

## Prof. Dr. Frank Simon

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## CAREER

- 10/2022–present Full Professor and Director of the Institute for Data Processing and Electronics, Karlsruhe Institute of Technology, Karlsruhe, Germany.  
Pursuing a broad technology-oriented research portfolio in particle and astroparticle physics, quantum technology, energy research and information, funded by the Helmholtz Association supplemented with significant third-party funds. Approximately 45 permanent staff members, and a total of more than 130 institute members, composed of scientists, engineers, technical and administrative personnel, students, apprentices and interns.
- 10/2007–09/2022 Research Group Leader at Max-Planck-Institute for Physics, Munich, Germany.  
Competitive tenure track, granted tenure as senior staff scientist and group leader in 2011.  
Physics studies and detector development for  $e^+e^-$  Higgs Factories. Precision measurements in flavour physics, detector construction and operation, beam background monitoring and protection with the Belle and Belle II experiments.
- 05/2005 – 09/2007 Postdoctoral Associate and Senior Postdoctoral Associate at the Massachusetts Institute of Technology, Laboratory for Nuclear Science, Cambridge, MA, USA.
- 2002 – 2005 Graduate Research Assistant at Max-Planck-Institute for Physics, Munich, Germany.
- 2000 – 2001 Research stay at CERN, Geneva, Switzerland.

## EDUCATION

- 02/2005 Doctorate (Dr. rer. nat.) from TU München, Germany.
- 11/2001 Diplom in Physics from TU München, Germany.
- 10/1998 Vordiplom in Physics from TU Darmstadt, Germany.
- 1996 – 1997 Mandatory basic military service in the German army.
- 07/1996 Abitur from Edith-Stein-Schule Darmstadt, Germany.

## RESEARCH PROFILE

Particle physics, technology development and instrumentation.

## SCIENTIFIC MANAGEMENT & COORDINATION (SELECTION)

- 2024 – 2027 Coordinator of the BMBF-funded collaborative research project High-D-Calo, developing calorimeters for future experiments.
- since 2023 Co-chair of the DRD7 proto-collaboration, an R&D collaboration on electronics and on-detector processing, forming in response to the 2021 ECFA Detector R&D Roadmap.
- since 2021 Member of the International Advisory Committee of the ECFA Study Group on Physics, Experiment and Detector for a future Higgs Factory.
- since 2021 Co-convener of the FCC Physics Program working group.
- since 2020 Chair of the Institute Board of the CALICE Collaboration.
- since 2020 Regional Shift Manager of the Belle II Collaboration.
- since 2016 Member of the Executive Team of the CLIC Detector & Physics (CLICdp) Collaboration.
- since 2016 Member of the Detector Board of the Helmholtz Alliance “Physics at the Terascale”.
- 2015 – 2019 Spokesperson of the CALICE Collaboration.
- 2014 – 2021 Member of the Linear Collider Collaboration Physics & Detectors executive board.
- 2014 – 2020 Coordinator of the calorimetry workpackage in the EU Horizon 2020 project AIDA-2020.
- 2013 – 2015 First chair of the Institute Board of the CLIC Detector & Physics Study.

## COMMISSIONS OF TRUST (SELECTION)

- since 2019 Chair of the CERN LHC Experiments Committee (LHCC). Member of the CERN Scientific Policy Committee and of the CERN Research Board.
- since 2024 Associate Editor of European Physics Journal C.
- since 2023 Ombudsperson for good scientific practice at KIT.
- since 2022 Elected member of the KIT Senate.
- since 2022 Member of the International Advisory Board of the FZU – Institute of Physics of the Czech Academy of Sciences.
- 2021 – 2027 Member of “BMBF Gutachterausschuss Teilchen” (Review panel for particle and nuclear physics grants of BMBF, Germany) for two funding periods (2021-24, 2024-27).
- since 2021 Elected member of the German Committee for Elementary Particle Physics (KET).
- since 2020 Member of the Particle Data Group.
- 2020, 2022 Remote expert referee for the European Research Council.
- 2017 – 2019 Chair of the CERN LHC Resources Scrutiny Group. Reviewing operations budgets and phase 2 upgrade plans of LHC experiments. Ex-officio member of CERN Resources Review Board and core member of the CERN LHC Experiments Committee Upgrade Cost Group.
- 2017-2023 Member of Advisory Board of the CERN research activities of the Czech Republic.
- since 2013 Moderator of arXiv.org.
- since 2012 Member of review panels for BMBF, Germany; Fermilab and DOE, USA; IN2P3 and CNRS, France; STFC, UK; MOST, China.
- since 2007 Regular reviewer for several journals, including the European Physics Journal C, Physics Letters B and Nuclear Instruments and Methods A.

## ORGANISATION OF SCIENTIFIC EVENTS (SELECTION)

- 2024 Organizing Committee, German Future Collider @ CERN Strategy Workshop 2024, Bonn, Germany.
- 2024 International Program Committee, Linear Collider Workshop 2024, Tokyo, Japan.
- 2024 Program Committee, FCC Physics Workshop 2024, Annecy, France.
- 2023 Organizing and International Scientific Committee, Future Accelerator Workshop 2023, Corfu, Greece.
- 2023 Program Committee, 2023 DPG Spring Meeting on Particle Physics, Dresden, Germany.
- 2019 Program Committee, Calorimetry for the High Energy Frontier (CHEF) 2019, Fukuoka, Japan.
- 2019 Program Committee and Local Organizer, DUNE Multi-Purpose Detector Workshop 2019, DESY, Germany.
- 2019 Program Committee, Linear Collider Workshop 2019, Sendai, Japan.
- 2018 Main organizer of the Terascale Detector Workshop 2018, Munich, Germany.
- 2017 Program Committee, Calorimetry for the High Energy Frontier (CHEF) 2017, Lyon, France.
- 2016 Topic Convener “Calorimetry”, IEEE Nuclear Science Symposium, Strasbourg, France.
- 2016 Co-organizer of the KET Workshop on Future  $e^+e^-$  Colliders, Munich, Germany.
- 2015 Main organizer of the CALICE Collaboration Meeting, Munich, Germany.
- since 2014 Advisory Board & co-organizer of up to now five Top at Lepton Colliders conferences.
- 2014 Topic Convener “High Energy Physics”, IEEE Nuclear Science Symposium, Seattle, WA, USA.
- 2014 Physics Advisory Committee and Track Convener “New concepts and techniques for accelerators and particle detectors”, PANIC 2014, Hamburg, Germany.

## TEACHING (SELECTION)

- since 2022 Lecture “Electronics for Physicists” for master students at KIT.
- 2018–2022 Lectures for 3<sup>rd</sup> and 4<sup>th</sup> year physics master students at TU München, “Particle Physics at Colliders and in the High Energy Universe” and “Particle Physics with Accelerators and Natural Sources”.

- 2008–2018 Lectures for 3<sup>rd</sup> and 4<sup>th</sup> year physics master students at TU München, "Particle Physics with high-energy Colliders (Higgs & Co)" and "Particle Physics with cosmic and ground-based Accelerators".
- 10/2016 "Highlight Lecture" on Physics for new incoming Bachelor students at TU München, invited by the TUM mathematics, physics and informatics student council.
- since 2008 Lectures at different international particle physics schools and summer student programs on topics of experimental physics and HEP instrumentation.

## STUDENT SUPERVISION

Supervisor of PhD, MSc and BSc students in physics and electrical engineering at KIT. Supervised a total of 14 PhD theses, 15 MSc / Diploma theses and 4 BSc theses at the Max-Planck-Institute for Physics, with students graduating at the Technical University Munich (TUM) and at the University of Munich (LMU). External reviewer for PhD theses at the University of Lyon and the University of Utrecht.

## SELECTED PUBLICATIONS

A full list of publications also including conference papers, design reports and other non-peer-reviewed publications is available at <https://inspirehep.net/author/profile/F.Simon.1>.

### Review Articles

- F. Sefkow and F. Simon, "Calorimeters - Introduction" and "Calorimeters - Hadronic Calorimeters", in R. L. Workman *et al.* [Particle Data Group], "Review of Particle Physics," PTEP **2022**, 083C01 (2022).
- F. Simon, "Silicon Photomultipliers in Particle and Nuclear Physics," Nucl. Instrum. Meth. A **926**, 85 (2019).
- G. Moortgat-Pick *et al.*, "Physics at the e+ e- Linear Collider," Eur. Phys. J. C **75**, 371 (2015).
- N. Brambilla *et al.*, "Heavy quarkonium: progress, puzzles, and opportunities," Eur. Phys. J. C **71**, 1534 (2011).

### Higgs Factory Physics

- A. Abada *et al.* [FCC Collaboration], "FCC Physics Opportunities: Future Circular Collider Conceptual Design Report Volume 1," Eur. Phys. J. C **79**, 474 (2019).
- H. Abramowicz *et al.*, [CLICdp Collaboration], "Top-Quark Physics at the CLIC Electron-Positron Linear Collider," JHEP **11**, 003 (2019).
- H. Abramowicz *et al.*, [CLICdp Collaboration], "Higgs Physics at the CLIC Electron-Positron Linear Collider," Eur. Phys. J. C **77**, 475 (2017).
- K. Seidel, F. Simon, M. Tesar and S. Poss, "Top quark mass measurements at and above threshold at CLIC," Eur. Phys. J. C **73**, 2530 (2013).

### CALICE and Highly Granular Calorimeters

- A. White *et al.* [CALICE Collaboration], "Design, construction and commissioning of a technological prototype of a highly granular SiPM-on-tile scintillator-steel hadronic calorimeter," JINST **18**, P11018 (2023).
- C. Adloff *et al.* [CALICE Collaboration], "The Time Structure of Hadronic Showers in highly granular Calorimeters with Tungsten and Steel Absorbers," JINST **9**, P07022 (2014).
- C. Adloff *et al.* [CALICE Collaboration], "Hadronic energy resolution of a highly granular scintillator-steel hadron calorimeter using software compensation techniques," JINST **7**, P09017 (2012).
- F. Simon, C. Soldner, "Uniformity Studies of Scintillator Tiles directly coupled to SiPMs for Imaging Calorimetry," Nucl. Instrum. Meth. **A620**, 196-201 (2010).

### Belle II and related methods

- T. M. G. Kraetzschmar, F. M. Krinner, M. Pfaff, N. K. Rad, A. Rostomyan, L. Schlechter and F. Simon, "Generalised Known Kinematics (GKK): an approach for kinematic observables in pair production events with decays involving invisible particles," JHEP **07**, 101 (2023).
- I. Adachi *et al.* [Belle-II Collaboration], "Search for Lepton-Flavor-Violating  $\tau$  Decays to a Lepton and an Invisible Boson at Belle II," Phys. Rev. Lett. **130**, no.18, 181803 (2023).
- P. M. Lewis *et al.*, "First Measurements of Beam Backgrounds at SuperKEKB," Nucl. Instrum. Meth. A **914**, 69 (2019).

*Reconstruction Techniques and Methods*

- C. Graf and F. Simon, “Time-assisted energy reconstruction in a highly-granular hadronic calorimeter,” JINST **17**, P08027 (2022).
- P. Azzi, L. Gouskos, M. Selvaggi and F. Simon, “Higgs and top physics reconstruction challenges and opportunities at FCC-ee,” Eur. Phys. J. Plus **137**, 39 (2022).
- H. L. Tran, K. Krüger, F. Sefkow, S. Green, J. Marshall, M. Thomson and F. Simon, “Software compensation in Particle Flow reconstruction,” Eur. Phys. J. C **77**, 698 (2017).

*DUNE*

- A. Abed Abud *et al.* [DUNE Collaboration], “Deep Underground Neutrino Experiment (DUNE) Near Detector Conceptual Design Report,” Instruments **5**, 31 (2021).
- L. Emberger and F. Simon, “A highly granular calorimeter concept for long baseline near detectors,” J. Phys. Conf. Ser. **1162**, 012033 (2019) [arXiv:1810.03677 [physics.ins-det]].

*Smaller Projects*

- A. Caldwell *et al.* [MADMAX Working Group], “Dielectric Haloscopes: A New Way to Detect Axion Dark Matter,” Phys. Rev. Lett. **118**, 091801 (2017).
- A. Caldwell, K. Lotov, A. Pukhov, F. Simon, “Proton-driven plasma-wakefield acceleration”, Nature Physics **5**, 363 (2009).

*STAR*

- B. I. Abelev *et al.* [STAR Collaboration], “Longitudinal double-spin asymmetry and cross section for inclusive neutral pion production at midrapidity in polarized proton collisions at  $\sqrt{s} = 200$  GeV,” Phys. Rev. D **80**, 111108(R) (2009).
- F. Simon *et al.*, “Development of Tracking Detectors with industrially produced GEM Foils,” IEEE Trans. Nucl. Sci. **54**, 2646 (2007).
- J. Adams *et al.* [STAR Collaboration], “Evidence from d + Au measurements for final-state suppression of high  $p_T$  hadrons in Au + Au collisions at RHIC”, Phys. Rev. Lett. **91**, 072304 (2003).

*COMPASS*

- M. C. Altunbas *et al.*, “Construction, test and commissioning of the triple-GEM tracking detector for COMPASS”, Nucl. Instrum. Meth. A **490**, 177 (2002).

*Book Chapters*

- F. Sefkow and F. Simon, “Calorimeters”. In: Fleck, I., Titov, M., Grupen, C., Buvat, I. (eds) “Handbook of Particle Detection and Imaging”, Springer (2021), [https://doi.org/10.1007/978-3-319-93785-4\\_53](https://doi.org/10.1007/978-3-319-93785-4_53).