


# Curriculum Vitæ

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Philipp M. Schicho



## 1. Personal information

name Dr. Philipp Maximilian Schicho  
born in Graz, Austria, 01 October 1991  
nationality Austrian  
address 26, Quai Ernest-Ansermet  
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inspire HEP inspirehep.net/authors/1639147  
google scholar scholar.google.com/citations?user=6BI62ioAAAAJ  
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## 2. Current position

09/2024 – today SNSF Ambizione fellow  
Département de Physique Théorique, Université de Genève  
Principle investigator of SNSF project no. 215997: *Gravitational waves from cosmological phase transitions: Precision cosmology in the light of LISA* (PRECLISA)

## 3. Employment history

09/2022 – 08/2024 Postdoctoral researcher  
Institute for Theoretical Physics, Goethe University Frankfurt  
Advisors: L. Sagunski, J. Schaffner-Bielich  
05/2020 – 08/2022 Postdoctoral researcher  
Helsinki Institute of Physics, University of Helsinki  
Advisors: A. Vuorinen, K. Rummukainen  
02/2017 – 04/2020 Doctor of Philosophy, PhD Physics (magna cum laude), 23/04/2020  
AEC, Institute for Theoretical Physics, University of Bern  
Advisor: M. 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: M.A. Fraser, M. 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: R. Schöfbeck  
Thesis: *Increasing the sensitivity of a search for supersymmetry in the single lepton channel with the Transverse Mass  $M_{T2}$  (CMS)*, (cf. research output [1]).

#### 4. Education

- 07/2017 Ècole de physique des Houches  
Effective Field Theory (EFT) in particle physics and cosmology
- 03/2017 Computer algebra and particle physics (CAPP) school, DESY, Hamburg
- 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: P. de Forcrand  
Thesis: *Inhomogeneous condensation in quark-based QCD effective models via wavelet pseudoparticles*, (cf. research output [3]).
- 07/2014 LAPP Annecy-le-Vieux, France  
Summer School in Particle and Astroparticle physics
- 08/2013 Theoretical Physics Summer school, University of Utrecht, Netherlands
- 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:  *$\pi$ - and  $\rho$ -Meson mass spectroscopy from Lattice QCD*, (cf. research output [2]).
- 09/2002 – 05/2010 Österreichische Reifeprüfung, Matura (with distinction, GPA 1.0/1.0)  
AHS BG/BRG Leibnitz, Austria  
Major: Physics and geometry  
Advisor: H. Scherz

Thesis: *Sonoluminescence – A bubble’s enlightenment*. A theoretical and experimental approach to the effect of Sonoluminescence.

## 5. Event organisation

- 02/2025– Seminar organizer, Cosmology and particle physics seminars, University of Geneva
- 08/2025 Workshop organizer, *Advancing gravitational wave predictions from cosmological first-order phase transitions*, CERN
- 08/2024 Conference organizer, *Strong and Electro-Weak Matter 2024*, Goethe University Frankfurt
- 06/2024 Convener, *2nd Edition of the Workshop ‘Quarkonia meet Dark Matter’ (QMDM)*, Institute for Advanced Study, Technical University of Munich
- 01/2024 Conference organizer, *Mainz-Frankfurt-Münster CosmoCoffee*, Mainz

## 6. Outreach

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

## 7. Research visits

- 06/2023 CERN, Genève
- 12/2022 Kavli IPMU, Tokyo; G. White
- 09/2022 Jožef Stefan Institute, Ljubljana; M. Nemevšek
- 06/2022 SUBATECH, Nantes; J. Ghiglieri
- 10/2021 University of Basel; S. Antusch
- 10/2021 University of Bern, AEC, Institute for Theoretical Physics; M. Laine
- 08/2019 University of Helsinki, Helsinki Institute of Physics; A. Vuorinen, K. Rummukainen
- 08/2018 Universidad del Bío-Bío, Grupo de Cosmología y Partículas Elementales; Y. Schröder

## 8. Professional services

- 03/2022– Referee  
American Physical Society’s journals: Phys. Rev. **D**, Phys. Rev. **L**  
Springer’s journals: JHEP, 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. Funding, awards, fellowships

2025 Best poster prize *CosmoFondue*

2025 CERN theory workshop  
CHF 10k event funding

2024 – 2028 SNSF Ambizione Fellowship, Swiss National Science Foundation (SNSF)  
CHF 810k research grant

2011 – 2014 Scholarship of excellence Graz University of Technology  
EUR 2.4k scholarship

## 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 A2

*Latin* Very good (literal translation)

## 12. Major scientific achievements

### 12.1. Precision thermodynamics for cosmological phase transitions.

Invigorated by the first gravitational wave (GW) detections from binary mergers, I dedicated a large part of my research to improving the precision of thermodynamic predictions for cosmological phase transitions. To this end, I assessed theoretical uncertainties affecting such transitions in [12]. The motivation for this leap in precision was that leading-order (LO) thermodynamic calculations are insufficient, rendering GW predictions ambiguous. Even seemingly minor uncertainties in the early stages of the beyond the Standard Model (BSM)  $\rightarrow$  GW pipeline can drastically alter predictions, potentially compromising successful stochastic gravitational wave background (SGWB) observations at LISA before they begin.

The work in [27] established the current state of the art in precision for GW predictions by completing perturbative computations for cosmological phase transitions. This level of accuracy was achieved by applying techniques of dimensional reduction to derive the three-dimensional SM EFT and by performing a three-loop computation of the effective potential.

### 12.2. Development of automated 3d EFT framework for thermal field theories.

To improve conceptual understanding of such EFT computations, we presented a didactic review [11] of thermal resummation techniques, combining perturbative and non-perturbative methods. Focusing on the dynamical real singlet extension of the Standard Model, I computed novel next-to-leading order (NLO) contributions to the parameters of the dimensionally reduced EFT. These results are intended to support future non-perturbative lattice studies.

We demonstrated that two-loop corrections in both matching and effective potential are substantial [26, 13] and essential for robust determinations of thermodynamic phase transition parameters. We also devised a minimal, gauge-invariant setup [17] that incorporates thermal resummation and supersedes previously used schemes.

In this context, I automated the evaluation and reduction of analytically challenging sum-integrals at non-zero temperature. This led to the development of the `Mathematica` package `DRalgo` [21], which has since been successfully applied not only in QCD but also in deriving the **most accurate predictions of gravitational waves** from cosmological first-order phase transitions in generic BSM theories.

### 12.3. Gauge-invariant framework for nucleation at finite temperature.

Theoretical uncertainties in determining the nucleation rate of bubbles of the stable vacuum at finite temperature remain a major challenge. In particular, radiatively induced transitions have long suffered from gauge-dependent ambiguities in the nucleation rate. I resolved this long-standing problem by employing effective field theory at the nucleation scale for the Abelian Higgs model. This allowed me to demonstrate, for the first time [18, 15], gauge invariance of the LO perturbative contributions in radiatively induced transitions.

#### 12.4. Model-generic determination of the bubble wall velocity during first-order phase transitions.

A major milestone in improving the precision of GW predictions was the development of the public software package `WallGo` [28]. I contributed significantly to the software development. The code solves a coupled system of hydrodynamic equations, classical scalar equations of motion, and Boltzmann equations—including out-of-equilibrium effects—to determine the bubble wall velocity  $v_w$  for generic models. **WallGo is the first public tool capable of computing  $v_w$  with full inclusion of out-of-equilibrium contributions.**

### 13. List of publications

If not specifically indicated otherwise, the following research list is in alphabetical order. In all subsequent research output, I contributed at the level of first or second author, conducted the computations, (co-)led the writing, and developed the main ideas of the project.

#### Journal articles

- [32] A. Bhatnagar, D. Croon, **P. Schicho**, *Interpreting the 95 GeV resonance in the Two Higgs Doublet Model: Implications for the Electroweak Phase Transition*, (2025), [2506.20716].
- [31] M. Kierkla, N. Ramberg, **P. Schicho**, and D. Schmitt, *Theoretical uncertainties for primordial black holes from cosmological phase transitions*, (2025), [2506.15496].
- [30] F. Bernardo, P. Klose, **P. Schicho**, and T. V. I. Tenkanen, *Higher-dimensional operators at finite-temperature affect gravitational-wave predictions*, (2025), [2503.18904].
- [29] M. Kierkla, **P. Schicho**, B. Swiezevska, T. V. I. Tenkanen, and J. van de Vis, *Finite-temperature bubble nucleation with shifting scale hierarchies*, (2025), [2503.13597].
- [28] A. Ekstedt, O. Gould, J. Hirvonen, B. Laurent, L. Niemi, **P. Schicho**, and J. van de Vis, *How fast does the WallGo? A package for computing wall velocities in first-order phase transitions*, JHEP **04**, 101 (2025), [2411.04970].
- [27] A. Ekstedt, **P. Schicho**, and T. V. I. Tenkanen, *Cosmological phase transitions at three loops: The final verdict on perturbation theory*, Phys. Rev. D **110**, 096006 (2024), [2405.18349].
- [26] M. Lewicki, M. Merchand, L. Sagunski, **P. Schicho**, and D. Schmitt, *Impact of theoretical uncertainties on model parameter reconstruction from GW signals sourced by cosmological phase transitions*, Phys. Rev. D **110**, 023538 (2024), [2403.03769].
- [25] J. Ghiglieri, **P. Schicho**, N. Schlusser, and E. Weitz, *The force-force correlator at the hard thermal scale of hot QCD*, JHEP **03**, 111 (2024), [2312.11731].
- [24] C. Lwowski, K. Kaiser, J. Bucur, **P. Schicho**, and T. Kohnen, *Accuracy of using the axial length of the fellow eye for IOL calculation in retinal detachment eyes undergoing silicone oil removal*, Br. J. Ophthalmology (2023) 10.1136/bjo-2023-323581.
- [23] J. Österman, **P. Schicho**, and A. Vuorinen, *Integrating by parts at finite density*, JHEP **08**, 212 (2023), [2304.05427].
- [22] L. Sagunski, **P. Schicho**, and D. Schmitt, *Supercool exit: Gravitational waves from QCD-triggered conformal symmetry breaking*, Phys. Rev. D **107**, 123512 (2023), [2303.02450].
- [21] A. Ekstedt, **P. Schicho**, and T. V. I. Tenkanen, *DRalgo: A package for effective field theory approach for thermal phase transitions*, Comput. Phys. Commun. **288**, 108725 (2023), [2205.08815].

- [20] T. Gorda, A. Kurkela, J. Österman, R. Paatelainen, S. Säppi, **P. Schicho**, K. Seppänen, and A. Vuorinen, *Degenerate fermionic matter at N<sup>3</sup>LO: Quantum electrodynamics*, Phys. Rev. D **107**, L031501 (2023), [2204.11893].
- [19] 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*, Phys. Rev. D **107**, 036012 (2023), [2204.11279].
- [18] J. Löfgren, M. J. Ramsey-Musolf, **P. Schicho**, and T. V. I. Tenkanen, *Nucleation at Finite Temperature: A Gauge-Invariant Perturbative Framework*, Phys. Rev. Lett. **130**, 251801 (2023), [2112.05472].
- [17] **P. Schicho**, T. V. I. Tenkanen, and G. White, *Combining thermal resummation and gauge invariance for electroweak phase transition*, JHEP **11**, 047 (2022), [2203.04284].
- [16] S. Biondini, **P. Schicho**, and T. V. I. Tenkanen, *Strong electroweak phase transition in t-channel simplified dark matter models*, JCAP **10**, 044 (2022), [2207.12207].
- [15] 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].
- [14] 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].
- [13] 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].
- [12] 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].
- [11] **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].
- [10] M. Laine, **P. Schicho**, and Y. Schröder, *A QCD Debye mass in a broad temperature range*, Phys. Rev. D **101**, 023532 (2020), [1911.09123].
- [9] M. Laine, **P. Schicho**, and Y. Schröder, *Soft thermal contributions to 3-loop gauge coupling*, JHEP **2018**, 37 (2018), [1803.08689].

## Conference proceedings

- [8] J. Ghiglieri, G. D. Moore, **P. Schicho**, N. Schlusser, and E. Weitz. *Hard parton dispersion in the quark-gluon plasma, non-perturbatively*. In *11th International Conference on Hard and Electromagnetic Probes of High-Energy Nuclear Collisions* (July 2023). [2307.09297].



- [7] G. Aarts, J. Aichelin, C. Allton, A. Athenodorou, D. Bachtis, C. Bonanno, N. Brambilla, E. Bratkovskaya, M. Bruno, M. Caselle, C. Conti, R. Contino, L. Cosmai, F. Cuteri, L. Del Debbio, M. D’Elia, P. Dimopoulos, F. Di Renzo, T. Galatyuk, J. N. Guenther, R. Houtz, F. Karsch, A. Y. Kotov, M. P. Lombardo, B. Lucini, L. Maio, M. Panero, J. M. Pawłowski, A. Pelissetto, O. Philipsen, A. Rago, C. Ratti, S. M. Ryan, F. Sannino, C. Sasaki, **P. Schicho**, C. Schmidt, S. Sharma, O. Soloveva, M. Sorba, and U.-J. Wiese. *Phase Transitions in Particle Physics – Results and Perspectives from Lattice Quantum Chromo-Dynamics*. In (Jan. 2023). [2301.04382].
- [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. Gagnon, 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**,  *$\pi$ - and  $\rho$ -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 Transverse Mass*, Project thesis (HEPHY Vienna, 2014).

## 14. List of presentations

### 14.1. Invited talks at conferences and workshops

- 04/08/2025 *Perturbative cosmological phase transitions in a broad temperature range*, invited **plenary** talk at *Numerical simulations of early Universe sources of gravitational waves* at NORDITA, Stockholm, Sweden
- 05/03/2025 *Limits and limitations of perturbative approaches to cosmological phase transitions*, invited talk at GW day at CERN, Geneva, Switzerland
- 08/10/2024 *Reliable theoretical predictions for GWs from first-order phase transitions*, invited **plenary** talk at *Fun with the phases of the Universe* at IFPU, Trieste, Italy
- 20/09/2024 *Reliable theoretical predictions for GWs from first-order phase transitions*, invited **plenary** talk at *Fundamental physics and gravitational wave detectors* at Pollica physics center, Italy
- 19/03/2024 *Strong cosmological phase transitions through the EFT lens*, invited **plenary** talk at *Quarkonia meet Dark Matter* at Institute for Advanced Study, Technical University of Munich, Germany
- 05/12/2022 *EFT framework for (precision) cosmological phase transition thermodynamics*, invited **plenary** talk at *What the heck happens when the Universe boils?* at Kavli IPMU, Tokyo, Japan

### 14.2. Contributed talks

- 06/06/2025 *Higher-dimensional operators at finite-temperature affect gravitational-wave predictions*, contributed talk at Swiss Cosmology Days 2025, ETH Zürich, Switzerland
- 05/06/2025 *Higher-dimensional operators at finite-temperature affect gravitational-wave predictions*, contributed talk at HEFT 2025, Geneva, Switzerland
- 21/02/2025 *Completing the perturbative program for cosmological phase transitions*, contributed talk at KEK theory meeting on particle physics phenomenology (KEK-PH2025winter), Tsukuba, Japan
- 04/09/2024 *Finite-temperature effective theories for first-order cosmological phase transitions*, contributed talk at High-Energy Theoretical Particle Physics Mini-Conference, Genève, Switzerland
- 14/09/2023 *Phase transition thermodynamic parameters at high precision*, contributed talk at 26th International Conference on Particle Physics and Cosmology (COSMO'23), Madrid, Spain
- 11/07/2023 *Degenerate fermionic matter at  $N^3LO$* , contributed talk at ELEMENTS Annual Conference, Bad Nauheim, Germany

- 03/07/2023 *Can EFT reveal if there was an electroweak phase transition?*, contributed talk at Cosmology from Home
- 22/06/2023 PRECLISA. *Gravitational waves from cosmological phase transitions: Precision cosmology in the light of LISA*, interview talk for the Ambizione grant of the Swiss National Science Foundation, Bern, Switzerland
- 17/05/2023 *Phase transition thermodynamic parameters at high precision*, contributed talk at How fast does the bubble grow?, DESY, Hamburg, Germany
- 05/05/2023 *Strong electroweak phase transition and simplified dark matter models*, contributed talk at Progress on Old and New Themes in cosmology (PONT) 2023, Avignon, France
- 20/06/2022 *Jet dispersion in hot QCD from the lattice*, contributed talk at SEWM 2022, Paris, France
- 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
- 29/03/2021 *Soft thermal contributions to 3-loop gauge coupling*, contributed parallel talk at FunQCD (online), Barcelona, Spain
- 28/06/2018 *Fun with thermal dimension-six operators*, contributed parallel talk at SEWM 2018, Barcelona, Spain

### 14.3. Seminar talks

- 27/03/2025 *Limits and limitations of perturbative approaches to cosmological phase transitions*, invited seminar talk at Warsaw University, Poland
- 26/02/2025 *Perturbative cosmological phase transitions and their bubble wall velocities*, invited seminar talk at Kavli IPMU, Tokyo, Japan
- 10/06/2024 *Completing the perturbative program for cosmological phase transitions*, invited seminar talk at Bielefeld University, Germany
- 23/11/2023 *Impact of computational diligence on GW signals from phase transitions*, invited seminar talk at Warsaw University, Poland
- 12/10/2023 *Impact of computational diligence on GW signals from phase transitions*, invited seminar talk at University of Basel, Basel, Switzerland
- 19/09/2023 *Impact of computational diligence on GW signals from phase transitions*, invited seminar talk at Helsinki Institute of Physics, Helsinki, Finland
- 15/06/2023 *Electroweak phase diagram at finite lepton number density*, contributed talk at Thermal Field Theory meets Phenomenology, Uppsala, Sweden

- 30/05/2023 *High-temperature effective field theories: Precision phase transition thermodynamics*, seminar talk at HEP seminar, Université de Genève, Switzerland
- 10/05/2023 *Integrating by parts at finite density*, informal talk at the DMGW meeting, Goethe University, Frankfurt, Germany
- 25/01/2023 *Degenerate fermionic matter at  $N^3LO$* , invited seminar talk at Gravitation and Cosmology seminar, Utrecht University, Netherlands
- 24/01/2023 *What can EFT tell us about the electroweak phase transition?*, seminar talk at CRC-TR211 meeting and Colloquium, Bielefeld University, Germany
- 08/11/2022 *EFT framework for cosmological phase transition thermodynamics*, seminar talk at the AstroCoffee, Goethe University, Frankfurt, Germany
- 13/10/2022 *Degenerate fermionic matter at  $N^3LO$* , invited seminar talk (online) at S@INT seminar, INT, Seattle, USA
- 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
- 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
- 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
- 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

## 15. Teaching activities

### 15.1. Lectures

02/2025	<i>Bubble wall velocities in cosmological phase transitions</i> Yonsei-Konkuk-Sogang mini-workshop on first-order phase transitions	1wk×5hr
10/2023 – 02/2024	Institute for Theoretical Physics, Goethe University Frankfurt <i>Theoretische Physik 1: Mathematische Ergänzungen</i>	15wk×2hr
03/2022	<i>Phase transitions in the early universe</i> (exercises) Galileo Galilei Institute for Theoretical Physics Theoretical Aspects of Astroparticle Physics, Cosmology and Gravitation	1wk×5hr

### 15.2. Exercises

2022	Institute for Theoretical Physics, Goethe University Frankfurt <i>Astrophysics II</i>	
2017 – 2020	AEC, Institute for Theoretical Physics, University of Bern 8832-FS2017-0 <i>Standard Model</i> 416542-HS2017-0 <i>Quantum mechanics I</i> 628-FS2018-0 <i>Quantum mechanics II</i> 7638-HS2018-0 <i>Exercises in theoretical physics</i> 430949-FS2019-0 <i>Specialist course: Introduction to BSM physics</i> 630-HS2019-0 <i>Statistical thermodynamics II</i>	
2015 – 2016	ETH Zürich, D-MATH/D-PHYS 401-1652-10L <i>Numerical analysis I</i> 401-0654-00L <i>Numerical methods</i> 402-0063-00L <i>Physics II</i>	
2013 – 2014	Graz University of Technology, ITP/IEP <i>Theoretical mechanics, physics laboratory I/II</i>	

### 15.3. Supervision

#### 15.3.1. PhD students as primary supervisor

2024 – F. Bernardo (U. Geneva)

#### 15.3.2. PhD theses mentor

2022 – 2024	R. Diedrichs, (U. Frankfurt) supervised by L. Sagunski
2022 – 2024	D. Schmitt, (U. Frankfurt) supervised by L. Sagunski
2020 – 2024	J. Österman, (U. Helsinki) supervised by A. Vuorinen



### 15.3.3. Master students as primary or joint primary supervisor

2025 – R. G. Reinle, (ETH Zürich)

2025 – S. Kämpf, (U. Geneva)

06/2021 – 03/2022 S. Vihko, (U. Helsinki) co-supervised with A. Vuorinen

Thesis: *EFT methods and calculational techniques in imaginary time formalism of thermal QCD.*

### 15.3.4. Bachelor students as primary or joint primary supervisor

10/2022 – 09/2023 R. Baumann, (U. Frankfurt) co-supervised with L. Sagunski, D. Schmitt

Thesis: *Gravitational waves in the Abelian Higgs model*

### 15.3.5. Project theses

05/2024 – 06/2025 B. Adadi, (ETH Zürich)

