

Guillaume Falmagne

PhD in particle physics (École Polytechnique)






Education and research experience

- from Sept. 2022 **Postdoctoral researcher**, High Meadows Environmental Institute (Princeton University),
Critical transitions in socio-ecological systems, Supervisor: Simon LEVIN
- Apr-Jul 2022 **Postdoctoral researcher**, Subatech (IMT Atlantique, CNRS), Nantes,
Continuing work on partonic energy loss in the quark-gluon plasma, Supervisor: François ARLEO
- 2018–2021 **PhD in particle physics**, Laboratoire Leprince-Ringuet, École Polytechnique (Institut Polytechnique de Paris).
(defended Dec. 2021)
- Courses Advanced Quantum Field Theory, CERN-Fermilab Hadron Collider Physics school (2019), International School of QCD (LPT Orsay, 2018). Extra-curricular: modelling the energy transition, plant seeds and future challenges, climate change and energy transition, ethics of scientific research, public speech.
- 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.
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- 2017–2018 **2nd year of Master in High Energy Physics**, École Polytechnique (Université Paris-Saclay)
- Courses Quantum Field Theory, Cosmology, Astrophysics, Statistical Analysis and Simulation, Physics Beyond the Standard Model, and various LHC Physics courses
- Research **5-month internship**, same context as PhD and validation of topic feasibility
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- end 2016 – jun 2017 Volunteering and cultural **experience** in South America and Eastern Europe.
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- 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.
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- 2013–2015 **Bachelor's degree and first year of Master in Fundamental Physics**, École Normale Supérieure de Cachan (Paris-Saclay) and Université Pierre et Marie Curie (Paris 6)
- Research (2015) **4-month internship**, SLAC National Accelerator Laboratory (Stanford University),
Matching NNLO predictions to 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.
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- 2011–2013 Classes préparatoires in Mathematics and Physics, Lycée Henri Poincaré (Nancy, France)
- 2011 Baccalauréat in Sciences





Awards

- 2022 **Best PhD thesis award of Institut Polytechnique de Paris**
- 2022 **Best PhD thesis award of *Groupeement de Recherche QCD***
- 2018 **Summa cum laude, 2nd year of Master, École Polytechnique**
- 2015 **Magna cum laude, 1st year of Master, ENS Cachan**
- 2013 **Admission at ENS Cachan after national competitive exams, 'normalien', full 4-year funding**
- 2011 **Summa cum laude, baccalauréat**

Main research works

- 2022 **Observation of the B_c^+ meson in PbPb and pp collisions at $\sqrt{s_{NN}} = 5.02$ TeV**, CMS collaboration, A. M. Sirunyan et al., [arXiv:2201.02659v1](https://arxiv.org/abs/2201.02659v1), accepted for publication in PRL
- Role (2018-21)  Contact author and main analyser
- 2021 **Observation of a $\Lambda_b - \bar{\Lambda}_b$ production asymmetry in proton-proton collisions at $\sqrt{s} = 7$ and 8 TeV**, LHCb collaboration, R. Aaij et al., published in [JHEP10 \(2021\) 060](https://arxiv.org/abs/2106.06000)
- Role (2015-17)  Major analyser
- 2019 **Quenching of hadron spectra in XeXe and PbPb collisions at the LHC**, François Arleo, Guillaume Falmagne, Proceedings of Hard Probes 2018, [PoS 075](https://arxiv.org/abs/1812.07500)
- Role (2018-21)  Improving and extending the model, set forth a new energy loss scaling law
- 2019–2021 **Author of all papers from the CMS Collaboration**
 -  Direct contributions to: Muon reconstruction in heavy ion collisions (CMS internal: CADI MUO-21-001), Fragmentation of jets containing a J/ψ (published in [PLB\(2021\) 136842](https://arxiv.org/abs/2106.06000))
- 2015 **Les Houches 2015: Physics at TeV Colliders Standard Model Working Group Report**, J.R. Andersen et al., [arXiv:1605.04692](https://arxiv.org/abs/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 \(recording available\)](https://arxiv.org/abs/2106.06000),
First observation of the B_c^+ meson in PbPb and pp collisions at 5.02 TeV at CMS
- 2021 Rencontres QGP France, [Étretat](https://arxiv.org/abs/2106.06000) (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 \(recording available\)](https://arxiv.org/abs/2106.06000),
Exotic quarkonia production in heavy ion collisions: $X(3872)$ and B_c^+
- 2021 **19th International Conference on Strangeness in Quark Matter (SQM)**, [online](https://arxiv.org/abs/2106.06000),
First measurement of the B_c^+ meson nuclear modification factor in PbPb collisions with CMS
 -  Published proceedings: [EPJ Web of Conferences 259](https://arxiv.org/abs/2106.06000), 12011 (2022)
- 2021 **14th International Workshop on Heavy Quarkonium (QWG)**, [online](https://arxiv.org/abs/2106.06000),
Quarkonium production studies in nuclear collisions at CMS
- 2020 Journées CMS-France, [online](https://arxiv.org/abs/2106.06000), B_c production: Towards a first observation in heavy ions collisions
- 2019 Journées de Rencontre des Jeunes Chercheurs, [Moulin-Mer](https://arxiv.org/abs/2106.06000) (France),
Probing the quark-gluon plasma with the B_c meson in CMS
 -  Published proceedings: C. Armand et al., [JRJC 2019 Book of Proceedings](https://arxiv.org/abs/2106.06000), p.88
- 2019 **GdR Intensity Frontier Workshop**, [Sommières](https://arxiv.org/abs/2106.06000) (France),
Study of B_c meson production in pp and PbPb collisions with CMS
 -  And plenary summary talk about the B_c parallel session
- 2019 Rencontres QGP France, [Étretat](https://arxiv.org/abs/2106.06000) (France),
Modification of B_u^+ , B_s^0 and B_c^+ mesons in PbPb collisions with the CMS detector
- 2018 **International Conference on Hard & Electromagnetic Probes of High-Energy Nuclear Collisions (Hard Probes)**, [Aix-les-Bains](https://arxiv.org/abs/2106.06000) (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](https://arxiv.org/abs/2106.06000)

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).
- 2014 – 2016 Private tutoring, *LiveMentor platform*
Mathematics and physics for students in classes préparatoires.
- nov-dec 2014 Teaching internship in physics, *High school, Lycée Frédéric Mistral, Fresnes (94, France)*

IT skills

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

Languages

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

Associative experience

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

Volunteering

- 2014–2015 **Member of the student association of the ENS Cachan**
In charge of communication and partnerships
- nov 2013 **Humanitarian association of the ENS Cachan (social microcredit)**
1st prize for the ENS Cachan in *The Rise* project (Babyloan association)

Non-professional activities

- Rugby 9 years in various clubs (Nancy, ENS Cachan, CERN Meyrin St Genis)
Scuba-diving CMAS two star diver
Running Typical performance: 10km in 40min (15km/h)
Music 9 years of classical formation in music theory and flute (Conservatoire Régional, Nancy, France),
2 years in the ENS Cachan brass band, 5 years in various choirs