Juliette Monsel

Researcher in theoretical physics

Gothenburg, Sweden
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Nationality: French

Research interests: stochastic thermodynamics, quantum optics, optomechanics and electronic transport.

Education

2019 **Ph.D.**, *Université Grenoble Alpes*, France, Theoretical Physics.

2016 **M.Sc.**, *École Normale Supérieure de Lyon*, France.
Major: Physics, Mention: highest honors

2014 **B.Sc.**, *École Normale Supérieure de Lyon*, France.
Major: Physics, Mention: highest honors

Research experience

2020 – 2022 (2 years) **Postdoctoral researcher**, *Department of Microtechnology and Nanoscience, Chalmers University of Technology*, Gothenburg, Sweden.
Advisor: Janine Splettstoesser. Thermodynamics of optomechanics and electronic transport.
- Analyzed optomechanical cooling in a thermodynamic perspective

2019 – 2020 (4 months) **Postdoctoral researcher**, *Institut Néel*, Grenoble, France.
Advisor: Alexia Auffèves. Quantum thermodynamics and optomechanics.
- Explored the potential of carbon nanotubes for thermodynamic experiments

2016 – 2019 (3 years 2 months) **Doctoral researcher**, *Institut Néel*, Grenoble, France.
Supervisor: Alexia Auffèves. Dissertation: Quantum thermodynamics and optomechanics.
- Demonstrated the potential of hybrid optomechanical systems and one-dimensional atoms to experimentally explore quantum thermodynamics
- Proposed methods to define and measure work in the quantum regime

Teaching experience

2017, 2018 (64 hours/year) **Teaching Assistant**, *Université Grenoble Alpes*, France.
Newtonian mechanics for first year undergraduates.
- Supervised students during tutorials (2×1,5 hours/week, $\sim$ 30 students) and practical work (3 hours/week, $\sim$ 15 students)
- Graded examinations and practical work reports
- Wrote exercises for the examinations

Publications

2020 J. Monsel, *Quantum Thermodynamics and Optomechanics*, ser. Springer Theses. Cham: Springer International Publishing.

J. Monsel, M. Fellous-Asiani, B. Huard, and A. Auffèves, "The Energetic Cost of Work Extraction," *Physical Review Letters*, vol. 124, no. 13, p. 130 601.

2018 J. Monsel, C. Elouard, and A. Auffèves, "An autonomous quantum machine to

measure the thermodynamic arrow of time," *npj Quantum Information*, vol. 4, no. 1, p. 59.

Conferences and seminars

Invited talks and seminars

2019 "Thermodynamics of hybrid optomechanical systems," *Seminar*, Department of Microtechnology and Nanoscience, Chalmers University of Technology, Gothenburg, Sweden.

"An autonomous quantum machine to measure the thermodynamic arrow of time," *Workshop on Quantum Networks and Non-equilibrium Systems*, Obergurgl, Austria.

2018 "Fluctuation theorems in a hybrid optomechanical system," *Seminar*, Department of Materials, Oxford University, United Kingdom.

Contributed talks

2020 "The energetic cost of work extraction," *Annual Quantum Thermodynamics conference*, Online.

2019 "An autonomous optomechanical energy converter," *Annual Meeting of the GDR MecaQ (Quantum Optomechanics, Nanomechanics)*, Palaiseau, France.

"An autonomous quantum machine to measure the thermodynamic arrow of time," *Annual Quantum Thermodynamics conference*, Espoo, Finland.

"Measuring the arrow of time in a hybrid optomechanical system," *II Workshop on Quantum Information and Thermodynamics*, Natal, Brazil.

2018 "Energy conversion in a hybrid optomechanical system: Laser-like behavior and cooling," *Condensed matter days (JMC)*, Grenoble, France.

2017 "Fluctuation theorems in a hybrid optomechanical system," *Annual colloquium of the GDR IQFA (Quantum Engineering, from Fundamental Aspects to Applications)*, Nice, France.

"Measuring the arrow of time in a hybrid optomechanical system," *VI Quantum Information Workshop*, Paraty, Brazil.

"Thermodynamics and hybrid optomechanical system," *Congress of the French Physical Society*, Orsay, France.

Posters

2020 "Optomechanical cooling efficiency: The cost of turning a valve," *Quantum Technology International Conference*, Online.

"The energetic cost of work extraction," *Workshop on Prospects of Ultrastrong light-matter interactions*, Gothenburg, Sweden.

2017 "Measuring the arrow of time in a hybrid optomechanical system," *VI Quantum Information School*, Paraty, Brazil.

"Measuring the arrow of time in a hybrid optomechanical system," *Annual Quantum Thermodynamics conference*, Oxford, United Kingdom.

Awards

2020 Spinger Thesis Award, recognizing outstanding Ph.D.research

Skills

Languages

English fluent

French native speaker

Italian good oral and written comprehension, expression to be reactivated

Computer

Programming Python, C++, Git, Matlab

Operating systems Linux, Windows, Mac

Text processing LaTeX, Libre Office

Service to the community

Reviewer New Journal of Physics (2020), Communication Physics (2020)

Fête de la Science Speaker and guide (2016 – 2019) at the "Fête de la Science", a yearly national French event during which scientific institutions promote science through animations and laboratory tours.

Volunteer experience

2020 – current **Bicycle mechanic**, *Cykelköket*, Gothenburg, Sweden.
The "Bike kitchen" is an open Do-It-Yourself bicycle workshop.
- Helped people repair their bikes
- Took part in the workshop's administration as a board member

2017 – 2020 **Volunteer**, *uN p'Tit véLo dAnS La Tête*, Grenoble, France.
Associative self-repair workshop aiming at teaching bicycle mechanics and promoting bike riding.
- Learned bicycle mechanics by dismantling and repairing bikes for the association
- Explained to members of the association how to repair their bikes
- Took part in meetings and helped organize events as a member of the board from September 2018 to February 2020

Interests

Reading novels (in French and in English), popular science magazines

Sports hiking, bike riding

Programming *Open-source software* development, answering questions on *StackOverflow*