

UNIVERSITÀ DEGLI STUDI DI MILANO selezione pubblica per n.5512 posto/i di Ricercatore a tempo determinato in tenure track (RTT) per il settore concorsuale 01/A4 - Mathematical Physics , settore scientifico-disciplinare MAT/07 - Mathematical Physics presso il Dipartimento di MATEMATICA "FEDERIGO ENRIQUES", Codice concorso 5512

1 Main information

All dates are in the dd/mm/yyyy format.

1.1 Personal information

Full Name	FROMHOLZ Pierre Martin Alexandre
Date of birth	
Nationality	French
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Spoken languages	French (mother tongue); English (fluent); Italian (advanced); German (advanced); Japanese (beginner)
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1.2 Professional experiences

Dates : from - to	Details
01/10/2021 - Present	Postdoctoral fellow , Department of Physics University of Basel, Basel, Switzerland Principal Investigator: Pr. LOSS Daniel and KLINOVAJA Jelena On topological matter in 1D & 2D and fractional modes & excitations
01/11/2018 - 30/09/2021	Postdoctoral fellow , Area Fisica of Scuola Internazionale Superiore di Studi Avanzati (SISSA) and the Department of Condensed Matter and Statistical Physics (CMSP) of The Abdus Salam International Center for Theoretical Physics (ICTP), Trieste, ITALY Research Director: Dr. Marcello Dalmonte On topological phases and lattice gauge theories
01/09/2015 - 31/10/2018	PhD (obtained) , LPTM Université de Cergy-Pontoise, Cergy, FRANCE Research Director: Pr. LECHEMINANT Philippe Title: "Study of Haldane-like topological phases in alkaline-earth (or assimilated) fermionic systems with $SU(N)$ symmetry in unidimensional lattices".
01/02/2015 - 31/08/2015	Postgraduate Intern , LPTM Université de Cergy-Pontoise, Cergy, FRANCE Research Director: Pr. LECHEMINANT Philippe Study of condensed matter using conformal field theory
01/09/2014 - 31/01/2015	Postgraduate Intern , LPT UMR 8627 CNRS/Université Paris-Sud, Orsay, FRANCE Research director: Pr. PARENTANI Renaud Study of Hawking radiation with analogue gravity

Note: the PhD defense took place on the 12/10/2018, and the jury deliberated and accepted the same day. However, the ceremony happened on 08/03/2019.

1.3 Education

Directly after high school, I attended two years of “Classe préparatoire” (a french alternative to the first two years of university) followed by a “Grande École” (the ENS, a french alternative to the next three years of university). The latter includes three internships and culminated with a master’s degree.

Dates : from - to	Details
01/09/2012 - 31/08/2014 (including)	Master degree , speciality Quantum Physics, École Normale Supérieure (ENS) Ulm, Paris, FRANCE Obtained with distinction “Trés bien”
01/02/2014 - 31/03/2014 (including)	Internship , in nuclear phenomenology, IRFU DPhN, CEA, Saint-Aubain, FRANCE Study of mesonic generalized parton distribution functions
01/02/2013 - 31/07/2013	Internship , in general relativity, University of Florida, Gainesville, Florida, USA Study of a Kerr black hole and post-Newtonian gravitation flux computation
01/09/2011 - 31/08/2012 (including)	Bachelor degree , in Physics, École Normale Supérieure (ENS) Ulm, Paris, FRANCE Obtained with distinction “Assez bien”
01/07/2012 - 31/08/2012	Internship , in rheology, University of Saarbrücken, Saarbrücken, GERMANY Study of the formation of a complex liquid drop by the super-resolution method
01/09/2009 - 31/08/2011	Classe préparatoire , Physics-Chemistry (PCSI-PC), Lycée Louis Le Grand, Paris, FRANCE Admitted to the contests of both the ENS and the “École Polytechnique”
30/06/2009	Scientific “Baccalauréat” laureate , Physics and German special class, Lycée Fabert, Metz, FRANCE Obtained with distinction “Trés bien” and congratulations of the jury.

1.4 Additional suggested information

1.4.1 Publications and preprints

The following mentions are in my current research field:

- Thingstad E., **Fromholz P.**, Ronetti F., Loss D., Klinovaja J.
Fractional Spin Quantum Hall Effect in Weakly Coupled Spin Chain Arrays
arXiv:2402.10849.
- Torre G., Odavić J., **Fromholz P.**, Giampaolo S. M., Franchini F.
Long-range entanglement and topological excitations
arXiv:2310.16091.
- Surace F. M., **Fromholz P.**, Scazza F., Dalmonte M.
Scalable, ab initio protocol for quantum simulating $SU(N) \times U(1)$ Lattice Gauge Theories
arXiv:2310.08643.
- Surace F. M., **Fromholz P.**, Oppong N. D., Dalmonte M., Aidelsburger M.
Abinitio derivation of lattice gauge theory dynamics for cold gases in optical lattices
PRX Quantum **4**, 020330 (2023).
- Fromholz P.**, Tsitsishvili M., Votto M., Dalmonte M., Nersesyan A., Chanda T.
Phase diagram of Rydberg-dressed atoms on two-leg triangular ladders
Phys. Rev. B **106**, 155411 (2022).
- Tsitsishvili M., Chanda T., Votto M., **Fromholz P.**, Dalmonte M., Nersesyan A.
Phase diagram of Rydberg-dressed atoms on two-leg square ladders: Coupling supersymmetric conformal field theories on the lattice
Phys. Rev. B **105**, 155159 (2022).
- Micallo T., Vitale V., Dalmonte M., **Fromholz P.**

Topological entanglement properties of disconnected partitions in the Su-Schrieffer-Heeger model
SciPost Phys. Core **3**, 012 (2020).

8. **Fromholz P.**, Lecheminant P.
Symmetry-protected topological phases in the $SU(N)$ Heisenberg spin chain: a Majorana-fermion approach
Phys. Rev. B **102**, 094410 (2020).
9. Capponi S., **Fromholz P.**, Lecheminant P., Totsuka K.,
Symmetry-protected topological phases in two-leg $SU(N)$ spin ladder with unequal spins
Phys. Rev. B **101**, 195121 (2020).
10. **Fromholz P.**, Magnifico G., Vitale V., Mendes-Santos T., and Dalmonte M.,
Entanglement topological invariants for one-dimensional topological superconductors
Phys. Rev. B **101**, 085136 (2020).
11. **Fromholz P.**, Capponi S., Lecheminant P., Papoular D. J., Totsuka K.,
Haldane phases with ultracold fermionic atoms in double-well optical lattices
Phys. Rev. B **99**, 054414 (2019).
12. Bois V., **Fromholz P.**, Lecheminant P.,
One-dimensional two-orbital $SU(N)$ ultracold fermionic quantum gases at incommensurate filling: A low-energy approach
Phys. Rev. B **93**, 134415 (2016).

The following mentions are no longer in my current research field:

13. Aurégan Y., **Fromholz P.**, Michel F., Pagneux V., Parentani R.,
Slow sound in a duct, effective transonic flows, and analog black holes
Phys. Rev. D **92**, 081503(R) (2015).
14. **Fromholz P.**, Poisson E., Will C. M.,
The Schwarzschild metric: It's the coordinates, stupid!
American Journal of Physics **82**, 295 (2014).
15. Fiscina J. E., **Fromholz P.**, Sattler R., Wagner C.,
Wide band Fresnel super-resolution applied to capillary breakup of viscoelastic fluids
Exp Fluids (2013) **54**: 1611.

1.4.2 Patents

I have never submitted or contributed to a patent, nor has any project I worked on directly lead to one.

1.4.3 Research monograph

- **Fromholz P.**,
PhD thesis: "Study of Haldane-like topological phases in alkaline-earth (or assimilated) fermionic systems with $SU(N)$ symmetry in unidimensional lattices."
235 pages, defended in October 2018

1.4.4 Invited presentations

Dates	Details
07/09/2023	Joint Annual Meeting of the Swiss and Austrian Physical Society 2023 Basel SWITZERLAND 04/09/2023 - 04/09/2023 15 mins
17/02/2022	Adriatic conference on Strongly Correlated Systems (and beyond; 2022) Trieste ICTP, ITALY (online) 16/02/2022 - 17/02/2022 20 mins
03/06/2019	Low-dimensional emergent phenomena in correlated systems and topological quantum matter Tbilisi GEORGIA 01/06/2019 - 10/06/2019 1 hour
08/07/2016	Exotic States of Matter with $SU(N)$ Symmetry Kyoto YITP, JAPAN 04/07/2016 - 15/07/2016 45 mins
23/06/2016	Dynamics and Transport in Quantum Gases Pontoise FRANCE 20/06/2016 - 24/06/2016 45 mins

1.4.5 Research expeditions

I have not organized nor participated to a research expedition.

1.4.6 Organization of seminars/conferences

Dates: From - To	Details
22/03/2021 - 24/03/2021	Adriatic Conference on Strongly Correlated Systems (1st edition) ICTP, Trieste, Italy (online) http://indico.ictp.it/event/9595/ Initiative - scientific committee - logistic committee - chair

I have, provided logistic help at the international conference “Dynamics and Transport in Quantum Gases” organized in Pontoise in 2016.

I have contributed in, or been the sole organizer of many seminars, journal clubs, tutorial, and PhD classes during my PhD and Postdoc.

1.4.7 Participation in industrial innovation

During an important regional formation for PhD students, the “Doctoriales 2018”, I won the first prize of “Projet Innovant”.

1.4.8 Prizes and awards

- 04/2024 ”Golden chalk” yearly prize for best teacher from the students association of the University of Basel
- 31/08/2020 3rd place National Famelab Science Communication Contest (Italy)
- 20/02/2020 1st place and public choice of Regional Famelab Science Communication Contest (Friuli)

1.4.9 Funding, grants

I benefited from a funding, the “Contrat Doctoral Spécifique”, for chosen students of the ENS or Polytechnic. It covered the PhD salary for all three years (Sept. 2015 - Aug. 2018).

Before, I also ranked in the national contest for admission at ENS, thus benefiting of a salary for four consecutive years (Sept. 2011 - Aug. 2015).

I wrote a project for the call H2020-MSCA-IF-2019 of the Marie Curie Fellowship, and got 72.80 % (not funded). I wrote a project for the SNSF Postdoctoral Fellowship (2022 call), but was not admitted.

I received the **NCCR SPIN Canvas Grant** (2000 CHF) in 2023 for my participation to the Berlin Science

Week festival (an outreach event).

1.4.10 Supervising and mentoring

When	Q.ty	Details
Post-D 2	40 h	Teacher for “Qualitative methods in theoretical physics” (M1-level, 5 students) Designed and delivered the lectures, wrote notes, and set the exercises and exams then handled by the TAs.
	12 h	Teaching assistant and teaching replacement for “Thermodynamics and Statistical Physics” (L3-level)
	40 h	Teacher for “Qualitative methods in theoretical physics” (M1-level, 5 students) Designed and delivered the lectures, wrote notes, and set the exercises and exams then handled by the TAs.
	7 h	Teaching assistant for “Quantum information” (M1-level, 12 students) I designed and delivered the lectures, wrote the lecture notes and set the exercises and exams then handled by the TAs.
Post-D 1	daily	Co-supervision of: <ul style="list-style-type: none"> • M. Tsitsishvili (02/2020-12/2021, master student then PhD student), • V. Vitale (07/2019-12/2020, PhD student), • T. Miccallo (07/2019-12/2019, <i>cum laude</i>, master student) Mentor of other PhD students and of the condensed matter diploma at ICTP.
PhD	192 h	Three years of “monitorat” contract for: <ul style="list-style-type: none"> • L1: Tutoring “Physics Panorama” (general basis of physics) for 3 years. • M1: Tutoring “Quantum Mechanics 1” for 3 years. • M1: Tutoring “General relativity” for 1 year. • L3: Teacher for an optional class on Newtonian and post-Newtonian physics. • L3: Tutoring a training for university contests for 1 year. • L1: Co-animating open doors day for freshmen (as a teacher). I was heavily involved with the pedagogical team, in the conception of homework and exams and the care of problematic and handicapped students.

L-x or M-x means bachelor (L) or master (M), year/level x.

1.5 Additional useful information

1.5.1 Major ongoing collaborations

Since	Details
01/01/2022	Pr. S. Marco GIAMPAOLO, Dr. S. Fabio FRANCHINI & team, Ruder Boskovic Institute, Zagreb, CROATIA
01/10/2021	Pr. Dr. LOSS Daniel & Pr. Dr. KLINOVAJA Jelena Condensed Matter Theory & Quantum Computing, Department of Physics University of Basel, Basel, SWITZERLAND
01/11/2018	Dr. Marcello DALMONTE & team, Condensed Matter and Statistical Physics Section International Center for Theoretical Physics, Trieste, ITALY
01/09/2016	Pr. Philippe LECHEMINANT & team Institut de physique du CNRS (INP), Paris, FRANCE

1.5.2 Posters

Dates	Details
15/04/2021	Korrelationstage 2021 Dresden , Germany (online) 15/04/2021 - 20/04/2021
23/10/2019	Conference on Signatures of Topology in Condensed Matter Trieste , ITALY 21/10/2019 - 25/10/2019
17/10/2019	Francqui Symposium: Wavefunctions and Entanglement in Quantum Field Theory Brussels , Belgium 14/10/2019 - 18/10/2019
11/04/2019	New Trends in Complex Quantum Systems Dynamics Venezia , ITALY 09/04/2019 - 12/04/2019
06/11/2019	Novel Quantum States in Condensed Matter Kyoto , JAPAN 23/10/2019 - 24/11/2019
24/06/2016	Dynamics and Transport in Quantum Gases Pontoise FRANCE 20/06/2016 - 24/06/2016
26/11/2015	Introduction to Out-of-equilibrium Quantum many-Body Physics Nancy , FRANCE, 25/11/2015 - 27/11/2015

1.5.3 Participation to Summer Schools

Dates: From - To	Details
30/09/2020 - 02/10/2020	Topology and Interactions in Optical Lattices Goethe-Universität Frankfurt, Frankfurt, GERMANY
10/08/2020 - 14/08/2020	Online School on Ultra Quantum Matter Perimeter Institute, Waterloo, CANADA
25/07/2017	Exact methods in low dimensional statistical physics Scientific Institute of Cargèse, Cargèse, FRANCE
25/11/2015 - 27/11/2015	Introduction to Out-of-equilibrium Quantum many-Body Physics Faculté des Sciences et technologies de Vandoeuvre, Nancy, FRANCE
22/07/2015 - 03/07/2015	Doctoral training: Statistical physics École de Physique des Houches, Les Houches, FRANCE
20/07/2014 - 01/08/2014	HASCO Summer School 2014 Göttingen, GERMANY

1.5.4 Scientific visits

All the visits mentioned below lead to a seminar or talk. They may have lasted more than just the day of the talk. When online, they lasted the seminar I gave and extra discussions before or after. I do not mention seminars I gave at the places I was or am working at.

Dates	Details
05/05/2022	Nano/CPT Faculté des sciences AMU, Marseille, FRANCE
28/01/2022	Laboratoire de Physique et Chimie Théoriques CNRS-Lorraine University, UMR 7019, Metz, FRANCE
18/02/2021	Laboratoire de Physique École normale supérieure de Lyon, Lyon, FRANCE (online)
08/02/2021	Department of Physics and Astronomy "Galileo Galilei" University of Padova, Padova, ITALY (online)
04/02/2021	Centre de Physique Théorique, Ecole Polytechnique, Palaiseau, FRANCE (online)
12/01/2021	Department of Physics University of Basel, Basel, SWITZERLAND (online)
09/07/2019	Department of Physics and Astronomy University of Bologna, Bologna, ITALY
09/10/2018	Laboratoire de Physique Théorique IRSAMC, Université Paul Sabatier, Toulouse, FRANCE
28/09/2018	Laboratoire de Physique Théorique et Hautes Énergies UMR 7589, Sorbonne University and CNRS, Paris, FRANCE
08/05/2018	Institute of Physics École Polytechnique Fédérale de Lausanne, Lausanne, SWITZERLAND
18/01/2018	Condensed Matter and Statistical Physics ICTP, Trieste, ITALY
04/08/2017	Summer school (non-invited talk) Scientific Institute of Cargèse, Cargèse, FRANCE
03/06/2016	GdR Atomes Froids Université de Lille 1, Lille, FRANCE

1.5.5 Programming language

I know several programming languages useful for scientific work. In order of proficiency:

Level	Language
Advanced	Mathematica, LaTeX
Intermediate	Python, Matlab, Maple
Beginner	C, VisualBasic

1.5.6 Training/Event in dissemination/outreach

Dates:	Details
30/10/2023 - 10/11/2023	Berlin Science Week festival 10 days of non-stop animations around science; outreach on Quantum computing and an art piece about unused research in my case. Berlin, GERMANY
23/09/2023	“Discussion dessinée”, part of museum night of Lausanne 1h30 of illustrated discussion between two scientists (incl. me), four artists, and the public. Lausanne, SWITZERLAND
22/05/2023	Pint of Science 30 mins of presentations and answering questions to interested citizens. Basel, SWITZERLAND
25/03/2022	Tinguely entangled 1 evening of Q&A with general public in an art&science event Basel, SWITZERLAND
05/09/2020	World Science Cafe, part of ESOF 2020 4 hours of face-to-face discussions with interested citizens. Trieste, ITALY
16/07/2020 - 20/07/2020	Famelab masterclass 3 days of Science Communication formations. (online)
20/02/2020; 31/08/2020	Regional and National Famelab Science Communication Contest Largest science communication contest in Italy. Trieste, ITALY
27/29/2019	Event: Trieste-Next 4 hours of science workshop with the general public, all ages Trieste, ITALY
16/09/2019 - 19/09/2019	Training School Science Communication 2019 Trieste, ITALY
16/07/2019	Write About Science Workshop Trieste, ITALY
25/06/2019 - 02/07/2019	Introduction to QuTiP, the Quantum Toolbox in Python, its ecosystem, and to open-source software in quantum technology research. Lectures, workshop and hands-on. Trieste, ITALY
16/04/2019 - 20/04/2019	Doctoriales Vallée de Seine 2018 Included vulgarization of thesis work to a general public and training in entrepreneurship Saint-Valery-en-Caux, FRANCE

1.5.7 Training in gender gap actions

Participated to, and wrote a report for “Conference on Global Approach to the Gender Gap in Mathematical, Computing and Natural Sciences: How to Measure It, How to Reduce It?” from 04/11/2019 to 08/11/2019 at ICTP, Trieste, ITALY.

1.5.8 Interests and engagement

I have been class representative at the ENS (3 years), in “Classe Préparatoire” (1 year) and in high school (1 year), where I also volunteered in the school association for manuals transmission and support for the disadvantaged (3 years).

I have participated to competitions in swimming and rock dancing, and have been instructor of the latter for a year.

Data: 10/04/2024

Luogo: Basel