Curriculum Vitae

MATHEUS HOSTERT

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ACADEMIC POSITIONS

Four-year 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
Institute for Particle Physics Phenomenology (IPPP), Durham University.
Dissertation: Hidden Physics at the Neutrino Frontier: Tridents, Dark Forces, and Hidden Particles.
Supervisor: Prof. Silvia Pascoli. Dissertation Committee: Profs. David Cerdeño and Joachim Kopp.

Bachelors degree in Physics – Federal University of Santa Catarina, Brazil MAR. 2011 - JUN. 2015
Year abroad at Durham University (SEPT. 2013 - SEPT. 2014) with honors 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 could provide feedback to 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 Dr. 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

- Working with the **MicroBooNE** collaboration under a memorandum of understanding to search for neutrino-induced e^+e^- events.
- Collaborator in the future experimental projects DUNE and νSTORM.

TEACHING AND MENTORING

- **Student mentoring**: mentors three PhD students in on-going projects: Daniele Massaro, Jaime Hoefken at Univeristy of Bologna. Has mentored Dr. Asli Abdullahi, Nicolò Foppiani, and Nicholas Kamp on several projects.
- **Summer Schools**, led a one-week project for high-school students at the International Summer School for Young Physicists (ISSYP) organized by the Perimeter Institute.
- **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

- **Snowmass 2021**: Editor for the "neutrino frontier" whitepaper on sterile neutrinos and for the "rare processes and precision measurements" whitepaper on new physics in kaon and hyperon factories. Made substantial contributions to 7 white papers and led a letter of intent with over 110 endorsers.
- **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.
- **Event 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 Durham, UK. Convener for the IceDune workshop in 2021.

SCIENCE OUTREACH

- **KITP Teacher's Conference 2022**: keynote speaker at the KITP teacher's conference.
- **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.

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. MicroBooNE and the e Interpretation of the MiniBooNE Low-Energy Excess, Argüelles, Esteban, Perez-Gonzalez, Phys.Rev.Lett. 128 (2022) 24 241802, 2022, arXiv:2111.10359 [hep-ph], [citations: **32**].
2. Heavy neutral leptons below the kaon mass at hodoscopic neutrino detectors, Argüelles, Foppiani, Hostert, Phys.Rev.D 105 (2022) 9 095006, 2022, arXiv:2109.03831 [hep-ph], [citations: **14**].
3. Novel multilepton signatures of dark sectors in light meson decays, Hostert, Pospelov, Phys.Rev.D 105 (2022) 1 015017, 2022, arXiv:2012.02142 [hep-ph], [citations: 9].

4. Constraints on decaying sterile neutrinos from solar antineutrinos, Hostert, Pospelov, Phys.Rev.D 104 (2021) 5 055031, 2021, arXiv:2008.11851 [hep-ph], [citations: **13**].
5. A dark seesaw solution to low energy anomalies: MiniBooNE, the muon $(g-2)$, and BaBar, Abdullahi, Hostert, Pascoli, Phys.Lett.B 820 (2021) 136531, 2021, arXiv:2007.11813 [hep-ph], [citations: **42**].
6. Pair production of dark particles in meson decays, Hostert, Kaneta, Pospelov, Phys.Rev.D 102 (2020) 5 055016, 2020, arXiv:2005.07102 [hep-ph], [citations: **13**].
7. Neutrino Masses from a Dark Neutrino Sector below the Electroweak Scale, Ballett, Hostert, Pascoli, Phys.Rev.D 99 (2019) 9 091701, 2019, arXiv:1903.07590 [hep-ph], [citations: **42**].
8. Dark Neutrinos and a Three Portal Connection to the Standard Model, Ballett, Hostert, Pascoli, Phys.Rev.D 101 (2020) 11 115025, 2020, arXiv:1903.07589 [hep-ph], [citations: **58**].
9. Z's in neutrino scattering at DUNE, Ballett, Hostert, Zukanovich Funchal, Phys.Rev.D 100 (2019) 5 055012, 2019, arXiv:1902.08579 [hep-ph], [citations: **53**].
10. Neutrino trident production at near detectors, Hostert, PoS NOW2018 (2019) 037, 2019, [citations: 1].
11. Testing New Physics Explanations of the MiniBooNE Anomaly at Neutrino Scattering Experiments, Argüelles, Hostert, Tsai, Phys.Rev.Lett. 123 (2019) 26 261801, 2019, arXiv:1812.08768 [hep-ph], [citations: **60**].
12. Neutrino Trident Scattering at Near Detectors, Ballett, Hostert, Zukanovich Funchal, JHEP 01 (2019) 119, 2019, arXiv:1807.10973 [hep-ph], [citations: **45**].

Under review or non-peer reviewed

1. DarkNews: a Python-based event generator for heavy neutral lepton production in neutrino-nucleus scattering, Abdullahi, Zink, Pascoli, preprint, 2022, arXiv:2207.04137 [hep-ph].
2. Dipole-Coupled Neutrissimo Explanations of the MiniBooNE Excess Including Constraints from MINERvA Data, Kamp, Hostert, Uchida, preprint, 2022, arXiv:2206.07100 [hep-ph], [citations: 2].
3. A New Way To Seek Out Dark Neutrino Sectors And To Boldly Explore Multi-Dimensional Parameter Spaces, Argüelles, Foppiani, Hostert, preprint, 2022, arXiv:2205.12273 [hep-ph].
4. Dark sectors in neutron-shining-through-a-wall and nuclear absorption signals, Hostert, McKeen, Raj, preprint, 2022, arXiv:2201.02603 [hep-ph], [citations: 5].
5. Hidden Physics at the Neutrino Frontier: Tridents, Dark Forces, and Hidden Particles, Hostert, thesis, 2019.
6. Light Sterile Neutrinos at νSTORM: Decoherence and CP violation, Ballett, Hostert, Pascoli, proceedings, 2017, arXiv:1705.09214 [hep-ph], [citations: 1].

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.