

Curriculum Vitæ

Haitham Zaraket¹

*Lebanese University, Faculty of sciences I
Hadeth, Beirut.*

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Personal information

Place and date of birth: Markaba, Lebanon, 1st of November 1973.
Nationality: Lebanese.

Education

- July 1995 B.S. in physics (the Lebanese University).
Rank: 1st.
- July 1996 M.S. in physics (the Lebanese University).
Rank: 1st.
- June 1997 *Diplôme d'Etudes Approfondies, {DEA} de physique théorique,*
(Post graduate Diploma in Theoretical Physics)
(*Ecole Normale Supérieure de Lyon, France*).
Diploma project with P. Aurenche, at LAPTH.
Diploma title: Finite temperature quantum field theory.
- June 2000 PH.D. in Science (Joseph Fourier University, Grenoble, France).
Specialty: Theoretical physics.
Supervisor: Patrick Aurenche,
Thesis title: Photon and dilepton production in a quark-gluon
plasma: infrared structure and coherent effects.

Fields of scientific interest

- A) In/out of equilibrium Quantum Field Theory, High temperature systems, Quark-gluon plasma, resummation methods. Background Field methods.
- B) Quantum information theory.
- C) Simulation and physical modeling: Aerodynamics, Forest fire, thermodynamics.

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Fellowships and awards

Rammal-Rammal scholarship: a four year grant (1996-2000), attributed by the Lebanese Scientific Research Center.

IDB Merit Scholarship (6-12 Month) in one of the top 200 universities in the World, 2014.

Computer skills

I have a good knowledge with the following

- I) **Operating system:** Windows, Unix/Linux
- II) **Softwares:** Matlab, Maple, flexpde, C.
- III) **Simulation:** Fluent under Ansys, Simulink (particularly: Aerosim, SimDrive), Cantera (thermodynamics), Xfoil, Farsite, FDS, WFDS.
- IV) **Optical design:** Zemax.

Languages

Arabic (mother tongue), English (fluent), French (fluent).

Professional Experience

I'm at present **Prof.** of physics at the Lebanese university Faculty of sciences and the director of the physics and electronics laboratory. I'm in charge of the "Theoretical physics" option of the "Fundamental physics" master. Part of the teaching team of the master program "Microwave".

I'm also a referee for Phys. Rev. D, J. of phys. **A**, J. of optics **B**, and the New journal of physics.

Teaching positions

France

Laboratory assistant at the University of Savoie (1998 – 2000).

Lebanon

- I) Lecturer at The Saint Joseph University (2000 – 2001).
- II) Assistant professor at the Lebanese University (2000 – 2006) then Professor at the same university (2006-**present**).
- III) Lecturer at the Institute of Geometry and topography (ESGT-Lebanon) (2001-2008).
- IV) Lecturer at the American university of Beirut (2002 – 2003).
- V) Lecturer at Notre Dame University (NDU) (2003-2008).
- VI) Lecturer at the Beirut Arab University (2003 – 2004).

VII) Lecturer at the Lebanese International University (2005-2008).

Courses taught:

- **Physics courses (MS-level):** Gauge theories: abelian and non-abelian, Electroweak theory. Introduction to Many body physics. Advanced electromagnetism. Particle physics, Advanced quantum mechanics.
- **Physics courses (senior level):** Electrodynamics, Thermodynamics, Statistical physics, Quantum mechanics, Atomic physics, Acoustics, Fields and Waves, Optics.
- **Physics courses (sophomore level):** Electricity and magnetism, Mechanics, Modern physics.
- **Engineering courses (senior level):** Propagation for wireless communications, Antenna theory, Electromagnetic propagation in the atmosphere with geodetic applications, Fields and waves (I,II).
- **Math-courses:** Mathematics for physicists, ordinary differential equations, Calculus.

Graduate thesis supervision:

- Co-director of the PHD thesis: Mariam Atoui, "Etude des processus $B \rightarrow D^{**}$ dans le cadre de la Chromodynamique Quantique sur réseau", Thesis done at Blaise Pascal university Clermont, France (Sept 2010-Sept 2013).
- Master thesis: Alaa Dbeyssi (2010), Dima Al-Dirani (2011), Abdullah Rokaya (2011), Wael Chmeissani (2012), Tahani Makke (2012). Chireen Saghir, Kammel Wehbi, Mohamad Kozeiha (2013). Fatima Shour (in collaboration with Stephane Péigne in Nantes), Rouba El-Moussawi (in collaboration with G. Aad in CCPM), Abir Siblani (in collaboration with Gregoire Kessedjian at LPSC-grenoble) (2014).
- Engineering graduation projects Co-supervision with Dr. Jihad El-Sahili: ALI KHALIL, ALI SAAD (Forest fire simulation 2012), Haydar Raya and Oussama Braydi (Wind turbine airfoil simulation and optimization using Fluent and Xfoil 2012).

PHD Thesis Committee:

- "Study of the internal structure of the proton with the PANDA experiment at FAIR" by Alaa Dbeyssi, submitted to the University Paris-Sud, (Sept. 2013).
- "Étude theorique des molecules lU_bR et lU_i par les methodes ab-initio" by Joumana Assaf, submitted to the University of Lille 1 and the Lebanese University, (Sept. 2014).

Research positions

Post-doctorate at the University of Winnipeg (Canada), for the periods: March 2002-Sept. 2002; March 2003-Sept. 2003; June 2004-Sept. 2004. Senioir part-time Post-doc 2014 at the LPSC-grenoble financed by the Islamic Development Bank.

Research projects

2014-2016 Projet International de coopération scientifique (PICS) CNRS-France et CNRS-Liban.
2014-2016 Head of a research group financed by the Lebanese University.
2010-2012 Recherche grant (LU).
2008-2010 Recherche grant (LU).

Collaborators

Ingo Schienbein (LPSC), Jean Philippe Guillet (LAPTH), Rachid Guernane (LPSC), Tomasz Paterek (Nanyang Technological University), P. Aurenche (LAPTH), R. Kobes (Winnipeg), M. Carrington (Brandon), G. Moore (McGill), F. Gelis (Saclay),

Research invitations, Invited professor

Sept. 1999	Jyvaskyla University, Finland, two weeks.
Nov. 1999	INT Washington state university, USA, three weeks.
Aug. 2001	LAPTH, Annecy Le vieux, France, one month.
July-Aug. 2006	LAPTH, Annecy Le vieux, France, two month.
Sept. 2008	LAPTH, Annecy Le vieux, France, one month.
Sept. 2009	LAPTH, Annecy Le vieux, France, one month.
Mar. 2010	Texas A&M University at Qatar, one week.
Sept. 2010	LAPTH, Annecy Le vieux, France, one month.
July 2011	LAPTH, Annecy Le vieux, France, one month.
June 2012	Blaise Pascal University Clermont-Ferrand, France, one week.
July 2012	LAPTH, Annecy Le vieux, France, one month.
Sept. 2013	UPV, Gandia, Spain, one month.
Several Months in 2014	LPSC, grenoble, France.

Publications

1. *Bremsstrahlung and photon production in thermal QCD.*
By: P. Aurenche, F. Gelis (Annecy, LAPTH), R. Kobes (Winnipeg Univ.), H. Zaraket (Annecy, LAPTH).
Phys. Rev. **D58**: 085003, (1998).

- e-Print Archive: hep-ph/9804224
2. *Soft dilepton production and hard thermal loops*
By H. Zaraket, in Proceedings of the 5th International Workshop on Thermal Field Theories and Their Applications.
e-print Archive: hep-ph/9810246.
 3. *Two loop Compton and annihilation processes in thermal QCD.*
By P. Aurenche, F. Gelis (Annecy, LAPTH), R. Kobes (Winnipeg Univ.), H. Zaraket (Annecy, LAPTH).
Phys. Rev. **D60**:076002, (1999).
e-Print Archive: hep-ph/9903307
 4. *KLN theorem, magnetic mass, and thermal photon production.*
By P. Aurenche (Annecy, LAPTH), F. Gelis (BNL), H. Zaraket (Annecy, LAPTH).
Phys. Rev. **D61**: 116001, (2000).
e-Print Archive: hep-ph/9911367.
 5. *Landau-Pomeranchuk-Migdal effect in thermal field theory.*
By P. Aurenche (Annecy, LAPTH), F. Gelis (BNL), H. Zaraket (Annecy, LAPTH).
Phys. Rev **D62**: 096012, (2000).
e-Print Archive: hep-ph/0003326.
 6. *Comment on "Modification of Z boson properties in the quark-gluon plasma " and "Two-loop contribution to high mass dilepton production by quark-gluon plasma".*
By P. Aurenche (LAPTH), R. Baier (Univ. Bielefeld), T. Becherrawy (Univ. Nancy), Y. Gabellini (INLN), F. Gelis (BNL), T. Grandou (INLN), M. Le Bellac (INLN)), B. Pire (CPhT, EP), D. Schiff (LPT, Orsay), H. Zaraket(LAPTH).
Phys. Rev **D65**: 038501, (2002).
e-print Archive: hep-ph/ 0009074.
 7. *Finite temperature world-line formalism and analytic continuation*
By H. Zaraket (Lebanese University & LAPTH, Annecy).
e-Print Archive: hep-ph/0108270.
 8. *Enhanced thermal production of hard dileptons by $3 \rightarrow 2$ processes*
By P. Aurenche (LAPTH, Annecy), F. Gelis (LPT, Orsay), H. Zaraket (Winnipeg Univ.).
J. High Energy Phys. **0207**, 063 (2002).
e-Print Archive: hep-ph/0204145.
 9. *A simple sum rule for the thermal gluon spectral function and applications*
By P. Aurenche (LAPTH, Annecy), F. Gelis (LPT, Orsay), H. Zaraket (Winnipeg Univ.).
J. High Energy Phys. **0205**, 043 (2002).
e-Print Archive: hep-ph/0204146.
 10. *Structured Adiabatic Quantum Search*
By Daria Ahrensmeier (Winnipeg Univ.), Saurya Das (Univ. New Brunswick), Randy Kobes, Gabor Kunstatter, Haitham Zaraket (Winnipeg Univ.).

- e-Print Archive: quant-ph/0208065.
11. *γ -Radiation from a thermalised Quark-gluon-Plasma*
By Haitham Zaraket (Winnipeg Univ.).
Nucl. Phys. **A 715**, 713 (2003).
 12. *Rapid Data Search using Adiabatic Quantum Computation*
By Daria Ahrensmeier (Winnipeg Univ.), Saurya Das (Univ. New Brunswick), Randy Kobes, Gabor Kunstatter, Haitham Zaraket (Winnipeg Univ.).
To appear in Proceedings of 6th International Conference on Quantum Communication, Measurement and Computing, M.I.T., July 22-26, 2002.
e-Print Archive: quant-ph/0208107.
 13. *Landau-Pomeranchuk-Migdal resummation for dilepton production*
By P. Aurenche (LAPTH, Annecy), F. Gelis (Saclay), G. Moore (McGill, Univ.), H. Zaraket (Winnipeg Univ.).
J. High Energy Phys. **0212**, 006 (2002).
e-Print Archive: hep-ph/02110336.
 14. *Distillable entanglement in $d \otimes d$ dimension*
By S. Hamieh (KVI, Netherlands), H. Zaraket (Winnipeg Univ.).
J. Phys. **A: Math. Gen.** **36** L387 (2003).
e-Print Archive: quant-ph/0304107.
 15. *A new adiabatic quantum search algorithm*
By H. Zaraket, V. Bagnulo, J. Kettner, R. Kobes, G. Kunstatter.
e-Print Archive: quant-ph/0308060.
 16. *Positive-operator-valued measure optimization of classical correlations*
By S. Hamieh (KVI), R. Kobes, H. Zaraket (Winnipeg Univ.).
Phys. Rev **A70**, 052325 (2004).
 17. *2PI effective action and gauge invariance problems*
By M. Carrington (Brandon Univ.), G. Kunstatter, H. Zaraket (Winnipeg Univ.),
Euro. Phys. J. **C42**, 253 (2005).
 18. *Failure of the collinear expansion in calculation of the induced gluon emission*
By P. Aurenche, B.G. Zakharov, H. Zaraket.
JETP Lett. **87**, 605 (2008).
e-Print Archive: hep-ph/0804.4282.
 19. *Quantum entanglement in an interacting electron gas*
By S. Hamieh, H. Zaraket.
Eur. Phys. J. **D 55**, 229 (2009), DOI: 10.1140/epjd/e2009-00228-0.
 20. *Quantum entanglement in a finite temperature interacting electron gas*
By S. Hamieh, H. Zaraket.
Eur. Phys. J. **D 56**, 297301 (2010).
 21. *Synchrotron radiation in a chromomagnetic field*
By Alaa Dbeyssi, Dima Al Dirani, and H. Zaraket.
Phys. Rev. **D 84**, 105033 (2011).

22. *Modeling Lebanese forest fuel, an aftermath study*
 By H. Zaraket, J. Sahili, A. Khalil, Ali Saad. A paper that should be complemented by further field work 2012.
23. *Modeling hard scattering with LPM effect*
 By H. Zaraket.
 To be submitted (Sept. 2014).

Conferences and workshops

1. Rencontres de Physique des Particules:
 14-16 Jan. 1998, Jussieu, Paris, France.
2. 5th Int. Workshop on Thermal Field Theories and Their Applications:
 9-14 August 1998, Regensburg, Germany.
 ref. [2]
3. Rencontres Jeunes Chercheurs 1998:
 13-18 Dec. 1998, Grasse, France.
 Talk's title: *Le taux de production de photons dans un QGP: sait-on le calculer?*
 Proceedings Jeunes chercheurs RJC98, French Physical Society.
4. Rencontres de Physique des Particules:
 13-15 Jan. 1999, LAPP, Annecy-le-Vieux, France.
 Talk's title: *Production de photons dans un Plasma de Quarks et de Gluons.*
5. International Workshop on Electromagnetic Probes of In-medium Effects in Strongly Interacting Systems:
 15-26 Mar. 1999 ECT Trento, Italy.
 Talk's title: *Photon and dilepton production in thermal QCD.*
6. Heavy Ion Theory (HIT99):
 17-20 May 1999, CERN, Geneva, Switzerland.
 Talk's title: *Hard Thermal Loops problems in photon production calculation.*
7. Non-equilibrium Dynamics in Quantum Field Theory (INT-99-3)
 4 Oct.-10 Dec. 1999, Seattle, USA. Attended during: 31 Oct.-21 Nov.
 Talk's title: *Photon production in a QGP, collinear and infrared divergences.*
8. CERN-TH Thursday seminar, Feb. 2000.
 Talk's title: KLN theorem and thermal photon production.
9. Matter under extreme conditions
 5-9 June 2000, Zif, Bielefeld, Germany.
 Talk's title: *Coherent effects, magnetic mass, and thermal photon production*
10. Strong Electroweak Matter
 13-17 June 2000, Marseille, France.
 Talk's title: *Perturbative and non-perturbative aspects of thermal photon production*

Proceedings: to be published by World Scientific Press.

11. Hard Thermal Loops: Application and perspectives:
11-15 Dec. 2000 Physiksentrum Bad Honnef, Germany.
Talk's title: *Scale separation and non-perturbative effects in thermal photon production.*
12. Fifth annual science and mathematics teacher conference:
18-19 May 2001, American University of Beirut.
Talk's title: *Careful about friction.*
13. Quark Matter 2002:
18-24 Jul. 2002, Nantes, France.
Invited Talk: *Photon spectrum from a thermalised Quark-Gluon-Plasma.*
14. QCD Moriond 2008:
La Thuile, Italy, 14 March, 2008
Talk's title: *Parton energy loss in collinear expansion*
Work done by: P. Aurenche, B.G. Zakharov, H. Zaraket
Presented by Zakharov.
15. IICQI-12:
Sharief University Tehran, Iran, Sept. 2012
Talk's title: *Quantum Discord in higher dimensions*
16. 10th International Workshop on High-pT Physics in the RHIC/LHC era:
SUBATCH Nantes, France, 9-12 Sept.
Talk's title: *Multiple scattering versus fully coherent scattering in pA and AA collision*