

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 **Postdoctoral researcher**, *Department of Microtechnology and Nanoscience, Chalmers University of Technology*, Gothenburg, Sweden.

(2 years)

Advisor: Janine Splettstoesser. Thermodynamics of optomechanics and electronic transport.

- Studied thermodynamic of electronic transport
- Analyzed optomechanical cooling in a thermodynamic perspective

2019 – 2020 **Postdoctoral researcher**, *Institut Néel*, Grenoble, France.

(4 months)

Advisor: Alexia Auffèves. Quantum thermodynamics and optomechanics.

- Explored the potential of carbon nanotubes for thermodynamic experiments

2016 – 2019 **Doctoral researcher**, *Institut Néel*, Grenoble, France.

(3 years 2 months)

Supervisor: Alexia Auffèves. 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 **Teaching Assistant**, *Université Grenoble Alpes*, France.

(64 hours/year)

Newtonian mechanics for first year undergraduates.

- Supervised students during tutorials ($2 \times 1,5$ hours/week, ~ 30 students) and practical work (3 hours/week, ~ 15 students)
- Graded examinations and practical work reports
- Wrote exercises for the examinations

Publications

Submitted J. Monsel, N. Dashti, S. K. Manjeshwar, J. Eriksson, H. Ernbrink, E. Olsson, E. Torneus, W. Wiczorek, and J. Splettstoesser, *Optomechanical cooling with coherent and squeezed light: the thermodynamic cost of opening the heat valve*. arXiv: 2103.03596.

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," *Phys. Rev. Lett.*, **124**, 130601.

- 2018 J. Monsel, C. Elouard, and A. Auffèves, "An autonomous quantum machine to measure the thermodynamic arrow of time," *npj Quantum Inf.*, **4**, 59.

Awards and Grants

- 2020 Springer Thesis Award, recognizing outstanding Ph.D. research
- 2016 Ph.D. grant from the CFM Foundation for Research

Conferences and seminars

Seminars and invited talks

- 2021 "Optomechanical cooling with coherent and squeezed light: The thermodynamic cost of opening the heat valve," *Seminar*, Lund University, Lund, Sweden.
- 2019 "Thermodynamics of hybrid optomechanical systems," *Seminar*, Dept. 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.

Skills

Languages

English	fluent
French	native speaker
Italian	good oral and written comprehension
Swedish	beginner

Computer

Programming	Python, C++, Git, Matlab
Operating systems	Linux, Windows, Mac
Text processing	L ^A T _E X, LibreOffice

Service to the community

Reviewer	J. Phys. A Math. (2021), New J. Phys. (2020), Commun. Phys. (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 **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 **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 (Python), answering questions on *StackOverflow*