Julien M. E. Fraïsse

PERSONAL INFORMATION

First name: Julien Mathieu Elias
Last name: Fraïsse
Date of birth: 16/12/1990
Nationality: French

CONTACT INFORMATION

Work address
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RESEARCH INTERESTS

Quantum information and quantum metrology: Quantum Fisher Information, channel estimation/identification, coherent averaging, geometry of channels, geometry of information, Heisenberg limit, quantum enhanced measurement, classical and quantum parameter estimation theory, multi-parameter estimation, many-body metrology

EDUCATION

Eberhard Karls Universität Tübingen

Ph.D., Theoretical physics — September 2013 to July 2017

Quantum metrology: from coherent averaging to channel estimation

Numerical and analytical calculations for the study of metrological efficiency of the so-called coherent averaging model, with applications to spin systems. Study of the channel estimation for qubits (depolarizing and phase flip channel) with extensions to ancillary qubits and under loss of qubits. Extensions of phase shift channels for quantum metrology.

- Adviser: Prof. Dr. Daniel Braun and Prof. Dr. Jóseph Fortágh
- Area of Study: Quantum metrology

University Toulouse Paul Sabatier

M.Sc., Physics of matter — 2011 to 2013

- Mention bien (*magna cum laude*)
- Thesis 1 (March 2013 - June 2013): **Heisenberg limited measurement** under supervision of Prof. Dr. Daniel Braun
- Thesis 2 (May 2012 - June 2012): **Study of decoherence free subspace with finite temperature** under supervision of Prof. Dr. Daniel Braun

B.Sc., Physics — 2008 to 2011

- Mention bien (*magna cum laude*)

PUBLICATIONS

[1] Fraïsse, J. M. E. and Braun, D. (2015), Coherent averaging. Annalen der Physik, 527: 701-712.

[2] Fraïsse, J. M. E. and Braun, D. (2017), Quantum channel-estimation with particle loss: GHZ versus W states. Quantum Measurements and Quantum Metrology, 3(1)

[3] Fraïsse, J. M. E., and Braun, D. (2017), Hamiltonian extensions in quantum metrology. Quantum Measurements and Quantum Metrology, 4(1), pp. 8-16.

[4] Fraïsse, J. M. E., and Braun, D. (2017), Enhancing sensitivity in quantum metrology by Hamiltonian extensions. Physical Review A 95, 062342

CONFERENCE POSTERS

[5] Fraïsse, J. M. E., Models of coherent averaging for quantum enhanced measurements In: *DPG-Frühjahrstagung*, March 23–27, 2015. Poster abstract.

TALKS

[6] Fraïsse, J. M. E., Coherent averaging in a spin system. At: *Quantum Information and Optics Group, National Autonomous University of Mexico*, September 8, 2015.

TEACHING EXPERIENCE

Eberhard Karls Universität Tübingen

Tutorials: Quantum information and quantum computation I
Winter semester 2013-2014

Tutorials: Quantum information and quantum computation II
Summer semester 2014

Tutorials: Statistical physics and thermodynamics
Winter semester 2014-2015

Tutorials: Classical field theory
Summer semester 2015-2016

SOFTWARE SKILLS

Scientific programming:
- Mathematica: expert
- Matlab: basic ability
- C: beginner

Scientific writing:
- LaTeX: expert

LANGUAGE SKILLS

- French: native speaker
- English: fluent
- Spanish: fluent
- German: basics

HONORS AND AWARDS

- Scholarship from LABEX NEXT 2012-2013: *Bourse d'excellence NEXT*
- Scholarship from french government 2011-2013: *Bourse au mérite — Master*
- Scholarship from french government 2008-2011: *Bourse au mérite — Bachelor*

EXPERTISE

Quantum physics
- quantum metrology, uncertainty relations, quantum channels, correlations in quantum systems, quantum optics, quantumness and classicality of states, quantum computation, quantum error correction, quantum state tomography

Mathematics:
- linear algebra, probability theory, statistical analysis, basics of group theory, basics of geometry