Curriculum Vitæ *updated: September 15, 2022*

Philipp M. Schicho

1. Personal information

name	Dr. Philipp Maximilian Schicho born in Graz, Austria, 01 October 1991
nationality	Austrian
address	P.O. Box 64 (Gustav Hällströmin katu 2) FI-00014 University of Helsinki, Finland
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2. Current position

09/2022 – 09/2024 Postdoctoral researcher
Institute for Theoretical Physics, Goethe University
Advisors: Laura Sagunski, Jürgen Schaffner-Bielich
Research: Early universe particle cosmology, cold dense QCD, energetic quarks and gluons inside quark-gluon plasma

05/2020 – 08/2022 Postdoctoral researcher
University of Helsinki, Helsinki Institute of Physics
Advisors: Aleksi Vuorinen, Kari Rummukainen
Research: Early universe particle cosmology, cold dense QCD

3. Employment history

02/2017 – 04/2020 Doctor of Philosophy, PhD Physics (magna cum laude), 23/04/2020
AEC, Institute for Theoretical Physics, University of Bern
Major: Thermal field theory and particle cosmology
Advisor: Mikko Laine
Thesis: *Multi-loop investigations of strong interactions at high temperatures*, (cf. research output [4]).

10/2016 – 01/2017 Technical student
CERN, Accelerator and Beam Transfer, Beam Transfer Physics
Theoretical optimisation of slow extraction (cf. research output [6]).
Advisors: Matthew A. Fraser, Malika Meddahi

06/2015 – 08/2015 Summer student
CERN, ABT, BTP
Thesis: *Optimising simulation times of SPS slow extraction using* `MAD-X`, (cf. research output [5]).

07/2014 – 08/2014 Summer student (GPA 1.0/1.0)
HEPHY, Institute of High Energy Physics, Vienna
Advisor: Robert Schöfbeck
Thesis: *Increasing the sensitivity of a search for supersymmetry in the single lepton channel with the Stransverse Mass* M_{T2} (CMS), (cf. research output [1]).

4. Education

07/2017 École de physique des Houches
Effective Field Theory (EFT) in particle physics and cosmology
Introduction to EFT to describe multi-scale quantum systems in a tractable fashion. EFT allows to concisely parametrise possible new physics beyond established models such as the Standard Model of particle physics and cosmology.

03/2017 Computer algebra and particle physics (CAPP) school, DESY, Hamburg
Topics at the interface of modern computer algebra and particle physics such as Feynman integrals and multi-loop techniques.

09/2014 – 11/2016 Master of Science, MSc Physics (GPA 5.5/6.0), 01/11/2016
ETH Zürich, Switzerland
Major: Theoretical high energy physics, lattice QCD, applied mathematics
Advisor: Philippe de Forcrand
Thesis: *Inhomogeneous condensation in quark-based QCD effective models via wavelet pseudoparticles*, (cf. research output [3]).

07/2014 Summer School in Particle and Astroparticle physics
LAPP Annecy-le-Vieux, France

09/2011 – 08/2014 Bachelor of Science, BSc Physics (with distinction, GPA 1.1/1.0), 12/08/2014
Graz University of Technology, Austria
Advisors: H. G. Evertz, C. B. Lang
Thesis: π- *and* ρ*-Meson mass spectroscopy from Lattice QCD*, (cf. research output [2]).

08/2013 Summer school, University of Utrecht, Netherlands
Theoretical topics on thermal and statistical physics, quantum mechanics, electrodynamics, condensed matter, high energy physics and quantum gravity.

09/2002 – 05/2010 Österreichische Reifeprüfung, Matura (with distinction, GPA 1.0/1.0)
AHS BG/BRG Leibnitz, Austria
Major: Physics and geometry
Advisor: Hermann Scherz
Thesis: *Sonoluminescence – A bubble's enlightenment.* A theoretical and experimental approach to the effect of Sonoluminescence.

5. Teaching activities

03/2022 School tutor, Galileo Galilei Institute for Theoretical Physics
Theoretical Aspects of Astroparticle Physics, Cosmology and Gravitation
Phase transitions in the early universe

2021– MSc thesis supervisor, University of Helsinki, Helsinki Institute of Physics

Sami Vihko, 06/2021 – 03/2022, co-supervised with Aleksi Vuorinen
Thesis: *EFT methods and calculational techniques in imaginary time formalism of thermal QCD.*

02/2017 – 02/2020 Teaching assistant, AEC, Institute for Theoretical Physics, University of Bern
Lecturing, designing and grading exercises and exams at Bachelor and Master level.
Quantum theory I/II, the Standard Model, statistical mechanics, introduction to BSM physics, theoretical exercises
References: Thomas Becher, Susanne Reffert, Rakhi Mahbubani

02/2015 – 05/2016 Teaching assistant, ETH Zürich, D-MATH/D-PHYS
Numerical mathematics I, Numerical methods, Physics I
References: Christoph Schwab, Sandra May, Andreas Vaterlaus

2013 – 2014 Teaching assistant, Graz University of Technology, ITP/IEP
Theoretical mechanics, physics laboratory I/II
References: W. v. d. Linden, Enrico Arrigoni

6. Outreach

09/2017 Public research display, University of Bern
Nacht der Forschung (NdF)

7. Research visits

06/2022	SUBATECH, Nantes; Jacopo Ghiglieri
10/2021	University of Basel; Stefan Antusch
10/2021	University of Bern, AEC, Institute for Theoretical Physics; Mikko Laine
08/2019	University of Helsinki, Helsinki Institute of Physics; Aleksi Vuorinen, Kari Rummukainen
08/2018	Universidad del Bío-Bío, Grupo de Cosmología y Partículas Elementales; York Schröder

8. Professional services

03/2022–	Referee American Physical Society's journals: Phys. Rev. **D**, Phys. Rev. **L** Springer's journals: Eur. Phys. J. **C**

9. Scientific research skills

Theoretical	(Dimensionally reduced) effective field theories, thermal field theory, quantum field theory, Lattice QCD, simulations in physics, computer algebra techniques, general relativity, cosmology, string theory, conformal field theory, group theory
Computational	`C/C++`, `Python`, `Matlab`, `FORM`, `ROOT`, `FORTRAN 77`, Unix, Linux, Mathematica, LaTeX, computer hardware, `HTML`, Office, CAD-Software

10. Prizes, awards, fellowships

2011 – 2014	Scholarship of excellence Graz University of Technology (EUR 800 scholarship p.a.)

11. Languages

German	Mother-tongue
English	Proficient C2, TOEFL 106/120 (2014), Cambridge ESOL B2 First FCE (2010)
Spanish	Intermediate B1
Danish	Elementary A2
French	Beginner A1
Latin	Very good (literal translation)

Research output list

Journal articles

[19] S. Biondini, **P. Schicho**, and T. V. I. Tenkanen, *Strong electroweak phase transition in t-channel simplified dark matter models*, (2022), [2207.12207].

[18] J. Hirvonen, J. Löfgren, M. J. Ramsey-Musolf, **P. Schicho**, and T. V. I. Tenkanen, *Computing the gauge-invariant bubble nucleation rate in finite temperature effective field theory*, JHEP **07**, 135 (2022), [2112.08912].

[17] A. Ekstedt, **P. Schicho**, and T. V. I. Tenkanen, `DRalgo`*: a package for effective field theory approach for thermal phase transitions*, (2022), [2205.08815].

[16] T. Gorda, A. Kurkela, J. Österman, R. Paatelainen, S. Säppi, **P. Schicho**, K. Seppänen, and A. Vuorinen, *Degenerate fermionic matter at N^3LO: Quantum Electrodynamics*, (2022), [2204.11893].

[15] T. Gorda, A. Kurkela, J. Österman, R. Paatelainen, S. Säppi, **P. Schicho**, K. Seppänen, and A. Vuorinen, *Soft photon propagation in a hot and dense medium to next-to-leading order*, (2022), [2204.11279].

[14] **P. Schicho**, T. V. I. Tenkanen, and G. White, *Combining thermal resummation and gauge invariance for electroweak phase transition*, (2022), [2203.04284].

[13] J. Ghiglieri, G. D. Moore, **P. Schicho**, and N. Schlusser, *The force-force-correlator in hot QCD perturbatively and from the lattice*, JHEP **02**, 58 (2022), [2112.01407].

[12] J. Löfgren, M. J. Ramsey-Musolf, **P. Schicho**, and T. V. I. Tenkanen, *Nucleation at finite temperature: a gauge-invariant, perturbative framework*, (2021), [2112.05472].

[11] L. Niemi, **P. Schicho**, and T. V. I. Tenkanen, *Singlet-assisted electroweak phase transition at two loops*, Phys. Rev. D **103**, 115035 (2021), [2103.07467].

[10] D. Croon, O. Gould, **P. Schicho**, T. V. I. Tenkanen, and G. White, *Theoretical uncertainties for cosmological first-order phase transitions*, JHEP **04**, 055 (2021), [2009.10080].

[9] **P. M. Schicho**, T. V. I. Tenkanen, and J. Österman, *Robust approach to thermal resummation: Standard Model meets a singlet*, JHEP **06**, 130 (2021), [2102.11145].

[8] M. Laine, **P. Schicho**, and Y. Schröder, *A QCD Debye mass in a broad temperature range*, Phys. Rev. D **101**, 023532 (2020), [1911.09123].

[7] M. Laine, **P. Schicho**, and Y. Schröder, *Soft thermal contributions to 3-loop gauge coupling*, JHEP **2018**, 37 (2018), [1803.08689].

Conference proceedings

[6] M. Fraser, D. Björkman, K. Cornelis, B. Goddard, V. Kain, **P. Schicho**, C. Theis, and H. Vincke. *Modelling the Radioactivity Induced by Slow-Extraction Losses in the CERN SPS*. In *Proc. of International Particle Accelerator Conference (IPAC'17)* (May 2017), 1897–1900.

[5] M. A. Fraser, R. G. Alia, B. Balhan, H. Bartosik, C. Bertone, D. Björkman, J. Borburgh, N. Conan, K. Cornelis, L. Gatignon, B. Goddard, Y. Kadi, V. Kain, A. Mereghetti, F. Roncarolo, **P. M. Schicho**, J. Spanggaard, O. Stein, L. Stoel, F. M. Velotti, and H. Vincke. *SPS Slow Extraction Losses and Activation: Challenges and Possibilities for Improvement*. In *Proc. of International Particle Accelerator Conference (IPAC'17)* (Copenhagen. 2017), 611–614.

Theses

[4] **P. M. Schicho**, *Multi-loop investigations of strong interactions at high temperatures*, PhD thesis (U. Bern, 2020).

[3] **P. M. Schicho**, *Inhomogeneous condensation in quark-based QCD effective models via wavelet pseudoparticles*, MA thesis (ETH Zürich, 2016).

[2] **P. Schicho**, *π- and ρ-Meson mass spectroscopy from Lattice QCD*, BA thesis (TU Graz, 2014).

[1] **P. Schicho**, *Increasing the sensitivity of a search for supersymmetry in the single lepton channel with the Stransverse Mass*, Project thesis (HEPHY Vienna, 2014).

Seminar and contributed talks

15/09/2022 *(Gauge independent) Bubble nucleation rate at finite temperature*, invited seminar talk at Jožef Stefan Institute, Ljubljana, Slovenia

24/08/2022 *Can EFT tell us if there was an electroweak phase transition?*, invited seminar talk at University of Graz, Graz, Austria

11/07/2022 *Soft light-cone observables from electrostatic QCD*, invited seminar talk (online) at the QCD theory seminar

07/07/2022 *Degenerate fermionic matter at N^3LO*, invited seminar talk at the Nuclear Physics Colloquium, Goethe University, Frankfurt, Germany

20/06/2022 *Jet dispersion in hot QCD from the lattice*, contributed talk at SEWM 2022, Paris, France

16/06/2022 *Can EFT tell us if there was an electroweak phase transition?*, invited seminar talk at SUBATECH, Nantes, France

31/05/2022 *Electroweak phase transition: Combining thermal resummation and gauge invariance*, invited seminar talk at NICPB, Tallinn University, Estonia

24/05/2022 *Combining thermal resummation and gauge invariance for electroweak phase transition*, invited seminar talk (online) at School of Physics and Astronomy, Monash University, Australia

06/04/2022 *(Non-)perturbative jet dispersion hot QCD*, contributed talk at Quark Matter 2022, Kraków, Poland

30/03/2022 *(Non-)perturbative jet dispersion hot QCD*, contributed talk at Mini workshop: Phase transitions in particle physics, Galileo Galilei Institute, Firenze, Italy

03/03/2022 *Effective theory approach to cosmological phase transitions*, invited seminar talk at Instituto de Astrofísica de Canarias, La Laguna, Spain

28/10/2021 *Gauge independent bubble nucleation rate at finite temperature*, invited seminar talk at University of Basel, Basel, Switzerland

19/10/2021 *Cosmological phase transition: Robust thermal resummation*, invited seminar talk at University of Bern, Bern, Switzerland

13/05/2021 *Cosmological phase transition: Robust thermal resummation*, invited seminar talk (online) at KIAS, Seoul, South Korea

29/03/2021 *Soft thermal contributions to 3-loop gauge coupling*, contributed parallel talk at FunQCD (online), Barcelona, Spain

25/11/2020 *How to be precise at the electroweak scale at finite-temperature*, invited seminar talk (online) at Kavli IPMU, Tokyo, Japan

13/08/2019 *3-Loop Gauge Coupling in Hot Yang-Mills*, invited seminar talk at Helsinki Institute of Physics, Helsinki, Finland

28/08/2018 *Fun with thermal dimension-six operators*, invited seminar talk at Universidad del Bío-Bío, Chillán, Chile

28/06/2018 *Fun with thermal dimension-six operators*, contributed parallel talk at SEWM 2018, Barcelona, Spain