

Matthew Black

Curriculum Vitae

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EDUCATION

- 2021 – 2024 **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

University of Edinburgh [10.24 – present]
Postdoctoral Researcher

I am currently working as a postdoctoral researcher in the Particle Physics Theory research group at the University of Edinburgh, focusing on non-perturbative predictions in flavour physics using lattice QCD. I work with colleagues both within the PPT 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.

Universität Siegen [03.21 – 10.24]
Doctoral Researcher

RESEARCH WORKS

See iNSPIRE-HEP/Matthew Black.

- ➡ **M. Black**, M. Lang, A. Lenz, Z. Wüthrich, *HQET sum rules for matrix elements of dimension-size four-quark operators for meson lifetimes within and beyond the Standard Model*, JHEP XX (2025) XXX, [arXiv:2412.13270 [hep-ph]]
- ➡ **M. Black**, R. Harlander, F. Lange, A. Rago, A. Shindler and O. Witzel, *Gradient Flow Renormalisation for Meson Mixing and Lifetimes*, PoS LATTICE2024 243, [arXiv:2409.18891 [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 $B_s \rightarrow e^+e^-$ 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**, 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, L^AT_EX
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 TPI 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

- 02.25 Gradient Flow Workshop, Zürich, Switzerland, *Using Gradient Flow to Renormalise Matrix Elements for Meson Mixing and Lifetimes*
- 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 Frühjahrstagung 2022, Heidelberg, Germany (virtual), *Flavour and LHC constraints in the 2HDM*

EVENTS ATTENDED

04.25 DiRAC AMD MI300 Series Hackathon, London, UK
02.25 Gradient Flow Workshop, Zürich, Switzerland
12.24 DiRAC Day 2024, Cardiff, UK
08.24 Lattice 2024, Liverpool, UK
07.24 Lattice@CERN 2024
06.24 Quirks in Quark Flavour Physics 2024, Zadar, Croatia
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 Frühjahrstagung 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

POSITION Chair, Professor
GROUP *Theoretical Physics 1
Universität Siegen*

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Dr. Oliver Witzel

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GROUP *Theoretical Physics 1
Universität Siegen*

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Dr. Robert Harlander

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

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