Philipp Hähnel

School of Mathematics
Trinity College Dublin
College Green
Dublin 2, Ireland

email: haehnel@maths.tcd.ie
homepage: phylyc.github.io

CV PHILIPP HÄHNEL

EDUCATION

Doctor of Philosophy, Mathematics, Trinity College Dublin, Mar 2014 – Mar 2018
Doctoral thesis: *Higher spin scattering amplitudes from twistor theory*
Advisor: Prof. T. McLoughlin Reviewer: Prof. Ruth Britto, Prof. Lionel Mason

Master of Science in Physics, Humboldt University of Berlin, Apr 2011 – Jun 2014, result 1.6
Master thesis: *The one-loop effective action of N=4 SYM-type theories*
Advisor: Dr. C. Sieg Reviewer: Prof. M. Staudacher, Dr. H. Dorn

Bachelor of Science in Physics, Humboldt University of Berlin, Oct 2007 – Mar 2011, result 2.3
Bachelor thesis: *Minimal surfaces in anti-de Sitter spaces*
Advisor: Dr. H. Dorn Reviewer: Dr. H. Dorn, Prof. J. Plefka

RESERACH INTERESTS

[**AI**]: agent architecture, reinforcement learning, deep learning, natural language processing, genetic algorithms

[**Physics**]: higher spin theories, gauge/gravity duality and holography, AdS/CFT correspondence, quantum gravity, scattering amplitudes, twistor theory, gauge field theory

PROGRAMMING SKILLS

- **LaTeX** [~13 years]
  - publications, hobby projects, almost everything written
- **Mathematica** [~12 years]
  - Master's thesis: automatisation of divergence calculations for wide class of theories
  - everything that needs calcuation or visualisation (plots and graphs)
- **Matlab / Scilab** [~3 years]
  - Data analysis for university courses, and used while working at the NRL and Fraunhofer Institute (see work experience below)
- **Python** [~1 year]
  - A platform for light-weight multi-player online games: github.com/arenarium
  - TensorFlow
- **C** [1 month]
  - Scripted bot for rogue-like game Sil: github.com/phylyc/genesis-sil

Work Experience

Research Scientist Intern at I.B.M., Dublin: (2018)
Data analysis; using Deep Learning for pollution modelling using TensorFlow

Teaching assistant at the School of Mathematics, Trinity College Dublin: (2014 2017)
Differential Geometry, General Relativity, Quantum Mechanics, Advanced Calculus, Classical Field Theory & Classical Electrodynamics

Teaching assistant at the Department of Physics, HU Berlin: (2011 2013)
Quantum Field Theory I & II, Linear Algebra and Analytical Geometry I & II

Organization of seminars for secondary school students at the TU Berlin: (2006 2012)
Introduction to General Relativity, *Physics of the Sun*, *The EPR-Paradox*, *Anomalies in the Solar System*, *Gravitational Lenses*, *Physics of Stars*, *Recent Cosmology*, *Introduction to Quantum Physics*, *Black Holes*

Student assistant at the Neurorobotics Research Laboratory, HU Berlin (2010 2011)
Software engineering: 2D physics simulator for exploration of autonomous robot designs

Student Internship at the Fraunhofer Inst. for Open Comm. Systems, Berlin (2007)
Data analysis: classifying neural signal data using k-fold cross-validation

Student Internship at the German Aerospace Center (DLR), Berlin (2005)
Image analysis: calculating atmospheric height of dust clouds on Mars

Publications

[1] **P. Haehnel** and T. McLoughlin, *On jet bundles and star products*, (in preparation)
[2] **P. Haehnel,** *All three-point amplitudes of conformal higher spin theories*, (in preparation)
[3] T. Adamo, **P. Haehnel** and T. McLoughlin, *Local twistor connection of conformal higher spin curvature tensors*, (in preparation)
[4] T. Adamo, **P. Haehnel** and T. McLoughlin, *Conformal higher spin scattering amplitudes from twistor space*, arXiv:1611.06200 [hep-th], JHEP 1704: 021, 2017
[5] **P. Haehnel** and T. McLoughlin, *Conformal higher spin theory and twistor space actions*, arXiv:1604.08209 [hep-th], *J. Phys. A: Math. Theor.* **50** 485401
[6] W. Hasse, E. Birsin and **P. Haehnel**, *On force-field models of the spacecraft flyby anomaly*, arXiv:0903.0109 [gr-qc].

Invited Talks and Posters

- Over 10 invited talks and posters on my publications, mainly [4] and [5], since 2014
- Participation in over 30 conferences, workshops and summer schools related to my research interests in theoretical physics since 2011

Honors

- Sep 2015 'String Theory Universe' travel grant for a short-term scientific mission, visiting Prof. L. Mason at the Mathematical Institute, University of Oxford
- 2007 2010 Scholarship of the German National Academic Foundation
- 2007 School's best graduation in physics
- 2007 3rd place at the Germany-wide, and additional 2nd place at the Berlin-wide competition of the 42th competition 'Jugend forscht' ('youth researches')

Early Scientific Activities

- 2006 2012 Member of work group *Astrometrie* at Wilhelm Foerster Observatory, Berlin
- 2003 2005 Member of the mathematical pupil association *Leonard Euler* at HU Berlin

Languages

German: native
English: fluent
French: basic

Other Interests

Swing & Blues dancing (performances & teaching)
Creative Writing
Piano
Whisky