

# 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),  
 $\Lambda_b^0$  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






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## Awards

- 2022 PhD best thesis award of Institut Polytechnique de Paris
- 2022 PhD best 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





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## 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  $J/\psi$  (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

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## 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)

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## Teaching experience

- 2018 – 2021 **Teaching assistant**, *École Polytechnique (Institut Polytechnique de Paris)*  
Optics, Waves, and Radiation (Bachelor 2<sup>nd</sup> year). Advanced Particle Physics (Master 1<sup>st</sup> 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)*

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## IT skills

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

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## Languages

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

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## 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)

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## 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