Guillaume Falmagne

PhD in particle physics (École Polytechnique)

Education and research experience

2018–2021 (defended 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), Heavy Ion Collisions school (IPN 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.

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

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.

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 **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), *summa cum laude.*

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.

2011–2013 Classes préparatoires in Mathematics and Physics, Lycée Henri Poincaré (Nancy, France),
*Leading to admission at the ENS Cachan after national competitive examinations **(normalien with full funding)**.*

2011 Baccalauréat in Sciences, *summa cum laude.*

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Main research works

2021 **Observation of the B_c^+ meson in PbPb and pp collisions at $\sqrt{s_{\mathrm{NN}}} = 5.02$ TeV**,
CMS collaboration, A. M. Sirunyan et al., arXiv:2201.02659v1, submitted to 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

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

Role (2018-21) ☞ Improving and extending the model

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)

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

☞ **Proceedings** accepted in EPJ Web of Conferences, reference epjconf211078

2021 **14th International Workshop on Heavy Quarkonium (QWG)**, online,
Quarkonium production studies in nuclear collisions at CMS

2020 Journées CMS-France, online (restricted access),
B_c production: Towards a first observation in heavy ion 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),
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 (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 (France),
B_s^0 and B^+ meson nuclear modification factors in PbPb collisions at 5.02 TeV with CMS detector

☞ **Published proceedings**: Guillaume Falmagne on behalf of the CMS Collaboration,
Proceedings of Hard Probes 2018, PoS 143

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Teaching experience

2018 – 2021 **Teaching assistant**, *École Polytechnique (Institut Polytechnique de Paris)*
Optics, Waves, and Radiation (Bachelor 2$^{\text{nd}}$ year). Advanced Particle Physics (Master 1$^{\text{st}}$ 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

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