Curriculum Vitae

MATHEUS HOSTERT

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ACADEMIC POSITIONS

Joint Post-Doctoral Position OCT. 2019 - PRESENT
Post-doctoral researcher at the Perimeter Institute and 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

EQUITY, DIVERSITY, AND INCLUSION EFFORTS

- Member of the Diversity & Inclusion Alliance of the College of Science and Engineering (CSE) at the University of Minnesota. Ensured that postdocs also had a their suggestions and concerns heard by the CSE Dean.

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 and νSTORM.

TEACHING AND MENTORING

- **Student mentoring**: currently mentors three PhD students in on-going projects: Asli Abdullahi at Durham University, Daniele Massaro and Jaime Hoefke at Univeristy of Bologna, and Nicolò Foppiani at 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 in 2021.
- **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.
- **CERN FPC PBC**: member of the Feebly Interacting Particle (FPC) working group, part of the Physics Beyond Colliders (PBC) effort at CERN. Currently building and maintaining a Python package that collects experimental limits on dark sectors.

SCIENCE OUTREACH

- **KITP Teacher's Conference 2022**: speaker at the KITP teacher's conference in 2022.
- **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. *'Dark sectors in neutron-shining-through-a-wall and nuclear absorption signals"*, M. Hostert, D. McKeen, M. Pospelov, N. Raj, arXiv:2201.02603, submitted to Phys.Rev.D.

2. *"MicroBooNE and the ν_e Interpretation of the MiniBooNE Low-Energy Excess"*, C. A. Argüelles, I. Esteban, M. Hostert, K. J. Kelly, J. Kopp, P. A. N. Machado, I. Martinez-Soler, Y. F. Perez-Gonzalez, arXiv:2111.10359, accepted as **Phys.Rev.Lett. Editors' Suggestion. citations: 27**.
3. *"Heavy neutral leptons below the kaon mass at hodoscopic detectors "*, C. Argüelles, N. Foppiani, M. Hostert, arXiv:2109.03831, Phys.Rev.D 105, 095006.
4. *"Novel multi-lepton signatures of dark sectors in light meson decays"*, M. Hostert and M. Pospelov, arXiv:2012.02142, Phys.Rev.D 105 (2022) 1, 015017.
5. *"Constraints on Decaying Sterile Neutrinos from Solar Antineutrinos"*, M. Hostert and M. Pospelov, arXiv:2008.11851, Phys.Rev.D 104 055031.
6. *"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), **citations: 38**.
7. *"Pair production of dark particles in meson decays"*, M. Hostert, K. Kaneta and M. Pospelov, 2005.07102, Phys.Rev.D 102 055016 (2020).
8. *"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: 52**.
9. *"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: 56**.
10. *"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: 38**.
11. *"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: 50**.
12. *"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: 41**.

Non-peer reviewed publications

1. *"White Paper on Light Sterile Neutrino Searches and Related Phenomenology"*, M.A. Acero et al, arXiv:2203.07323, Snowmass Summer Study paper, editor.
2. *"Feebly-Interacting Particles:FIPs 2020 Workshop Report"*, Agrawal, Prateek et al , arXiv:2102.12143.
3. *"Neutrino trident production at near detectors"*, M. Hostert, PoS (NOW2018) 037. Proceedings from Neutrino Oscillations Workshop 2018.
4. *"Light Sterile Neutrinos at νSTORM: Decoherence and CP violation"*, P. Ballett, M. Hostert and S. Pascoli, arXiv:1705.09214, NuPhys2016, ePrint Proceedings.

TALKS AND SEMINARS

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

Plenary talks

1. KITP, Interdisciplinary Developments in Neutrino Physics (USA): 03/22, invited plenary talk.
2. CAHEP (Central America): 11/20, invited plenary talk.
3. NuPhys 2019 (UK): 12/19, invited plenary talk.
4. CERN Neutrino Platform Week 2019: (CERN, Switzerland): 08/19, invited plenary talk.
5. Prospects of Neutrino Physics, IPMU (Japan): 04/19, invited plenary talk.
6. PONDD (FNAL, USA) (12/18): invited plenary talk.
7. 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.