

## EDUCATION

- Sorbonne Université, Laboratoire Kastler Brossel, Paris, France** 2019-2023  
PhD in Quantum Optics, Supervisor : Pr. Julien Laurat
- École Normale Supérieure, Paris, France** 2015-2018  
Master degree (GPA : 3.8) and Bachelor (GPA : 3.9) degree within the International Center for Fundamental Physics with Major in Quantum Physics.
- Lycée Louis-le-Grand, Paris, France** 2013-2015  
“Classes préparatoires”: two-year undergraduate intensive course in Mathematics, Physics and Chemistry to prepare for the entrance examinations of the French “Grandes Ecoles”.

## RESEARCH EXPERIENCE

- Laboratoire Kastler Brossel, Sorbonne Université, Paris, France** 2019-2023  
*PhD Graduate Student*  
Project : “Strong interaction between cold atoms and guided modes of a photonic crystal waveguide”  
Supervision : Pr. Julien Laurat, Quantum Networks Team
- Precise design and simulation of the photonic crystal waveguide chip to be used to trapped atoms around, with optimized Purcell factor and robustness to fabrication errors.
  - Development of a fast and user-friendly Python package for designing dipole traps around nanostructures.
  - Built from scratch first version of the experiment : vacuum system, hardware, software and optics.
  - Trapped a single Rubidium atom with higher-order tweezers.
- Funding : École Normale Supérieure 3-year scholarship
- Laboratoire Kastler Brossel, Sorbonne Université, Paris, France** April – June 2018  
*Research intern*  
Supervision : Pr. Julien Laurat
- Optimization of the optical depth of a cloud of cold atoms trapped around an optical nanofiber via deep learning tools.
- Quantum Optics Group, Kyoto University, Kyoto, Japan** February – August 2017  
*Research Intern*  
Supervision : Pr. Yoshiro Takahashi  
Experimental study of interactions between ultracold Yb and Li in an optical lattice.
- Measurement of  $m_F$ -dependent inelastic scattering rates in a  $^{174}\text{Yb}(^3\text{P}_2)$ - $^6\text{Li}$  collisional system at high and low magnetic fields.
  - First ever achievement of a degenerate mixture of  $^7\text{Li}$  (boson) and  $^{173}\text{Yb}$  (fermion) and measurement of the scattering lengths.
- Laboratoire de Physique des Plasmas, Ecole Polytechnique, Palaiseau, France** July 2016  
*Research Intern*  
Supervision : Dr. Cyrille Honoré  
Characterization of electric instabilities that can emerge in a model of a nuclear fusion reactor, from analysis of experimental data.

## PUBLICATIONS

1. **A. Bouscal**, M. Kemiche, S. Mahapatra, N. Fayard, J. Berroir, T. Ray, JJ. Greffet, F. Raineri, A. Levenson, K. Bencheikh, C. Sauvan, A. Urvoy, J. Laurat, *Systematic design of a robust half-W1 photonic crystal waveguide for interfacing slow light and trapped cold atoms*, arXiv:2301.04675 (2023)
2. N. Fayard, **A. Bouscal**, J. Berroir, A. Urvoy, T. Ray, S. Mahapatra, M. Kemiche, A. Levenson, JJ. Greffet, K. Bencheikh, J. Laurat, C. Sauvan, *Asymmetric comb waveguide for strong interactions between atoms and light*, Opt. Express **30**, 45093 (2022)

3. **A. Bouscal\***, J. Berroir\*, T. Ray, A. Urvoy, J. Laurat, *Nanotrappy: An open-source versatile package for cold-atom trapping close to nanostructures*, Phys. Rev. Research **4**, 013079 (2022)
4. F. Schäfer, H. Konishi, **A. Bouscal**, T. Yagami, M.D. Frye, J.M. Hutson, Y. Takahashi, *Ultracold collisions in the Yb-Li system*, J. Phys.: Conf. Ser. **1412**, 062005 (2020)
5. F. Schäfer, N. Mizukami, P. Yu, S. Koibuchi, **A. Bouscal**, Y. Takahashi, *Experimental realization of ultracold Yb-<sup>7</sup>Li mixtures in mixed dimensions*, Phys. Rev. A **98**, 051602 (2018)
6. F. Schäfer, H. Konishi, **A. Bouscal**, T. Yagami, Y. Takahashi, *Spin dependent inelastic collisions between metastable state two-electron atoms and ground state alkali-atoms*, New J. Phys. **19**, 103039 (2017)
7. F. Schäfer, H. Konishi, **A. Bouscal**, T. Yagami, Y. Takahashi, *Spectroscopic determination of magnetic-field-dependent interactions in an ultracold Yb(<sup>3</sup>P<sub>2</sub>)-Li mixture*, Phys. Rev. A **96**, 032711 (2017)

## PRESENTATIONS

### Oral

- Rencontres des Jeunes Physicien-ne-s, Paris, France, “A new photonic crystal platform for interfacing slow light and trapped cold atoms”, 2<sup>nd</sup> November 2022
- 2021 Conference on Lasers and Electro-Optics Europe (CLEO Europe), Munich, Germany, “Systematic design of a novel photonic crystal waveguide platform for coupling guided light with trapped cold atoms”, 20<sup>th</sup> – 24<sup>th</sup> June 2021
- 2021 Conference on Lasers and Electro-Optics (CLEO US), San José, USA, “Systematic design of photonic crystal waveguides for strong coupling with trapped cold atoms”, 9<sup>th</sup>-14<sup>th</sup> May 2021
- ANU – LKB Workshop 2021, Paris, France

### Poster

- 3<sup>rd</sup> workshop on waveguide QED, Erice, Italy, 8<sup>th</sup>-13<sup>th</sup> May 2023
- GdR IQFA 13<sup>th</sup> colloquium, Palaiseau, France, 16<sup>th</sup>-18<sup>th</sup> November 2022
- NONGAUSS Workshop 2022, Paris, France, 27<sup>th</sup>-28<sup>th</sup> June 2022
- 27<sup>th</sup> International Conference on Atomic Physics (ICAP 2022), Toronto, Canada, 17<sup>th</sup>-22<sup>nd</sup> July 2022
- GdR IQFA 12<sup>th</sup> colloquium, Lyon, France, 3<sup>rd</sup>-5<sup>th</sup> November 2021

## TEACHING EXPERIENCE

### Physics Department, Sorbonne Université

2020 - 2022

#### Teaching Assistant

For each of the 2020-2021 and 2021-2022 academic year:

- Taught third-year tutorial on “Thermodynamics and Statistical Physics”.
- Taught third-year optional tutorial on “Analytical Mechanics”. Worked alongside the professor to design the course and the tutorial sessions.

### Fundación Ciencia Joven, Valparaíso, Chile

July – November 2018

#### Science Monitor (Volunteering)

Volunteering in schools in Valparaíso. Monitor for groups of around ten students to help them carry out and experimental scientific project to the end. Included science popularization workshops.

### TalENS program, École Normale Supérieure, Paris

October 2017 – June 2018

#### Tutor (Volunteering)

ENS volunteering program aiming at scientific dissemination among French high-schoolers from impoverished neighborhoods. Fortnightly lectures and quarterly visits to scientific exhibitions.

### Lycées Louis-le-Grand and Michelet, Paris and Vanves, France

2016 – 2017 / 2019-2020

#### Oral examiner

Oral examinations (*colles*) to first and second-year bachelor students twice a week in these elite “classe préparatoires”

## GENERAL AUDIENCE PUBLICATIONS

**Adrien Bouscal** and Stéphane D'Ascoli, *Voyage au cœur de l'atome*, First Editions (2022)

General audience book on quantum physics and derived technologies, winner of the « Coup de cœur des médias » prize of the 2022 Roberval Prize

## OTHER PROFESSIONAL EXPERIENCE

**The Boston Consulting Group (BCG), Paris, France**

February – August 2019

*Visiting Associate*

Worked as a strategy consultant on two 3-month demanding missions:

- Complete redefinition of consumer demand segments for a world leading company in consumer goods using quantitative analysis
- Coordination of the digital, IT, and Agile transformation of a major French bank