Matthew Black

Curriculum Vitae

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https://github.com/mbr-phys

EDUCATION

2021 – PRESENT **PhD in Theoretical Particle Physics**
Universität Siegen

2016 – 2020 **Master of Physics (MPhys)**
FIRST CLASS HONOURS
Theoretical Physics
University of Durham

2009 – 2016 **Secondary Education**
The High School of Glasgow

POSITIONS

Universität Siegen [03.21 – present]
Doctoral Researcher

I am currently working as a doctoral researcher in the TP1 research group for particle physics at Universität Siegen, focusing on B physics using both lattice QCD simulations and QCD sum rules calculations, therefore making use of different non-perturbative methodologies for the physics. I work with colleagues both within the TP1 group and internationally to complete research, and also as part of the RBC/UKQCD collaboration focused on delivering high precision lattice results. Further research interests include new physics models and quantum computation for high energy physics.

RESEARCH WORKS

See iNSPIRE-HEP/Matthew Black.

➥ **M. Black**, R. Harlander, F. Lange, A. Rago, A. Shindler and O. Witzel, *Using Gradient Flow to Renormalise Matrix Elements for Meson Mixing and Lifetimes*, PoS LATTICE2023 263, [arXiv:2310.18059 [hep-lat]]

➥ **M. Black**, O. Witzel, *B Meson Decay Constants Using Relativistic Heavy Quarks*, PoS LATTICE2022 405, [arXiv:2212.10125 [hep-lat]]

➥ **M. Black**, A. D. Plascencia and G. Tetlalmatzi-Xolocotzi, *Enhancing $B_s \to e^+e^-$ to an Observable Level in the Two-Higgs-Doublet Model*, Phys.Rev.D 107 (2023) 3 035013, [arXiv:2208.08995 [hep-ph]]

➥ O. Atkinson, **M. Black**, C. Englert, A. Lenz and A. Rusov, *MUonE, muon $g-2$ and electroweak precision constraints within 2HDMs*, Phys.Rev.D 106 (2022) 11 115031, [arXiv:2207.02789 [hep-ph]]

➥ O. Atkinson, **M. Black**, C. Englert, A. Lenz, A. Rusov and J. Wynne, *The Flavourful Present and Future of 2HDMs at the Collider Energy Frontier*, JHEP 11 (2022) 139, [arXiv:2202.08807 [hep-ph]]

➥ O. Atkinson, **M. Black**, A. Lenz, A. Rusov and J. Wynne, *Cornering the Two Higgs Doublet Model Type II*, JHEP 04 (2022) 172, [arXiv:2107.05650 [hep-ph]]

COMPUTER SKILLS

INTERMEDIATE Fortran, Perl, HTML

EXPERT Python, C++, Unix, LaTeX
Grid, Hadrons, Qlua

TEACHING

Throughout my Masters and PhD, I have taken up teaching assistant duties for various courses:
➥ Practical Lab: Intro to Lattice QCD [2 semesters, Siegen]
➥ Scientific Programming [1 semester, Siegen]
➥ Introduction to Python programming for physics [2 semesters, Durham]

Furthermore I helped to advise a Bachelors student through their dissertation work [1 semester, Siegen].

FURTHER EXPERIENCES

Systems Administrator [09.22 – present]

During my time at UniSiegen, I have taken on responsibilities as part of the Sys Admin team managing and maintaining the Linux computer systems of the TP1 group, including central server systems. This involves educating users on working with Linux systems and providing assistance and new services as needed by the group.

SELECTED TALKS

02.24 MIT Virtual Lattice Field Theory Colloquium Series, *Gradient Flow Renormalisation for Meson Mixing and Lifetimes*
08.23 Lattice 2023, Fermilab, USA, *Using Gradient Flow to Renormalise Matrix Elements for Meson Mixing and Lifetimes*
03.23 ECT* Workshop on The Gradient Flow in QCD and other Strongly Coupled Field Theories, Trento, Italy, *Using Gradient Flow to renormalise Matrix Elements for B Meson Mixing and Lifetimes*
08.22 Lattice 2022, Bonn, Germany, *B Meson Decay Constants Using Relativistic Heavy Quarks*
06.22 Quirks in Quark Flavour Physics, Zadar, Croatia, *B meson decay constants from Lattice QCD*
06.22 Young Scientists Meeting of the CRC TRR 257, Karlsruhe, Germany, *Non-Perturbative Calculations for B-mesons*
03.22 DPG Frühjarhstagung 2022, Heidelberg, Germany (virtual), *Flavour and LHC constraints in the 2HDM*
05.21 Annual Meeting of the CRC TRR 257 (virtual), *Cornering the Two-Higgs-Doublet II Model*

EVENTS ATTENDED

10.23 LHCb Implications Workshop 2023 (virtual)
10.23 Young Scientists Meeting of the CRC TRR 257, Siegen, Germany
08.23 Lattice 2023, Fermilab, USA
04.23 MIAPbP program on Quantum Computing Methods for High Energy Physics, Munich, Germany
03.23 ECT* Workshop on The Gradient Flow in QCD and other Strongly Coupled Field Theories, Trento Italy
10.22 LHCb Implications Workshop 2022 (virtual)
09.22 DIRAC Practical Introduction to Quantum Computing, London, UK
08.22 Lattice 2022, Bonn, Germany
06.22 Quirks in Quark Flavour Physics, Zadar, Croatia
06.22 Young Scientists Meeting of the CRC TRR 257, Karlsruhe, Germany
03.22 DPG Frühjarhstagung 2022, Heidelberg, Germany (virtual)
10.21 LHCb Implications Workshop 2021 (virtual)
08.21 Lattice 2022 (virtual)
05.21 Annual Meeting of the CRC TRR 257 (virtual)

REFERENCES

Dr. Alexander Lenz

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Dr. Oliver Witzel

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Dr. Robert Harlander

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GROUP *Institute for Theoretical Particle Physics and Cosmology*
RWTH Aachen University

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