, Ata-ur-Rahman, Ioannis Kourakis and Anisa Qamar, *IEEE Transactions in Plasma Science* **43** (4), 974 (2015); doi: 10.1109/TPS.2015.2404298.
140. [2015/A02] *Amplitude modulation of quantum-ion-acoustic wavepackets in electron-positron-ion plasmas: modulational instability, envelope modes, extreme waves*, Ata-ur-Rahman, Michael Mc Kerr, Wael El-Taibany, Ioannis Kourakis and Anisa Qamar, *Physics of Plasmas* **22**, 022305 (2015); DOI: <http://dx.doi.org/10.1063/1.4907247>.
139. [2015/A01] *Nonlinear hydrodynamic Langmuir waves in fully degenerate relativistic plasma*, F. Haas and I. Kourakis, *Plasma Phys. Cont. Fusion* **57**, 044006 (2015); doi: 10.1088/0741-3335/57/4/044006.
138. [2014/A08] *Modelling relativistic solitary wave interactions in over-dense plasmas: a perturbed nonlinear Schrödinger equation framework*, E. Siminos, G. Sánchez-Arriaga, V. Saxena and I. Kourakis, *Phys. Rev. E*, **90** (6) 063104 (2014); DOI: 10.1103/PhysRevE.90.063104; also as: <http://arxiv.org/abs/1410.0662>.
137. [2014/A07] *Relativistic theory for localized electrostatic excitations in degenerate electron-ion plasmas*, Michael Mc Kerr, Fernando Haas, Ioannis Kourakis, *Physical Review E*, **90**, 033112 (2014); DOI: 10.1103/PhysRevE.90.033112.
136. [2014/A06] *A Schamel equation for ion acoustic waves in superthermal plasmas*, G. Williams, F. Verheest, M.A. Hellberg, G. Anowar and I. Kourakis, *Phys. Plasmas*, **21**, 092103 (2014); doi: 10.1063/1.4894115.
135. [2014/A05] *Pressure anisotropy effects on nonlinear electrostatic excitations in magnetized electron-positron-ion plasmas*, M. Adnan, G. Williams, A. Qamar, I. Kourakis, *Eur. Phys. J. D*, **68**, 247 (2014); DOI: 10.1140/epjd/e2014-50384-y.
134. [2014/A04] *Vlasov-kinetic computer simulations of electrostatic waves in dusty plasmas: an overview of recent results*, S. M. Hosseini Jenab and I. Kourakis, *European Physical Journal D* **68**, 219 (2014); DOI: 10.1140/epjd/e2014-50177-4.
133. [2014/A03] *Multicomponent kinetic simulation of BGK modes associated with ion acoustic and dust-ion acoustic excitations in electron-ion and dusty plasmas*, S. M. Hosseini Jenab and I. Kourakis, *Phys. Plasmas*, **21**, 043701 (2014); <http://dx.doi.org/10.1063/1.4869730> .
132. [2014/A02] *Dust-acoustic shocks in strongly coupled dusty plasmas*, S. E. Cousens, S. Sultana, I. Kourakis, V. V. Yaroshenko, F. Verheest and M. A. Hellberg, *Phys. Rev. E* **89**, 043103 (2014); <http://dx.doi.org/10.1103/PhysRevE.89.043103>.
131. [2014/A01] *Freak waves and electrostatic wavepacket modulation in a quantum electron-positron-ion plasma*, M. McKerr, I. Kourakis and F. Haas, *Plasma Phys. Cont. Fusion* **56**, 035007 (17pp) (2014).
130. [2013/A13] *On the existence and stability of electrostatic structures in non-Maxwellian electron-positron-ion plasmas*, G. Williams and I. Kourakis, *Physics of Plasmas*, **20**, 122311 (2013); <http://dx.doi.org/10.1063/1.4849415>.
129. [2013/A12] *Semiclassical relativistic fluid theory for electrostatic envelope modes in dense*

- electron-positron-ion plasmas: modulational instability & rogue waves*, Ioannis Kourakis, Michael McKerr and Ata Ur-Rahman, *J. Plasma Phys.*, **79** (6), 10891094 (2013) (<http://dx.doi.org/10.1017/S0022377813001323>); also: *Corrigendum, ibid.*, **80** (04), 653 (1 p.); DOI: <https://doi.org/10.1017/S0022377814000178>.
128. [2013/A11] *Dust-acoustic supersolitons in a three-species dusty plasma with kappa distributions*, M.A. Hellberg, T.K. Baluku, F. Verheest and I. Kourakis, *J. Plasma Phys.*, **79** (6), 10391043 (2013).
127. [2013/A10] *Ion-acoustic supersolitons in plasmas with two-temperature electrons: Boltzmann and kappa distributions*, Frank Verheest, Manfred A. Hellberg and Ioannis Kourakis, *Phys. Plasmas* **20**, 082309/1-12 (2013); doi: 10.1063/1.4818888.
126. [2013/A09] *Re-examining the Cairns-Tsallis model for ion acoustic solitons*, G. Williams, I. Kourakis, F. Verheest, M. A. Hellberg, *Physical Review E* **88**, 023103/1-6 (2013).
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124. [2012/A07] *Time-Resolved Characterization of the Formation of a Collisionless Shock*, H. Ahmed, M.E. Dieckmann, L. Romagnani, Domenico Doria, Gianluca Sarri, M. Cerchez, E. Ianni, I. Kourakis, A. L. Giesecke, M. Notley, R. Prasad, K. Quinn, O. Willi, M. Borghesi, *Physical Review Letters*, **110**, 205001 (2013); DOI: 10.1103/PhysRevLett.110.205001.
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2. [2017/A06R] *Dissipative electrostatic shock waves in multi-ion dusty plasmas*, I. S. Elkamash and I. Kourakis, submitted to *Physical Review E* (USA), under review.
3. [2017/A07R] *Dark envelope soliton interaction in plasmas in the presence of a positron beam and superthermal electrons*, S. A. El-Tantawy, Al-Mikhwah, E. I. El-Awady, S. K. El-Labany, I. Kourakis and S. M. E. Ismaeel, submitted to *Physics of Plasmas* (AIP, USA), under review.

### B.3 Participation in Book Chapters / Conference Proceedings (refereed)

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14. [2004/C9] *“Intrinsic localized modes in dust lattices”*, I. Kourakis, P. K. Shukla and V. Basios, *Proceedings of the 2004 ICPP: International Congress on Plasma Physics* (Nice, France, 2004); e-Proceedings: <http://hal.ccsd.cnrs.fr/ccsd-00001892/en/>.

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12. [2004/C7] “*Lagrangian formulation of ion- and dust-ion-acoustic waves*”, I. Kourakis and P. K. Shukla, *Proceedings of the 2004 ICPP: International Congress on Plasma Physics* (Nice, France, 2004); e-Proceedings: <http://hal.ccsd.cnrs.fr/ccsd-00001891/en/>.
11. [2004/C6] “*Theory of solitary waves in complex plasma lattices*”, I. Kourakis, P. K. Shukla and B. Eliasson, *Proceedings of the 2004 ICPP: International Congress on Plasma Physics* (Nice, France, 2004); e-Proceedings: <http://hal.ccsd.cnrs.fr/ccsd-00001890/en/>.
10. [2004/C5] “*Discrete breather modes in complex plasma crystals*”, I. Kourakis, P. K. Shukla and V. Basios, *Proceedings of the 31st EPS Conference on Plasma Physics* (London, UK), *European Conference Abstracts (ECA)* (Petit Lancy, Switzerland), Vol. **28B**, P1.011 (2004).
9. [2004/C4] “*Modulational instability and envelope excitations of dust-acoustic waves in a non-thermal background*”, I. Kourakis and P. K. Shukla, *Proceedings of the 31st EPS Conference on Plasma Physics* (London, UK), *European Conference Abstracts (ECA)* (Petit Lancy, Switzerland), Vol. **28B**, P4.081 (2004).
8. [2004/C3] “*Envelope localized modes in electrostatic plasma waves*”, I. Kourakis and P. K. Shukla, *Proceedings of the 31st EPS Conference on Plasma Physics* (London, UK), *European Conference Abstracts (ECA)* (Petit Lancy, Switzerland), Vol. **28B**, P5.058 (2004).
7. [2004/C2] “*Lagrangian formulation of electrostatic plasma waves: Application to dust-acoustic waves*”, I. Kourakis and P. K. Shukla, *Proceedings of the 31st EPS Conference on Plasma Physics* (London, UK), *European Conference Abstracts (ECA)* (Petit Lancy, Switzerland), Vol. **28B**, P-2.067 (2004).
6. [2004/C1] “*Theory of nonlinear excitations in dusty plasma crystals*”, I. Kourakis, P. K. Shukla and B. Eliasson, *Proceedings of the 31st EPS Conference on Plasma Physics* (London, UK), *European Conference Abstracts (ECA)* (Petit Lancy, Switzerland), Vol. **28B**, O-5.07 (2004).
5. [2002/C2] “*Modulational instability and localized excitations in dusty plasma crystals*”, I. Kourakis, *Proceedings of the 29th EPS meeting on Controlled Fusion and Plasma Physics, European Conference Abstracts (ECA)* Vol. **26B** (2002) P-4.221.
4. [2002/C1] “*Relaxation times for magnetized plasma*”, I. Kourakis, *Proceedings of the 29th EPS meeting on Controlled Fusion and Plasma Physics, European Conference Abstracts (ECA)* Vol. **26B**, P-4.008 (2002).
3. [2001/C1] “*Kinetic Theory and diffusion coefficients for plasma in a uniform magnetic field (Debye potential)*”, I. Kourakis, D. Carati & B. Weyssow, *Proceedings of the 2000 International Conference on Plasma Physics / APS-DPP meeting in Québec*, Vol. **1**, 49 - 53 (2001).
2. [2000/C1] “*Kinetic Theory and diffusion coefficients for plasma in a uniform magnetic field (Coulomb potential)*”, I. Kourakis & D. Carati, *Proceedings of the 27th EPS meeting on Controlled Fusion and Plasma Physics, Eur. Conf. Abstracts (ECA)* Vol. **24B**, 872 - 875 (2000).
1. [1998/C1] “*Fokker-Planck equation for a test-particle in magnetized plasma*”, I. Kourakis, *Proceedings of the 1998 ICPP & 25th EPS meeting on Controlled Fusion and Plasma Physics, ECA (Europhysics Conference Abstracts)* **22C**, 264 - 267 (1998).

## B.5 Dissertations

2002/DISS. “*Kinetic theory for a test-particle weakly coupled to a heat-bath. Application to magnetized plasmas*”, PhD thesis, ULB - Université Libre de Bruxelles, Belgium (2002).

2001/DISS. “*Kinetic theory for a test-particle weakly-coupled to a large heat-bath in equilibrium - application to magnetized plasma*”, mémoire de D.E.A. (Belgian MPhil. thesis), ULB - Université Libre de Bruxelles, Belgium (2001).

1991/DISS. *Modulational instability in hydrogen-bonded systems* (“*Instabilité Modulationnelle dans les Systèmes à Liaisons Hydrogènes*”), mémoire de D.E.A. (French MSc. thesis), Université de Bourgogne, Dijon, France (1991).

## B.6 Lecture Notes & Tutorials

2008/T1. *Introduction to Plasma Modelling*, Lecture Notes by I. Kourakis (75 %, + coordinator), Marco Borghesi and Matt Zepf (25 %), MSc course PHY9013, Queen’s University Belfast (2008).

2008/T2. *Laser-produced Plasmas*, Lecture Notes by D. Riley, I. Kourakis, C. Lewis and M. Zepf, MSc module PHY9016, Queen’s University Belfast (2008+).

2007/T1. *Nonlinear field line random walk and generalized compound diffusion of charged particles*, I. Kourakis, *2007 Summer College on Plasma Physics* (Abdus Salam ICTP, Trieste, Italy, 2007); published online at the ICTP server.

2007/T2. *Localized envelope excitations in pair plasmas*, I. Kourakis, *2007 Summer College on Plasma Physics* (Abdus Salam ICTP, Trieste, Italy, 2007); published online at the ICTP server.

2006/T1. *Nonlinear Modulated Envelope Electromagnetic Excitations in Multi-Component Plasmas: Focus on Oblique Electromagnetic Wavepackets in Magnetized e-p-i Plasmas or Doped Pair Plasmas*, I. Kourakis, *International Workshop on Frontiers of Plasma Science* (Abdus Salam ICTP, Trieste, Italy, 2006); online on the ICTP server, at: <http://cdsagenda5.ictp.trieste.it>.

2005/T1. *Collective processes in dusty plasma crystals*, I. Kourakis, *Autumn College on Plasma Physics* (Abdus Salam ICTP, Trieste, Italy, 2005); available online as ICTP/SMR1673/19, at the ICTP server.

2004/T1. “*Electrostatic wave propagation in dusty plasmas - occurrence of dust in fusion plasmas*”, I. Kourakis & P. K. Shukla, ‘*3rd School on Fusion Physics and Technology*’, Volos (Greece), 1 April 2004 (proceedings in greek, Association Euratom-Hellenic Republic, 2005).

2003/T1. “*Fokker-Planck kinetic equation for a test-particle in plasma inside a magnetic field*”, I. Kourakis & A. Grecos, ‘*1st School on Fusion Physics and Technology*’, Volos (Greece), may 2002, pp. 147 – 163 (proceedings in greek, 2003).

## Appendix C: CONFERENCE ATTENDANCE / TALKS / SEMINARS

### C.1 Invited Presentations (Invited Talks)

43. Invited Speaker, *International Scientific Spring (ISS-2018)*, 12-16 March 2018, Islamabad, Pakistan.
42. Invited Lecture, Special Session on Kappa Distributions, in *SigmaPhi2017 - International Conference on Statistical Physics*, 10-14 July 2017, Corfu, Greece.
41. *5th SOLARNET workshop*, invited lecture, Belfast, 1 September, 2016.
40. Invitation to the VI International Conference on *Frontiers in Nonlinear Physics - FNP2016*, Mini-Symposium on “*Rogue Waves in Nature*”, invited lecture, Nizhny Novgorod & St. Petersburg, July 17-23, 2016 (cancelled).
39. UK National Astronomy Meeting - NAM2016, Session “*Solar and Experimental Plasma Physics Synergy*”, invited lecture, 27 June - 1 July 2016.
38. *International Scientific Spring*, National Centre for Physics, Islamabad, Pakistan (9 March 2016); invited video-lecture.
37. *QuAMP-2015 - International Conference on Quantum, Atomic, Molecular and Plasma Physics*, University of Sussex, Brighton, UK, 1-4 September 2015; invited lecture.
36. Joint *BUKS-2015 - MHD waves and Instabilities in the Solar Atmosphere and Celebrating the Scientific Career of Michael Ruderman – Honorary Meeting*, Budapest, 25-29 May 2015; invited lecture.
35. *International Scientific Spring*, National Centre for Physics, Islamabad, Pakistan (20 March 2015); invited video-lecture.
34. *SIAM Conference on Nonlinear Waves and Coherent Structures (SIAM NW14)*, August 11-14, 2014, Churchill College, University of Cambridge, UK, <http://www.siam.org/meetings/nw14/>; invited lecture (special session on “*Nonlinear Waves in Metamaterials*”) (attendance canceled due to overlapping commitments).
33. Invited Lecture, *SigmaPhi2014 - International Conference on Statistical Physics*, 07-12 July 2014, Rhodes, Greece.
32. *HIPOLIN 2014 - An Introduction to high power light-matter interactions*, Summer School, Rethymnon Crete, Greece; invited lecture (4 July 2014).
31. *International Scientific Spring ISS-2014*, National Center for Physics, Islamabad, Pakistan, 10-14 March 2014; (invited talk; not attended).
30. 7th International Conference on the Physics of Dusty Plasmas (ICPDP2014), held in New Delhi, 3-7 March 2014 (invited talk; not attended); <http://www.icdpd2014.com>.
29. AGU (American Geophysical Union) Fall Meeting 2013 (<http://fallmeeting.agu.org/2013/>), held in San Francisco USA, 9-13 December 2013 (invited talk: special session “*Kappa-distributions in Space Plasmas*”, org. George Livadiotis & Peter Yoon).
28. Invitation to *First ICTP-NCP International College on Plasma Physics (SMR 2565)* (held in Islamabad Pakistan, 11-15 November 2013), jointly organized by the International Centre for Theoretical Physics (ICTP, Trieste, Italy) and the National Center for Physics (NCP, Pakistan); declined, to personal commitment.

27. *HIPOLIN 2013 - An Introduction to high power light-matter interactions*, Summer School, Rethymnon Crete, Greece; lecture delivered 10 July 2013.
26. *International Scientific Spring*, National Centre for Physics, Islamabad, Pakistan (11-15 March 2013).
25. *ITCPS2012 - International Topical Conference on Plasma Science*, Faro, Portugal (24-28 September 2012).
24. *APPEPLA 2012 - Applications of Electronics in Plasma Physics*, Rethymnon Crete, Greece (July 2012).
23. *Joint European Physical Society (EPS) Conference on Plasma Physics and Int. Congress. on Plasma Physics*, Stockholm, Sweden (2-6 July 2012).
22. *International Scientific Spring*, National Centre for Physics, Islamabad, Pakistan (5-9 March 2012).
21. *APPEPLA 2011 - Applications of Electronics in Plasma Physics*, Rethymnon Crete, Greece (September 2011).
20. *ICPDP - 6th International Conference on the Physics of Dusty Plasmas*, Garmisch-Partenkirchen, Germany (May 16-20, 2011).
19. *International Scientific Spring*, National Centre for Physics, Islamabad, Pakistan (March 01-04, 2011) (not attended due to last minute administrative problem).
18. *Workshop on Frontiers in Plasma Physics*, ICTP International Center of Theoretical Physics, Trieste, Italy (July 2010).
17. *APPEPLA - Applications of Electronics in Plasma Physics*, Rethymnon Crete, Greece (June-July 2010).
16. *Summer College in Plasma Physics*, ICTP International Center of Theoretical Physics, Trieste, Italy (August 2009).
15. *SIAM Conf. on Applications of Dynamical Systems (DS09)* in Snowbird Utah, USA.
14. *9th Workshop on Fine Particle Plasmas (NIFS)* in Toki/Gifu, Japan (Dec. 2008; invitation; not attended due to inconvenience).
13. *Greek-Turkish conference on "Statistical Mechanics and Dynamical Systems"*, Rhodos, Greece & Marmaris, Turkey (11-17 September 2008).
12. *International Congress on Plasma Physics (ICPP 2008)*, Fukuoka, Japan (8-12 Sept. 2008).
11. *Int. Workshop on the Frontiers of Modern Plasma Phys.*, Trieste, Italy (14-25 July 2008).
10. *SIAM Conf. on Nonlinear Waves and Coherent Structures (NW08)*, Rome, Italy (21-24 July 2008).
9. *5th International Conference on Dusty Plasma Physics Conference (ICPDP5)*, Ponta Delgada, Azores, Portugal (18-24 May 2008).
8. *2007 Summer College on Plasma Physics*, Abdus Salam International Centre for Theoretical Physics, Trieste, Italy (31 July - 24 August 2007).
7. *3rd FSA (Flemish-South African) Workshop on Space Plasma Physics*, Universiteit Gent, Belgium (27 - 29 Sept. 2006).

6. *International Workshop on Frontiers of Plasma Science*, Abdus Salam International Centre for Theoretical Physics, Trieste, Italy (21 August - 1 September 2006).
5. *Autumn College on Plasma Physics: Collective Processes*, Abdus Salam International Centre for Theoretical Physics, Trieste, Italy (5-30 September 2005).
4. *1st FSA Workshop on Dusty and Space Plasma Physics*, Gent, Belgium (22 - 24/09/2004).
3. *SPIG 2004: 22nd Summer School and International Symposium on the Physics of Ionized Gases*, Tara Park, Serbia and Montenegro (23 - 27 August 2004).
2. *3rd School on Fusion Physics and Technology*, organized by the Euratom - Hellenic Republic Association, held at the University of Thessaly, Volos, Greece (29 March - 2 April 2004).
1. *1st School on Fusion Physics and Technology*, organized by the Euratom - Hellenic Republic Association, held in the University of Thessaly, Volos, Greece (16 - 21 May 2002).

## C.2 Contributed presentations (talks, posters)

52. 44th Eur. Phys. Soc. Conference on Plasma Physics (Belfast, 26-30 June 2017); 1 oral talk, 1 poster presented and 3 posters co-authors: for titles, see items 60-64 in Conf. Proceedings section above.
51. *Extended modulation instability criteria for dissipative dusty plasmas*, 8th Int. Conf. Phys. Dusty Plasmas, Prague (20-25 May 2017) (poster presentation).
50. *Analysis and Applications of Localized Structures in Nonlinear Media*, Lorentz Center, Leiden, Holland, 29 Aug - 2 Sep 2016 (oral talk).
49. *43rd IoP Plasma Physics Group Annual Meeting*, Isle of Skye, UK; 23-26 May 2016 (oral talk and poster (presented by I. Elkamash)).
48. 42nd EPS Conference on Plasma Physics (Lisbon, Portugal, July 2015), Poster and paper (presented by I. Elkamash).
47. 42nd EPS Conference on Plasma Physics (Lisbon, Portugal, July 2015), Poster and paper (presented by I. Elkamash).
46. 41st EPS Conference on Plasma Physics (Berlin, Germany, July 2014), Poster and paper (presented by G. Williams).
45. *11th Conference of the Hellenic Astronomical Society (HelAS)*, Athens, Greece; 8-12 September 2013.
44. *2013 IoP Plasma Physics Group Annual Meeting*, York, UK; 25-29 March 2013 (oral talk).
43. *International endeavor to establish Laser-Based High Energy Physics and Applications Conference (IZEST)*, University of Strathclyde, Glasgow (UK), November 13-15, 2012 (poster).
42. *2nd Conference on Localized Excitations in Nonlinear Complex Systems (LENCOS'12)*, Sevilla (Spain), July 9-12, 2012 (oral talk).
41. Joint *39th European Physical Society (EPS) Conference on Plasma Physics and Int. Congress. on Plasma Physics*, Stockholm, Sweden (2-6 July 2012); poster(s) and paper(s) (presented by G. Williams and M. McKerr).
40. *5th Chaotic Modeling and Simulation International Conference (CHAOS 2012)*, Athens

(Greece), 12-15 June 2012 (oral talk).

39. *ENLITE12 - International Workshop on Laser-Plasma Interaction at Ultra-High Intensity*, Dresden Germany; 16 - 20 April 2012 (oral talk).

38. *2012 IoP Plasma Physics Group Annual Meeting*, Oxford, UK; March 2012.

37. *Rogue Waves – ROGUE11*, International Workshop (Scientific Coordinators: Nail Akhmediev, Alan C. Newell, Efim Pelinovsky), Dresden Germany; 07 - 11 November 2011 (poster).

36. *30th International Conference on Phenomena in Ionized Gases (ICPIG2011)*, Belfast, Northern Ireland, UK; 28 Aug.-2 Sept. 2011 (poster).

35. *2011 IoP Plasma Physics Group Annual Meeting*, North Berwick, Scotland UK; March 2011 (poster); *IoP best student poster prize awarded to PhD student S. Sultana*.

34. *2010 EPS meeting on Plasma Physics*, Dublin, Ireland; June 2010 (poster).

33. *12th Workshop on Phys. Dusty Plasmas*, Boulder Colorado USA, 17-20 May 2009 (talk).

32. *2009 IoP Plasma Physics Group Annual Meeting*, Warwick, UK; 30 March - 2 April, 2009 (poster).

31. *International Conference on Statistical Physics (Sigma-Phi 2008)*, Kolymbari, Crete, Greece (14-18 July 2008) (poster).

30. *35th IEEE International Conference on Plasma Science*, Karlsruhe, Germany (15-19 June, 2008) (talk).

29. *2008 IoP Plasma Physics Group Annual Meeting*, London, UK (1-4 April, 2008) (talk).

28. *Hamiltonian Lattice Dynamical Systems*, Leiden, Netherlands (October 15-19, 2007) (talk).

27. *The Sun, the Heliosphere and the Earth, IHY 2007 conference*, international workshop, Bad Honnef, Germany (May 14-18, 2007); poster contributions (2).

26. *Nonlinear Physics in Periodic Structures and Metamaterials*, international workshop, Max Planck Institut für Physik komplexer Systeme, Dresden, Germany, March 19-30, 2007; contributed talk.

25. *Dynamics Days Europe 2006*, Heraklion-Crete, Greece (25 - 29 September 2006).

24. *Nonlinear Physics and Mathematics (NLPM 2006)*, International Workshop, Kiev, Ukraine (25-27 May, 2006); poster contribution.

23. *13th International Congress on Plasma Physics*, Kiev, Ukraine (22-26 May, 2006).

22. *NEXT-SigmaPhi: News, Expectations and Trends in Statistical Physics*, Kolymbari (Crete), Greece (13-18 August 2005).

21. *Nonlinear Science and Complexity: 18th Panhellenic Summer School and Conference*, University of Thessaly, Volos, Greece (18-30 July 2005).

20. *ICPP2004: 12th Int. Congress on Plasma Physics*, Nice, France (25 - 29 October 2004).

19. *International Conference and Summer School: Complexity in Science and Society*, Patras and Ancient Olympia, Greece (14 - 26 July 2004).

18. *Workshop on Theoretical Plasma Physics*, ICTP International Center of Theoretical Physics, Trieste, Italy (5 - 16 July 2004).

17. *31st EPS meeting on Plasma Physics*, London, UK (28 June - 2 July 2004).
16. *International Topical Conference on Plasma Physics - ITCPP 2003*, Santorini, Greece (8 - 12 September 2003).
15. Annual meeting of the Belgian Physical Society, UMH - Université de Mons - Hainaut, Mons, Belgium (25 - 26 May 2004).
14. *International Conference on Noise and Fluctuations - ICNF 2003*, Prague, Czech Republic (18 - 22 August 2003).
13. *16th Summer School / Panhellenic Congress on Nonlinear Dynamics: Chaos and Complexity*, Halkida, Greece (14 - 24 July 2003).
12. *11th International Workshop on the Physics of Non-Ideal Plasmas - PNP11*, Valencia, Spain (20 - 25 March 2003).
11. *29th EPS meeting on Plasma Physics and Controlled Fusion* (17 - 21 June 2002), Montreux, Switzerland (17 - 21 June 2002).
10. *International Workshop on Chaotic Transport and Complexity in Classical and Quantum Dynamics*, Carry-le-Rouet (Marseille), France (24 - 28 June 2002).
9. *'III Congreso Venezolano de Física'*, Meeting of the Physical Society of Venezuela, Universidad Simon Bolívar, Caracas, Venezuela (10 - 14 December 2001).
8. *Collisions in the Universe*, Conference, FUNDP - Facultés Universitaires Notre-Dame de Namur, Namur, Belgium (21 - 22 November 2001).
7. Workshop: *Kinetic Theory and Asymptotic Expansions in Classical and Quantum Systems*, Granada, Spain (17 - 21 September 2001).
6. *2000 ICPP - International Conference on Plasma Physics / APS-DPP (American Physical Society - Division of Plasma Physics) joint meeting*, Québec, Canada (23 - 27 October 2000).
5. *27th EPS (European Physical Society) meeting on Plasma Physics and Controlled Fusion*, held at Budapest, Hungary (12 - 16 June 2000).
4. *8th European Fusion Theory Conference*, Como, Italy (27 - 29 October 1999).
3. *International Topical Conference on Plasma Physics: New Frontiers of Nonlinear Sciences*, University of Algarve, Faro, Portugal (6 - 10 September 1999).
2. *1998 ICPP (International Congress on Plasma Physics) and 25th EPS (European Physical Society) meeting on Plasma Physics and Controlled Fusion*, Prague, Czech Republic (28 June - 3 July 1998).
1. Annual meeting of the Belgian Physical Society, Limburgs Universitair Centrum, Belgium (29 - 30 May 1997).

### **C.3 Research visits & presentations upon invitation / seminars**

15. Research Visit & seminar talk (on 26 November 2014), Ruhr University Bochum (RUB), Bochum Germany, 24-28 November 2014; hosted by Professor R Schlickeiser.
14. Research Visit & seminar talk (on 18 June 2014), Ruhr University Bochum (RUB), Bochum Germany, 16-21 June 2014; hosted by Professor R Schlickeiser.



13. Research Visit & seminar talk (on 12 June 2014), Crete Center for Quantum Complexity and Nanotechnology (CCQCN), Heraklion - Crete, 9-12 June 2013; hosted by Professor G Tsironis.
12. *Special Visiting Researcher (Pesquisador Visitante Especial - PVE)* status, held at Universidade Federal do Rio Grande do Sul - UFRGS, Porto Alegre, Brazil, supported by the Brazilian Research Fund (CNPq - Conselho Nacional de Desenvolvimento Científico e Tecnológico - Brasil); two visits, in March and in May 2014; Colloquium talk at UFRGS (27 May 2014).
11. Research Visit & seminar talk, invited and funded by SANSa (South-African National Space Agency), Hermanus South Africa, 5-8 October 2013; hosted by Dr Shimul Maharaj.
10. Research Visit & seminar talk, invited and supported by NITheP (National Institute of Theoretical Physics), University of Kwazulu - Natal, Durban, South Africa, 24 October - 24 November 2013; hosted by Professor Manfred A. Hellberg.
9. December 2010 - January 2011: Research visit to University of Sydney, funded by a UK Royal Society travel grant: hosted by Professor Sergey Vladimirov.
8. March 2009: Research visit to ANU - Australian National University, Canberra: hosted by Professor Yuri Kivshar.
7. February - March 2009: Research visit to University of Sydney, funded by a UK Royal Society travel grant: hosted by Professor Sergey Vladimirov.
6. Atomistic Simulation Centre, Queen's University Belfast, UK; 2008, invited seminar.
5. Hellenic Open University, Patras, Greece, April 28, 2007.
4. Ruhr Universitaet Bochum, Lehrstuhl Theoretische Physik IV – Theoretische Weltraum und Astrophysik, Bochum, Germany, 16 Nov. 2005.
3. Aristotle University of Thessaloniki, Engineering (Polytechnic) School, General Department, Thessaloniki, Greece, 3 Nov. 2005.
2. National Technical University of Athens, School of Applied Mathematics and Physical Sciences, Mathematics Department, Athens Greece, 25 Feb. 2005.
1. MPIPkS - Max Planck Inst. Phys. of Complex Systems, Dresden, Germany, 24 Nov. 2004.

#### **C.4 Scientific training / Schools attended**

8. *8th Panhellenic Congress / 13th Summer School on Complexity and Nonlinear Dynamics*, Hania (Crete), Greece (17 - 28 July 2000).
7. Summer School on *Solitons: concepts and recent developments*, Dijon, France; organized by *Centre de Dynamique des Systèmes Complexes* and Université de Bourgogne (16-20 June 1997).
6. Workshop on *Fluctuations, Nonlinearity and Disorder*, Heraklion (Crete), Greece; organized by the University of Crete and the FORTH: Foundation of Research and Technology Hellas (30 September 1997 - 4 October 1997).
5. *2nd Carolus Magnus Summer School on Plasma Physics*, Aachen, Germany; organized by the institutes: KFA-Forschungszentrum, Jülich, FOM-Instituut voor Plasmafysica, Nieuwegein and ERM/KMS Laboratory for Plasma Physics, Brussels (11 - 22 September 1995).
4. *3rd Panhellenic Congress / 8th Summer School on Complexity and Chaotic Dynamics of Nonlinear Systems*, Democritus University of Thrace, Xanthi, Greece (17 - 28 July 1995).

3. *2nd Panhellenic Congress / 7th Summer School on Complexity and Nonlinear Dynamics*, Democritus University of Thrace, Xanthi, Greece (25 July - 5 August 1994).
2. *International Summer School on Chaos and Nonlinear Dynamics*, University of the Aegean, Samos, Greece (July 1990).
1. *2nd Summer School on Chaos and Nonlinear Dynamics*, University of the Aegean, Samos, Greece (July 1989).