Curriculum Vitae

MATHEUS HOSTERT

ADDRESS: 31 Caroline St N, Waterloo,
ON N2L 2Y5, Canada
EMAIL: mhostert@perimeterinstitute.ca
WEBPAGE: mhostert.com
ORCID: 0000-0002-9584-8877
INSPIRE: M.Hostert.1

ACADEMIC POSITIONS

Joint Post-Doctoral Position OCT. 2019 - PRESENT
Researcher at the Perimeter Institute and the William I. Fine Theoretical Physics Institute, University of Minnesota.

EDUCATION

PhD in Theoretical Physics – Durham University, United Kingdom OCT. 2015 - SEP. 2019
Research at the Institute for Particle Physics Phenomenology (IPPP), Durham University.
Dissertation: *Hidden Physics at the Neutrino Frontier: Tridents, Dark Forces, and Hidden Particles.*
Dissertation Committee: Profs. David Cerdeño and Joachim Kopp.
Supervisor: Prof. Silvia Pascoli.

Bachelors degree in Physics – Federal University of Santa Catarina, Brazil MAR. 2011 - JUN. 2015
Year abroad at Durham University (SEPT. 2013 - SEPT. 2014) and honors course on advanced mathematics.

FELLOWSHIPS AND AWARDS

Science without Borders PhD scholarship (SEPT. 2015): excellence-based Brazilian scholarship for a full PhD abroad.

Science without Borders Undergraduate scholarship (SEPT. 2013): excellence-based Brazilian scholarship for one year of undergraduate studies abroad.

Research poster awards: Neutrino 2020, NuPhys 2018, and NuPhys 2017.

ACADEMIC ENGAGEMENT

TRAINING AND RESEARCH PLACEMENTS

- **InvisiblesPLUS network**, 2019: one month at Nevis Laboratories, Columbia University, working with Prof. Georgia S. Karagiorgi and Dr. Mark Ross-Lonergan on MicroBooNE.
- **InvisiblesPLUS network**, 2019: one month at Lawrence Berkeley National Laboratory, point of contact: Prof. Christian Bauer.
- **InvisiblesPLUS network**, 2018: two month placement at Fermilab, working with Prof. Pedro Machado.
- **Undergraduate research**, 2015: undergraduate research under the supervision of Profs. Débora P. Menezes and Marcus E. B. Pinto studying symmetry non-restoration in quantum field theory.
- **IPPP summer student**, 2014: undergraduate research on neutrino oscillations under the supervision of Prof. Silvia Pascoli.
- **Volunteer UG researcher**, 2013: volunteer undergraduate researcher under the supervision of Prof. Débora P. Menezes studying equations of state for stellar remnants.

EXPERIMENTAL COLLABORATIONS

- External **MicroBooNE** collaborator and one of the main analyzers in a search for neutrino-induced e^+e^- events.
- Member of collaborations for the future experimental projects DUNE, νSTORM, and IsoDAR.

TEACHING AND MENTORING

- **Student mentoring**: currently mentors three PhD students in on-going projects: Asli Abdullahi (Durham University), Daniele Massaro (Univeristy of Bologna), and Nicolò Foppiani (Harvard University).
- **Graduate tutor**, 2016 to 2018: led 2nd year physics students in problem classes on advanced classical mechanics and quantum theory.
- **Undergraduate tutor**, 2012 to 2013: invited tutor for university-wide program mentoring first year students at Federal University of Santa Catarina (UFSC).

COMMUNITY ENGAGEMENT

- **Main local organizer**: for the international workshop on Weak Interactions and Neutrinos (WIN) 2021, in Minnesota US, and the Young Theorists Forums 9, 10, and 11, in the UK.
- **Convener**: for the IceDune workshop.
- **Snowmass 2021**: main author of a letter of intent on "Opportunities and signatures of non-minimal Heavy Neutral Leptons" with over 110 endorsers.
- **Snowmass community paper editor**: for the sterile neutrino topic in the "neutrino frontier", and for the topic of new physics searches at kaon and hyperon factories in the "rare processes and precision measurements" frontier.

SCIENCE OUTREACH

- **Celebrate Science 2018**: volunteer in regional outreach event for schools in County Durham.
- **Orkney Science Festival 2018**: volunteer in the International Orkney Science Festival, visiting schools in remote islands of the Orkney archipelago in the north of Scotland.
- **Royal Society Summer Exhibition 2017 and 2018**: event organizer for the "modeling the invisible" exhibition and volunteer at the "ghosts in the universe" exhibition on neutrinos.
- **Pint of Science 2017**: event manager for local outreach event in County Durham. A complete list can be found at

PUBLICATIONS

The following is a selected list of publications for which I was one of the primary contributors. Author lists are displayed in alphabetical order, as is the standard in particle physics. A complete list can be found at inspirehep.net/authors/1621061.

Peer-reviewed publications:

1. *"Constraints on Decaying Sterile Neutrinos from Solar Antineutrinos"*, M. Hostert and M. Pospelov, arXiv:2007.11813, Phys.Rev.D 104 055031.
2. *"A Dark Seesaw Solution to Low Energy Anomalies: MiniBooNE, the muon (g-2), and BaBar"*, A. Abdullahi, M. Hostert and S. Pascoli, 2007.11813, Phys. Lett. B 820 136531 (2021).
3. *"Pair production of dark particles in meson decays"*, M. Hostert, K. Kaneta and M. Pospelov, 2005.07102, Phys.Rev.D 102 055016 (2020).
4. *"Dark Neutrinos and a Three Portal Connection to the Standard Model"*, P. Ballett, M. Hostert, S. Pascoli, 1903.07589, Phys.Rev.D 101 115025 (2020), **citations: 30**.
5. *"Testing New Physics Explanations of MiniBooNE Anomaly at Neutrino Scattering Experiments"*, C. Argüelles, M. Hostert and Y. Tsai, 1812.08768, Phys.Rev.Lett. 123 (2019) no.26, 261801, **citations: 41**.

6. *"Neutrino Masses from a Dark Neutrino Sector below the Electroweak Scale"*, P. Ballett, M. Hostert and S. Pascoli, 1903.07590, Phys.Rev.D 99 (2019) 091701, **citations: 26**.
7. *"Z′ in neutrino scattering at DUNE"*, P. Ballett, M. Hostert, S. Pascoli, Y. F. Perez-Gonzalez, Z. Tabrizi and R. Z. Funchal, 1902.08579, Phys.Rev.D 100 (2019) 055012, **citations: 33**.
8. *"Neutrino trident scattering at near detectors"*, P. Ballett, M. Hostert, S. Pascoli, Y. F. Perez-Gonzalez, Z. Tabrizi and R. Z. Funchal, arXiv:1807.10973, JHEP 1901 (2019) 119, **citations: 27**.

Preprints:

1. *"Heavy neutral leptons below the kaon mass at hodoscopic detectors "*, C. Argüelles, N. Foppiani, M. Hostert, arXiv:2109.03831, submitted to Phys.Rev.Lett.
2. *"Novel multi-lepton signatures of dark sectors in light meson decays"*, M. Hostert and M. Pospelov, arXiv:2012.02142, submitted to Phys.Rev.D.

Non-peer reviewed publications

1. *"Feebly-Interacting Particles:FIPs 2020 Workshop Report"*, Agrawal, Prateek et al , arXiv:2102.12143.
2. *"Neutrino trident production at near detectors"*, M. Hostert, PoS (NOW2018) 037. Proceedings from Neutrino Oscillations Workshop 2018.
3. *"Light Sterile Neutrinos at νSTORM: Decoherence and CP violation"*, P. Ballett, M. Hostert and S. Pascoli, arXiv:1705.09214, NuPhys2016, ePrint Proceedings.

ACADEMIC PRESENTATIONS

A selected list of presentations at high-profile meetings is shown below. For a complete list, see mhostert.com/talks/.

Plenary talks

1. CAHEP (Central America): 11/20, invited plenary talk.
2. NuPhys 2019 (UK): 12/19, invited plenary talk.
3. CERN Neutrino Platform Week 2019: (CERN, Switzerland): 08/19, invited plenary talk.
4. Prospects of Neutrino Physics, IPMU (Japan): 04/19, invited plenary talk.
5. PONDD (FNAL, USA) (12/18): invited plenary talk.
6. Near detector workshop 2018 (CERN, Switzerland) (06/18): invited plenary talk.

Contributed talks and seminars

1. American Physics Society DPF meeting 2021 (USA): 05/21, contributed talk.
2. American Physics Society April Meeting (USA): 04/21, contributed talk.
3. Neutrino Seminar, Fermilab (USA): 03/21, invited seminar.
4. 3rd South American Dark Matter Workshop (ICTP, Brazil): 10/20, contributed talk.
5. ICHEP 2020 (Czech Republic): 07/20, contributed short talk and poster.
6. Neutrino 2020 (USA): 06/20, award winning short talk and poster.
7. Phenomenology Symposium 2020 (USA): 05/20, invited contributed talk.
8. Brookhaven Neutrino Theory Virtual Seminars (Brookhaven National Laboratory, USA): 05/20, invited talk.
9. Neutrino Oscillation Workshop 2018 (Italy): 09/21, invited talk.