Curriculum Vitae – Prof. Dr. rer. nat. Sebastian Kempf

Name and title:	Prof. Dr. rer. nat. Sebastian Kempf
Date of birth:	09.06.1983
Nationality:	German
Office address:	Karlsruhe Institute of Technology (KIT) Institute of Micro- and Nanoelectronic Systems (IMS) Hertzstraße 16 Building 06.41 76187 Karlsruhe Germany E-Mail: sebastian.kempf@kit.edu
URL:	https://www.ims.kit.edu/english/14_1857.php
ORCID:	0000–0002–3303–128X
Google Scholar:	https://scholar.google.de/citations?user=eVzoVhYAAAAJ&hl=de
Researcher ID:	P–7612–2016
Total publications:	99
Total citations:	3387
h-index:	25 (according to Google Scholar on 2026-07-01)
Current position(s):	Chair (W3-professorship) of Micro- and Nanoelectronic Systems, Faculty for Electrical Engineering and Information Technology (ETIT), Division III – Mechanical and Electrical Engineering, Karlsruhe Institute of Technology (KIT), Germany. Co-opted Faculty Member of the Faculty for Physics, Division V – Physics and Mathematics, Karlsruhe Institute of Technology (KIT), Germany. Head of Institute of Micro- and Nanoelectronic Systems (IMS), KIT, Germany. Head of Research group “High-resolution Superconducting Sensors”, Institute for Data Processing and Electronics (IPE), KIT, Germany. Scientific Director of the Competence Center for High-resolution Superconducting Sensors (HSS), KIT, Germany
Research interest(s):	Development, fabrication, characterization, and application of superconducting quantum sensors Development, fabrication, characterization, and application of superconducting electronics, in particular superconducting quantum interference devices (SQUIDs), SQUID based multiplexing techniques, and SQUID readout electronics Fabrication of superconducting (quantum) devices, quantum electronic circuits as well as superconductor-based quantum detectors Investigation of fundamental properties of superconducting quantum devices

Qualifications and Career:

since 03/2022	Head of research group “High resolution superconducting sensors (HSS)”, IPE, KIT, Germany
since 10/2020	Chair (W3-professorship) of “Micro- and Nanoelectronic Systems”, Faculty ETIT, Division III, KIT, Germany
02/2018 – 09/2020	Senior scientist (tenured position). Head of research group “Superconducting Electronics” as well as service department “Sample Preparation”, Kirchhoff-Institute for Physics (KIP), Heidelberg University (UHEI), Germany
07/2017	Habilitation in Physics (Venia Legendi), Faculty of Physics and Astronomy, UHEI, Germany
01/2014 – 09/2020	Head of research group “Superconducting Electronics“, KIP, UHEI, Germany
08/2013 – 12/2013	Postdoctoral fellow in the research group “Quantum Sensors“ headed by Prof. Dr. Christian Enss, KIP, UHEI, Germany
02/2013 – 08/2013	Guest scientist, Physikalisch-Technischen Bundesanstalt (PTB) Berlin, Research group „Kryosensensorik“; Position at KIP, UHEI, Germany
08/2012 – 02/2013	Postdoctoral fellow in the research group “Quantum Sensors“ headed by Prof. Dr. Christian Enss, KIP, UHEI, Germany
07/2012	PhD (Doctor rerum naturalium) in Physics – summa cum laude
08/2007	Diploma in Physics – Grade: excellent
09/2002 – 07/2012	Physics studies at Heidelberg University, Germany

Engagement in the research system, Institutional responsibilities:

since 05/2026	Spokesperson of Sub-topic DTS-ST2 *Quantum Technologies*, Topic *Detector Technology and Systems* (MT-DTS), Program *Matter and Technologies* (MT), Research Field *Helmholtz Matter*
since 10/2023	Member of the Council for Research and Promotion of Young Scientists (CRYS), KIT, Germany
since 03/2023	Deputy spokesperson of the Karlsruhe School of Elementary Particle and Astroparticle Physics: Science and Technology (KSETA), KIT, Germany
since 01/2023	Scientific director (elected) of the Competence Centre for for High-Resolution Superconducting Sensors, KIT, Germany
since 2023	Associated member of the KATRIN Collaboration
since 2022	Member of the DELight Collaboration
since 2022	Co-opted Faculty Member, Department of Physics, KIT, Germany.
since 2022	Member (Guest) of the Helmholtz program committee “Matter and Technology (MT)”, KIT, Germany

since 12/2020	Principal Investigator as well as member (elected) of the Executive Board and Admission Panel of the "Karlsruhe School of Elementary Particle and Astroparticle Physics: Science and Technology (KSETA)", KIT, Germany
since 12/2020	Member of the Steering Committee of the KIT Center "Elementary Particle and Astroparticle Physics (KCETA)", KIT, Germany
since 12/2020	Member of the Academic Committee of "Helmholtz International Research School for Astroparticle Physics and Enabling Technologies (HIRSAP)", KIT, Germany
since 11/2020	Member (elected) of Council of Division III – Mechanical and Electrical Engineering, KIT, Germany
since 10/2020	Member of the Steering Committee of the Karlsruhe Centre for Optics and Photonics (KCOP), KIT, Germany
since 10/2020	Member of Faculty Council of the Department for Electrical Engineering and Information Technology, KIT, Germany
10/2020 – 06/2025	Board-Member of the "Electron Capture in ^{163}Ho (ECHo)"-Collaboration
06/2021 – 06/2024	Member of the management board of the EURAMET project 20FUN04 "PrimA-LTD – Towards new primary activity standardization methods based on low-temperature detectors" within the framework of the "European Metrology Programme for Innovation and Research (EMPIR)"
06/2018 – 12/2021	Member of the management board of the EURAMET project 17FUN02 "MetroMMC – Measurement of fundamental nuclear decay data using metallic magnetic calorimeters" within the framework of the "European Metrology Programme for Innovation and Research (EMPIR)"
06/2016 – 06/2019	Member of the management board of the EURAMET project 15SIB10 "MetroBeta – Radionuclide beta spectra metrology" within the framework of the "European Metrology Programme for Innovation and Research (EMPIR)"
06/2011 – 06/2025	Member of the "Electron Capture in ^{163}Ho (ECHo)"-Collaboration

Fellowships and awards

2025	Innovation Partnership Award 2025, Heidelberg Instruments Mikrotechnik GmbH
2015	Certificate of honour for outstanding teaching, Department of Physics and Astronomy, Heidelberg University, Germany.
2013	Ruprecht-Karls-Prize, Heidelberg University, Germany.

Organisation of workshops, conferences, and meetings:

2027	Designated Co-Chair of the "18th European Conference on Applied Superconductivity (EUCAS 2027)", Heidelberg, Germany
2026	Chair of the "Fourth International Workshop on Physics and Applications of Metallic Magnetic Calorimeters", Karlsruhe, Germany

2024	Chair of the workshop “Cryoelectronic devices – KRYO 2024”, Karlsruhe, Germany
2023	Chair of the “Second International Workshop on Physics and Applications of Metallic Magnetic Calorimeters”, Karlsruhe, Germany
since 2022	Member of the International Advisory Committee of the biannual “International Workshop on Low Temperature Detectors (LTD)”
since 2019	Member of the Scientific Advisory Committee of the annual “Workshop on Cryoelectronic Devices (KRYO)”
2019	Co-chair of the “First International Workshop on Physics and Applications of Metallic Magnetic Calorimeters”, Heidelberg, Germany
2018	Principal member (main organizer) of the local organization committee of the workshop “Cryoelectronic devices – KRYO 2018”, Schöntal, Germany
2017	Member of the local organization committee of the international conference “International Conference on Ultra Low Temperature Physics – ULT2017”, Kirchhoff-Institute for Physics, Heidelberg, Germany, 2017
2011	Member of the local organization committee of the international conference “14th International Workshop on Low Temperature Detectors – LTD14”, Kirchhoff-Institute for Physics, Heidelberg, Germany, 2011

Reviewing activities:

since 2023	Reviewer for the European Research Council (ERC)
since 2022	Reviewer for the Agence Nationale de la Recherche (ANR), France
since 2022	Reviewer for the German Research Foundation (DFG), Germany
since 2012	Reviewer for several peer-reviewed scientific journals including Journal of Low Temperature Physics, Applied Physics Letters, IEEE Transactions on Applied Superconductivity, IEEE Transactions on Microwave Theory and Techniques, Superconductor Science and Technology, Journal of Astronomical Telescopes, Instruments and Systems

Memberships of scientific societies:

since 2007	Member of the German Physical Society (DPG), Germany

Ten selected publications:

[1] **Mutual Inductance Sensing SQUID: Cryogenic microcalorimeter based on mutual inductance readout of superconducting temperature sensors**
J. Zeuner, C. Schuster, S. Kempf
Appl. Phys. Lett. **128** (2026) 212603, DOI: 10.1063/5.0326766

[2] **Advanced microwave SQUID multiplexer model incorporating readout power effects and Josephson junction inhomogeneities**
M. Neidig, M. Wegner, and S. Kempf
Supercond. Sci. Technol. **39** (2026) 045003, DOI: 10.1088/1361-6668/ae54d9

[3] **Improved limit on the effective electron neutrino mass with the ECHo-1k experiment**
F. Adam, F. Ahrens, L. Ardila Perez, M. Balzer, A. Barth, D. Behrend-Uriarte, …, S. Kempf, …, T. Wickenhäuser
Phys. Rev. Lett **136** (2026) 121801, DOI: 10.1103/lqkb-hylx

[4] **Magnetic microcalorimeter with paramagnetic temperature sensors and integrated dc-SQUID readout (Editor's Pick)**
M. Krantz, F. Toschi, B. Maier, G. Heine, C. Enss, S. Kempf
Appl. Phys. Lett. **124** (2024) 032601, DOI: 10.1063/5.0180903

[5] **SQUID-based superconducting microcalorimeter with in-situ tunable gain**
C. Schuster, S. Kempf
Appl. Phys. Lett. **123** (2023) 252603, DOI: 10.1063/5.0179862

[6] **Analytical model of the readout power and SQUID hysteresis parameter dependence of the resonator characteristics of microwave SQUID multiplexers**
M. Wegner, C. Enss, and S. Kempf
Supercond. Sci. Technol. **35** (2022) 075011, DOI: 10.1088/1361-6668/ac6d15

[7] **Flux ramp modulation based hybrid microwave SQUID multiplexer**
C. Schuster, M. Wegner, C. Enss, and S. Kempf
Appl. Phys. Lett. **120** (2022) 162601, 10.1063/5.0087994

[8] **Flux ramp modulation based MHz frequency division dc-SQUID multiplexer**
D. Richter, L. Hoibl, T. Wolber, N. Karcher, A. Fleischmann, C. Enss, M. Weber, O. Sander, and S. Kempf
Appl. Phys. Lett. **118** (2021) 122601, DOI: 10.1063/5.0044444

[9] **Physics and Applications of Metallic Magnetic Calorimeters**
S. Kempf, A. Fleischmann, L. Gastaldo, and C. Enss
J. Low Temp. Phys. **193** (2018) 365-379, DOI: 10.1007/s10909-018-1891-6

[10] **Demonstration of a scalable frequency-domain readout of metallic magnetic calorimeters by means of a microwave SQUID multiplexer**
S. Kempf, M. Wegner, A. Fleischmann, L. Gastaldo, F. Herrmann, M. Papst, D. Richter, and C. Enss
AIP Advances **7** (2017) 015007, DOI: 10.1063/1.4973872