

Jean-Jacques ZONDY

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Born Nov. 7th 1959
(Madagascar)

SHORT CV

EDUCATION

- 2003** **Diplôme d'Habilitation à Diriger des Recherches (HDR)**
Orsay - France Université Paris-Sud 11, Orsay (France)
- 1986** **Diplôme de Doctorat en Physique (PhD) – Speciality : *Atoms, Lasers & Molecules*** - Université Paris-Sud 11, Orsay (France)
Orsay - France
- Languages:** **English, Italian** : Fluent ; **Spanish, Portuguese, German** : good notions ;
Cantonese, Madagascan: native.

PROFESSIONAL EXPERIENCE (Research)

- 2015 (April=>)** Associate Professor, Nazarbaev University (Physics Dept, School of Science & Technology), Astana, Kazakhstan.
- 1988 – 2015:** Physicist/Research Engineer (Optics/Optical metrology, Optical Frequency Standards) for R&D programmes of French National Bureau of Standards (BNM), in a number of research organizations : *Laboratoire Primaire du Temps et des Fréquences* (BNM-LPTF/Paris Observatory) ; *Système de Reference Temps-Espace* (BNM-SYRTE ; LNE-SYRTE /Paris Observatory) ; *Institut National de Métrologie* (LNE/Conservatoire National des Arts et Metiers, Paris); *Laboratoire Commun de Métrologie LNE-Cnam* (LNE/ Conservatoire National des Arts et Metiers, Paris).
- 2005** Founder of a sales & consulting company in lasers and nonlinear optics devices and systems, **Nonlinear Optics Technologies (NLOT)** (<http://www.nlo-technologies.fr>), in charge of the commercialization of the new family of Li-containing chalcogenide mid-IR nonlinear compounds he contributed to develop in collaboration with Novosibirsk crystal growers (L. Isaenko group).

Research topics (*Theory & Experiments*)

- **Coherent Optics & Laser Physics:** *Atomic and Molecular Physics, Light-matter interactions, Laser precision spectroscopy and measurements.*
- **Nonlinear Optics & Quantum Optics:** *Parametric Frequency conversion (SHG, SFG, DFG, OPA); Theory and experiments related to Poynting-vector walkoff-compensation in birefringent (bulk or periodic) nonlinear media aiming at enhancing conversion efficiencies of 3-wave mixing processes; Cascaded $\chi^{(2)}$ second-order processes, Quasi-phase-matching, theory of optical parametric oscillators (OPOs), Nonlinear dynamics of complex optical/atomic medium systems, chaotic dynamics, quantum optics.*
- **Optical frequency metrology & precision measurements :** *Optical clocks, μ -wave-to-visible phase-coherent optical frequency multiplication chains, high precision measurements, laser frequency stabilization and phase-locking, Femtosecond optical frequency combs, length metrology, analog electronics (servo control).*
- **Laser physics, laser engineering & instrumentation:** *Laser system development (DPSSL, gas, semiconductor, fiber, QCLs); Optical Parametric Oscillators (cw, ns, fs regime), DFG mid-IR laser spectrometers, Single-frequency narrow-linewidth (nonlinear) lasers, intra-cavity frequency-doubled lasers, Q-switched and mode-locked lasers*
- **Nonlinear Optical Materials:** *Nonlinear Optical Materials characterization (metrology of the optical, mechanical, thermal properties of oxide and chalcogenide mid-IR compounds; material synthesis process)*
- **Laser spectroscopy:** *Laser absorption spectroscopy & Laser-based optical sensors (CRDS, CEAS ...), Mid-IR high-resolution molecular saturation spectroscopy*

Latest research topics (2008 – 2014):

- Development of continuous-wave, widely-tunable (1.5-4 μ m), narrow-linewidth, mid-IR periodically-poled-LiNbO₃-based travelling-wave OPO devices; and of nanosecond mid-IR (1.3 -10 μ m) narrow-band OPOs based on various Li-containing chalcogenide nonlinear crystals (LiInS(e)₂, LiGaTe₂, LiGaS(e)₂, AgGaS(e)₂, ...)
- Breath analysis by sensitive mid-IR laser spectroscopy (cavity ring-down) of bio-markers, using home-built widely-tunable cw mid-IR optical parametric oscillators (OPOs)
- Determination of molecular parameter data (linestrengths, line positions of ν_3 band of CH₄, N₂O...) using mid-IR tunable OPO-based direct or saturated-absorption spectroscopy (high-precision Optical-Frequency-Comb-referenced spectroscopy).
- Investigation of $\chi^{(2)}:\chi^{(2)}$ cascaded-Kerr frequency comb generation in the mid-IR using cw OPOs subject to intracavity competing second-order nonlinearities; dynamics and quantum optics of self-phase-locked OPOs.

TEACHING – TRAINING EXPERIENCE

- 1982 – 1983** Physics teacher (Lycée Technique d'Argenteuil, France, Highschool level)
- 1984 – 1988** Applied mathematics instructor (*DEUST-Laser et Fibres Optiques, Univ. Paris 11 – Engineering school in Optronics of Paris 11 university*).
- 1991 – 1995** Geometrical optics instructor and lecturer, responsible of setting up an introductory optics laboratory for undergraduate students of the *Ecole d'Ingénieurs NFI-Optronique de l'Univ. Paris-Sud*.
- 2013 (July)** Lecturer in nonlinear optics (MSc level) for the winter school "*Light and its Interaction with Matter*" organized by Instituto de Fisica Gleb Wataghin - IFGW, Univ. Campinas (UNICAMP), Brazil (July 15-26, 2013)
- 1990 - 2014** Training and supervision of 10 PhD students, 6 post-doctoral fellows, 15 MSc students and from 2008 supervision of 1 Assistant professor (Prof Malo Cadoret, Cnam), **and** research training of 2 Brazilian graduating and 1 MSc (within the France-Brazil bilateral cooperation programme CAPES-COFECUB (project n° 710/11).

RESEARCH EVALUATION AND ORGANIZATION

- 1993 =>** Frequent Referee for various peer-reviewed international physics journals edited by OSA, APS, AIP, IoP, EPS, Elsevier, Springer. Frequent Jury members of PhD examinations (EU).
- 1996 – 1999** Coordinator of an international INCO-Copernicus cooperation project between EU and Russia (FP4, 4th Framework programme of the EU) on the growth and characterisation of a novel family of lithium-containing ternary chalcogenides compounds for mid-IR nonlinear optics.
- 1999 =>** Referee of research projects submitted to European framework programmes (FP4-FP7, INTAS) and referee for national projects submitted by established or junior researchers to national funding research agencies (ANR in France, ANVUR in Italy).
- 2001 - 2005** Served as Member of the program committee *Applications of Nonlinear Optics* of the CLEO-QELS/EQEC conference on Laser and electro-optics.

PUBLICATIONS, PATENTS, DISTINCTIONS, CITATION METRICS

- **Number of publications** (1986-2014): 162 (see list in Researchgate.net link below)
- **Book chapters** (5)
- **Patents (2)**: Brevet d'invention No 96 01197 jointly with CRISTAL LASER S.A. : *Structure monolithique obtenue par contact optique de cristaux non linéaires en compensation de walk-off* ; Brevet d'invention N° 08 03153 (CNRS/LNE) : *Dispositif optique de conversion de longueur d'onde, et source de lumière cohérente utilisant un tel dispositif*.
- **Distinction** (2010): *OSA Senior Member* nomination by Optical Society of America Board of Directors for his "contribution to advancements in optics & photonics".
- **Citation metrics**: Web of Science (Thomson Reuters) h-index: 23 (2013)
- **ResearchID**: <http://www.researcherid.com/rid/B-9324-2013>
- **Researchgate.net**: https://www.researchgate.net/profile/Jean-Jacques_Zondy/