



Guillaume Falmagne

Postdoctoral researcher in complex systems (Princeton University)

Education and research experience

2022 – now **Postdoctoral research associate**, High Meadows Environmental Institute (Princeton University), *Critical transitions in socio-ecological systems*, Supervisor: Simon LEVIN

Spring 2022 **Postdoctoral researcher**, Subatech (IMT Atlantique, CNRS), Nantes, *Continuing research on partonic energy loss in the quark-gluon plasma*, Supervisor: François ARLEO

2018 – Dec 2021 **PhD in particle physics**, Laboratoire Leprince-Ringuet, École Polytechnique (Institut Polytechnique de Paris).

Courses Advanced Quantum Field Theory, CERN-Fermilab Hadron Collider Physics school (2019), International School of QCD (LPT Orsay, 2018). Models for the energy transition, plant seeds, ethics of research.

Research *Observation of the B_c^+ meson in heavy ion collisions with the **CMS** detector; Partonic **energy loss** in the quark-gluon plasma*, supervisors: Raphaël GRANIER DE CASSAGNAC, François ARLEO.

2017–2018 **2nd year of Master in High Energy Physics**, École Polytechnique (Université Paris-Saclay), *summa cum laude*

Research **5-month internship**, same context as PhD (feasibility study)

end 2016 – jun 2017 Volunteering and cultural **experience** in South America and Eastern Europe.

2015 – end 2016 **12-month research internship**, CERN (Geneva, Switzerland), Λ_b^0 production **asymmetry** measurements at 7 and 8 TeV with the **LHCb** detector at the LHC, supervisor: Sascha STAHL.

2013–2015 **Bachelors degree and first year of Master in Fundamental Physics**, École Normale Supérieure de Cachan (Paris-Saclay) and Université Pierre et Marie Curie (Paris 6), *magna cum laude*

Research (2015) **4-month internship**, SLAC National Accelerator Laboratory (Stanford University), *Matching NNLO and parton showers for Z/W-Higgs production in the SHERPA generator. Multi-scale improved NLO jet clustering (MINLO)*, supervisors: Lance DIXON, Stefan HOECHE.

Research (2014) **2-month internship**, Laboratoire Leprince-Ringuet, École Polytechnique, *Unfolding the resolution of the CMS detector in the measurement of bottomonium suppression in the quark-gluon plasma*, supervisor: Raphaël GRANIER DE CASSAGNAC.

2011–2013 Classes préparatoires in Mathematics and Physics, Lycée Henri Poincaré (Nancy, France)

2011 Baccalauréat in Sciences, *summa cum laude*

Awards and fellowships

- 2022 PhD thesis award of *Institut Polytechnique de Paris*
- 2022 PhD thesis award of *Groupeement de Recherche QCD*
- 2022 Accessit to the *Daniel Guinier* PhD thesis award of *Société Française de Physique*
- 2022 CERN Senior Research Fellowship, declined for HMEI Research Associate position, Princeton U.
- 2013 Admission at ENS Cachan after national competitive exams, 'normalien', full 4-year funding

Main research works

- 2022 **Observation of the B_c^+ Meson in Pb-Pb and pp Collisions at $\sqrt{s_{NN}} = 5.02$ TeV and Measurement of its Nuclear Modification Factor**, CMS collaboration, *Phys. Rev. Lett.* **128**, 252301
- Role (2018-21) Contact author and main analyser
- 2022 **Probing the path-length dependence of parton energy loss via scaling properties in heavy ion collisions**, François Arleo, Guillaume Falmagne, *arXiv:2212.01324* (submitted to PRL)
- 2019 **Quenching of hadron spectra in XeXe and PbPb collisions at the LHC**, François Arleo, Guillaume Falmagne, *Proc. of Hard Probes 2018*, *PoS* **075**
- Role (2018-22) Extending the model and its comparison to measurements, and set forth three additional scaling laws
- 2021 **Observation of a $\Lambda_b^0 - \bar{\Lambda}_b^0$ production asymmetry in proton-proton collisions at $\sqrt{s} = 7$ and 8 TeV**, LHCb collaboration, *JHEP* **10** (2021) 060
- Role (2015-17) Major analyser
- 2019–2021 **Author of all papers from the CMS Collaboration submitted in this period (> 200)**
 Direct contributions to: Muon reconstruction in heavy ion collisions (CMS internal: MUO-21-001), Fragmentation of jets containing a J/ψ (*PLB*(2021) 136842)
- 2015 **Les Houches 2015: Physics at TeV Colliders Standard Model Working Group Report**, J.R. Andersen et al., *arXiv:1605.04692*
- Role (2015) Contribution to matching NNLO and parton showers in V-Higgs + MINLO procedure in SHERPA

Scientific talks

- 2021 **CERN-LHC Seminar**, *online* (recording available),
First observation of the B_c^+ meson in PbPb and pp collisions at 5.02 TeV at CMS
- 2021 Rencontres QGP France, *Étretat* (France),
First observation of B_c^+ meson production in PbPb and pp collisions with CMS
- 2021 **9th Edition of Large Hadron Collider Physics Conference (LHCP)**, *online* (recording available),
Exotic quarkonia production in heavy ion collisions: $X(3872)$ and B_c^+
- 2021 **19th International Conference on Strangeness in Quark Matter (SQM)**, *online*,
First measurement of the B_c^+ meson nuclear modification factor in PbPb collisions with CMS
 Published proceedings: *EPJ Web of Conferences* **259**, 12011 (2022)
- 2021 **14th International Workshop on Heavy Quarkonium (QWG)**, *online*,
Quarkonium production studies in nuclear collisions at CMS
- 2020 Journées CMS-France, *online*, B_c production: Towards a first observation in heavy ions collisions
- 2019 Journées de Rencontre des Jeunes Chercheurs, *Moulin-Mer* (France),
Probing the quark-gluon plasma with the B_c meson in CMS
 Published proceedings: C. Armand et al., *JRJC 2019 Book of Proceedings*, p.88
- 2019 **GdR Intensity Frontier Workshop**, *Sommières* (France),
 B_c meson production in pp and PbPb collisions with CMS, and plenary talk (B_c session summary)
- 2019 QGP France, *Étretat* (France),
Modification of B_u^+ , B_s^0 and B_c^+ mesons in PbPb collisions with the CMS detector
- 2018 **Int. Conf. on Hard & EM Probes of High-Energy Nuclear Collisions**, *Aix-les-Bains* (France),
 B_s^0 and B^+ meson nuclear modification factors in PbPb collisions at 5.02 TeV with CMS detector
 Published proceedings: G. Falmagne for the CMS Collaboration, *Proc. of Hard Probes 2018*, *PoS* **143**

Teaching experience

- 2018 – 2021 **Teaching assistant**, *École Polytechnique (Institut Polytechnique de Paris)*
Optics, Waves, and Radiation (Bachelor 2nd year). Advanced Particle Physics (Master 1st year).
- 2020 **Research mentor**, *École Polytechnique*
Noémie Pilleux: Master 1st year, 2 months. Natalie Blot: Bachelor, 2 months.
- 2014 – 2016 Private tutoring, *LiveMentor platform*
Mathematics and physics for students in classes préparatoires.
- nov-dec 2014 Teaching internship in physics in high school, *Lycée Frédéric Mistral, Fresnes (France)*

Skills

IT

- Proficiency C++, Python, LaTeX, ROOT (CERN), Linux, Git
- Basic knowledge Bash, Excel, Fortran, CamL, Igor, Scilab

Languages

- French, English native/fluent
- German Reading, writing, conversation
- Spanish, Italian Reading, basic conversation

Non-professional activities

Scientific outreach

- oct 2019 Volunteer at **CERN Open Days**, *CMS site*, Geneva
Outreach on CMS activities, 80,000 visitors in total in a week-end
- apr 2019 Animation of the CERN stand at **Geek Touch Convention**, Lyon (France)
Demonstrating CERN activities to a broad public

Associations

- 2019–2022 **Representative** of the Ph.D. students and postdocs at the **LLR Laboratory Council**
- 2014–2015 Member of the **student association** of the ENS Cachan
In charge of communication and partnerships
- nov 2013 Humanitarian association of ENS Cachan: social microcredit event (*The Rise*, Babyloan association)

Hobbies

- Rugby 10+ years in clubs and a university team
- Scuba-diving CMAS two star diver
- Running Typical performance: 10km in 40min
- Music Flute (9 years of classical formation, university bands), classical singing (8 years in choirs)