

# CURRICULUM VITAE

Julia Gehrlein

## PERSONAL DATA

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Upton, NY  
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## ACADEMIC POSITIONS

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Since Sep 2019 Research Associate at the High Energy Theory group at BNL  
Sep 2016-Aug 2019 PhD student at the IFT, UAM-CSIC, Madrid, Spain  
Junior Early Stage Researcher at the ITN Marie Curie *Elusives*  
Nov 2015-Aug 2016 Master Student in Physics at the Institute for Theoretical Particle  
Physics, KIT, Karlsruhe, Germany  
Jun 2014-Jul 2015 Research student at the Institute for Theoretical Particle Physics,  
KIT, Karlsruhe, Germany  
Apr 2014-Jun 2014 Bachelor student in Physics at the Institute for Theoretical Par-  
ticle Physics, KIT, Karlsruhe, Germany

## EDUCATION

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June 2019 PhD in Physics  
Aug 2016 Master of Science in Physics  
Oct 2014-Aug 2016 Master Student in Physics at the KIT, Karlsruhe, Germany  
Sept 2014 Bachelor of Science in Physics  
Oct 2011-Sept 2014 Studies of Physics at the KIT, Karlsruhe, Germany  
Mar 2011 High school degree (“Abitur”)

## DOCTORAL THESIS

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Institution Física Teórica UAM-CSIC, Madrid, Spain  
Title Neutrino windows to new physics  
Supervisor Dr. Enrique Fernández-Martínez, Dr. Mattias Blennow  
Date June 2019

## MASTER THESIS

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Institution Karlsruhe Institute of Technology (KIT), Karlsruhe, Germany  
Title On the predictivity of leptonic sum rules  
Supervisor Dr. Martin Spinrath  
Date August 2016

## BACHELOR THESIS

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Institution Karlsruhe Institute of Technology (KIT), Karlsruhe, Germany  
Title An  $SU(5) \times A_5$  Flavour Model – Phenomenology (in German)  
Supervisors Dr. Martin Spinrath  
Date June 2014

## SCHOLARSHIPS

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2016	Junior Early Stage Researcher fellowship with the Marie Curie ITN <i>Elusives</i> (100.000 € over 3 years)
2015	DESY Summer Student fellowship of 2100 €

## TRAVEL AWARDS

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2019	Travel award of 1100 \$ to spend three weeks at Fermilab, USA
2018	Travel award of 600 € to attend Moriond Electroweak, La Thuile, Italy
2017	Travel award of 2000 € to spend one week at KTH Stockholm, Sweden
2016	Travel award of 250 € to attend the DPG Spring Meeting, Hamburg, Germany
2015	Travel award of 250 € to attend the DPG Spring Meeting, Wuppertal, Germany

## RESEARCH STAYS

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Aug 2019	Research stay at Fermilab, USA Host: Stephen Parke
Feb 2019	Invited research stay at LPTHE Paris, France Host: Kalliopi Petraki
Feb-May 2018	Research stay at University Heidelberg, Germany Host: Jörg Jäckel
Jun-Sept 2017	Internship at GMV, Madrid, Spain Host: Ana Maria Curiel
Mar-May 2017	Research stay at Fermilab, USA Host: Stephen Parke
Jan 2017	Research stay at the KTH, Stockholm, Sweden Host: Mattias Blennow
Jul-Sep 2015	DESY Summer Student Programme, at DESY, Hamburg, Germany Supervisors: Georg Weiglein, Emanuele Bagnaschi

## COMPUTING SKILLS

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Mathematica, L<sup>A</sup>T<sub>E</sub>X, C/ C++, Python, Feynrules, Madgraph, Madanalysis, nuSQuIDS, MultiNest, Armadillo

## TEACHING EXPERIENCE AS TEACHING ASSISTANT

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Summer Term 2015	Theoretical Mechanics I
Winter Term 2015/2016	Theoretical Quantum Mechanics II

## ATTENDED WORKSHOPS AND SCHOOLS

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Nov 2020	Magnificent CE $\nu$ NS Workshop (virtual due to Covid-19)
July 2020	ICHEP (virtual due to Covid-19)
June 2020	Neutrino 2020 (virtual due to Covid-19)
May 2020	Phenomenology 2020 symposium (virtual due to Covid-19)
Nov 2019	Magnificent CE $\nu$ NS Workshop in Chapel Hill, USA
Sep 2019	BNL Forum at Brookhaven National Laboratory, USA
June 2019	Invisibles19 Workshop in Valencia, Spain
June 2019	Invisibles19 School in Canfranc, Spain
Nov 2018	Software Carpentry Workshop, IFT Madrid, Spain
Sep 2018	Invisibles18 Workshop in Karlsruhe, Germany
Aug 2018	Invisibles18 School in Burghausen, Germany
May 2018	Planck 2018 in Bonn, Germany
Mar 2018	Moriond 2018-Electroweak in La Thuile , Italy
June 2017	Invisibles17 Workshop in Zurich, Switzerland
June 2017	Invisibles17 School in Murten, Switzerland
Sep 2016	Invisibles16 Workshop in Padova, Italy
Sep 2016	Invisibles16 School in Trieste, Italy
Feb 2016	DPG Spring Meeting, Hamburg, Germany
Mar 2015	DPG Spring Meeting, Wuppertal, Germany

## FURTHER ACTIVITIES

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2020	Member of the organisation committee for NuTau 2021
Since Aug 2020	Snowmass2021 early career liaison for the neutrino theory and neutrino BSM groups
Since Aug 2020	Member of the high energy physics seminar committee at BNL
Since 2020	Organizer of the neutrino journal club at BNL
2018	Member of the Junior organisation committee for BLV 2019 in Madrid
Since 2018	Reviewer for EPJC, PRD, JCAP, JHEP
Sep 2017-Aug 2019	In charge of the <a href="#">Pheno-Coffee</a> (journal club) at the IFT
Sep 2017-Aug 2019	Filming of various videos for the outreach project <i>IFT responde</i> <a href="#">What is particle decay?</a> , <a href="#">Matter-Antimatter annihilation</a> , <a href="#">Why does light take so long to exit the Sun whereas neutrinos can escape easily?</a> , <a href="#">Why is the weak force weak?</a>
Sep 2016-Aug 2019	Author of various articles for the outreach section of the <i>Elusives</i> homepage <a href="#">Baryogenesis and Dark Matter from B-mesons</a> , <a href="#">DAMPE: a spectral break and a new excess in the TeV spectrum of cosmic-ray electrons and positrons</a> , <a href="#">The Radial Acceleration Relation in Rotationally Supported Galaxies</a>
Sep 2016-Aug 2019	In charge of the <i>Invisibles+</i> and <i>Elusives</i> Webinar at the IFT

## MEMBERSHIPS

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Member	German Physical Society, Brookhaven Women in Science, Graduate Women in Science
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# LIST OF PUBLICATIONS

Julia Gehrlein

PEER-REVIEWED ARTICLES

CITATIONS ON INSPIRE (APRIL 2021): 581

- [A18] *Long-lived bino at the LHC*  
Julia Gehrlein and Seyda Ipek,  
16 pp. Accepted for publication in JHEP, arXiv: 2103.01251 [hep-ph].
- [A17] *Leptonic Sum Rules from Flavour Models with Modular Symmetries*  
Julia Gehrlein and Martin Spinrath,  
27 pp. Published in JHEP **03** (2021), 177, arXiv: 2012.04131 [hep-ph].
- [A16] *A Statistical Analysis of the COHERENT Data and Applications to New Physics*  
Peter B. Denton and Julia Gehrlein,  
26 pp. Accepted for publication in JHEP, arXiv: 2008.06062 [hep-ph].
- [A15] *CP-Violating Neutrino Non-Standard Interactions in Long-Baseline-Accelerator Data*  
Peter B. Denton, Julia Gehrlein and Rebekah Pestes,  
9 pp. Published in Phys. Rev. Lett. **126** (2021) no.5, 051801, arXiv: 2008.01110 [hep-ph].
- [A14] *An Attractive Scenario for Light Dark Matter Direct Detection*  
Hooman Davoudiasl, Peter B. Denton and Julia Gehrlein,  
6 pp. Published in Phys. Rev. D **102** (2020) no.9, 091701, arXiv: 2007.04989 [hep-ph].
- [A13] *A testable hidden-sector model for Dark Matter and neutrino masses*  
Julia Gehrlein and Mathias Pierre,  
40 pp. Published in JHEP02 (2020) 068, arXiv:1912.06661 [hep-ph].
- [A12] *Very Light Asymmetric Dark Matter*  
Gonzalo Alonso-Álvarez, Julia Gehrlein, Joerg Jaeckel and Sebastian Schenk,  
32 pp. Published in JCAP **1909**, 003 (2019), arXiv:1906.00969 [hep-ph].
- [A11] *Bino phenomenology at the LHC*  
Julia Gehrlein, Seyda Ipek and Patrick J. Fox,  
18 pp. Published in JHEP **1903**, 073 (2019), arXiv:1901.09284 [hep-ph].
- [A10] *Natural and Dynamical Neutrino Mass Mechanism at the LHC*  
Julia Gehrlein, Dorival Gonçalves, Pedro A. N. Machado and Yuber F. Perez-Gonzalez,  
9 pp. Published in Phys. Rev. D **98**, no. 3, 035045 (2018), arXiv:1804.09184 [hep-ph].
- [A9] *IceCube bounds on sterile neutrinos above 10 eV*  
Mattias Blennow, Enrique Fernandez-Martinez, Julia Gehrlein, Josu Hernandez-Garcia and Jordi Salvado,  
20 pp. Published in Eur. Phys. J. C **78**, no. 10, 807 (2018),  
arXiv:1803.02362 [hep-ph].
- [A8] *Dark Matter and the elusive  $Z'$  in a dynamical Inverse Seesaw scenario*  
Valentina De Romeri, Enrique Fernandez-Martinez, Julia Gehrlein, Pedro A. N. Machado and Viviana Niro,  
21 pp. Published in JHEP **1710**, 169 (2017), arXiv:1707.08606 [hep-ph].
- [A7] *Neutrino Mass Sum Rules and Symmetries of the Mass Matrix*  
Julia Gehrlein and Martin Spinrath,

10 pp. Published in Eur. Phys. J. C **77**, no. 5, 281 (2017), arXiv:1704.02371 [hep-ph].

- [A6] *Renormalisation Group Corrections to Neutrino Mixing Sum Rules*  
Julia Gehrlein, Serguey T. Petcov, Martin Spinrath and Arsenii V. Titov,  
42 pp. Published in JHEP **1611** (2016) 146, arXiv:1608.08409 [hep-ph].
- [A5] *On the Predictivity of Neutrino Mass Sum Rules*  
Julia Gehrlein, Alexander Merle and Martin Spinrath,  
30 pp. Published in Phys. Rev. D **94** (2016) no.9, 093003,  
arXiv:1606.04965 [hep-ph].
- [A4] *Leptogenesis in an  $SU(5) \times A_5$  Golden Ratio Flavour Model: Addendum.*  
Julia Gehrlein, Serguey T. Petcov, Martin Spinrath and Xinyi Zhang,  
15 pp. Published in Nucl. Phys. B **899** (2015) 617, arXiv:1508.07930 [hep-ph].
- [A3] *Renormalisation Group Corrections to Neutrino Mass Sum Rules.*  
Julia Gehrlein, Alexander Merle and Martin Spinrath,  
25 pp. Published in JHEP **1509** (2015) 066. arXiv:1506.06139 [hep-ph].
- [A2] *Leptogenesis in an  $SU(5) \times A_5$  Golden Ratio Flavour Model.*  
Julia Gehrlein, Serguey T. Petcov, Martin Spinrath and Xinyi Zhang,  
22 pp. Published in Nucl. Phys. B **896** (2015) 311, arXiv:1502.00110 [hep-ph].
- [A1] *An  $SU(5) \times A_5$  Golden Ratio Flavour Model.*  
Julia Gehrlein, Jens P. Oppermann, Daniela Schäfer and Martin Spinrath,  
34 pp. Published in Nucl. Phys. B **890** (2015) 539, arXiv:1410.2057 [hep-ph]

## CONFERENCE PROCEEDINGS

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- [P2] *Sterile neutrinos searches at IceCube*  
Mattias Blennow, Enrique Fernandez-Martinez, Julia Gehrlein, Josu Hernandez-Garcia  
and Jordi Salvado,  
4 pp. Published in Proceedings 20th International Workshop on Neutrinos from  
Accelerators (NuFact18): Blacksburg, VA, USA, August 13-18, 2018.
- [P1] *Inverse Seesaw from dynamical  $B - L$  breaking*  
Julia Gehrlein,  
4 pp. Published in Proceedings Moriond 2018-Electroweak session,  
arXiv:1805.04730 [hep-ph].

## SNOWMASS2021 LETTER OF INTEREST

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- [LOI5] *A comprehensive EFT global fit in the neutrino oscillation experiments*
- [LOI4] *Low scale neutrino mass models*  
**Lead author**
- [LOI3] *Neutrino Non-Standard Interactions*
- [LOI2] *Leptonic Sum Rules*  
**Lead author**
- [LOI1] *Coherent Elastic Neutrino-Nucleus Scattering: Theoretical and experimental impact*

# LIST OF PRESENTATIONS

## Julia Gehrlein

### SEMINAR TALKS

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- May 2021 *CP violation at long baseline experiments,*  
**Invited** Seminar at Northwestern
- May 2021 *Leptonic sum rules,*  
**Invited** Neutrino Seminar at Fermilab
- Dec 2020 *The quest for  $\theta_{13}$  -A theoretical perspective-,*  
**Invited** Colloquium at BNL
- Dec 2020 *CP violation at long baseline experiments,*  
**Invited** theory seminar at UCLA
- Nov 2020 *New Leptonic sum rules from flavour models,*  
HET lunch seminar at BNL
- Oct 2020 *New physics with  $CE\nu NS$ ,*  
**Invited** theory seminar at WashU, St. Louis
- Oct 2020 *New physics with  $CE\nu NS$ ,*  
**Invited** neutrino physics center seminar at Virginia Tech
- Sep 2020  *$CE\nu NS$  gate to new physics,*  
HET lunch seminar at BNL
- Jun 2020 *A testable hidden-sector model for Dark Matter and neutrino masses,*  
**Invited** theory seminar at Fermilab
- Apr 2020 *A testable hidden-sector model for Dark Matter and neutrino masses,*  
HET lunch seminar at BNL
- Nov 2019 *Neutrino Windows to new physics,*  
HET lunch seminar at BNL
- Feb 2019 *Natural and dynamical neutrino mass model at the LHC,*  
**Invited** seminar at LPTHE Paris
- Dec 2018 *IceCube bounds on sterile neutrinos above 10 eV,*  
**Invited** Webinar for N3AS network
- Nov 2018 *Natural and dynamical neutrino mass model at the LHC,*  
**Invited** *Elusives* Student Webinar
- May 2018 *Cosmic neutrino background,*  
PhD seminar at University of Heidelberg
- Feb 2017 *Corrections to Leptonic sum rules,*  
PhD seminar at the IFT, Madrid
- Jan 2017 *Corrections to Leptonic sum rules,*  
**Invited** *Elusives* Student Webinar
- May 2016 *Leptonic sum rules,*

- Invited** Institute Seminar, KIT
- Dec 2015 *Sum rules for lepton flavor observables,*  
**Invited** Seminar: B-Lunch (joint theorists and experimentalists seminar), KIT
- Oct 2015 *Neutrino mass and angle sum rules,*  
Seminar: Flavour and Supersymmetry (Group Seminar), KIT
- May 2015 *Leptogenesis,*  
Institute Seminar, KIT
- Apr 2015 *The  $8 \times 8$ -fold way,*  
Seminar: Flavour and Supersymmetry (Group Seminar), KIT
- Nov 2014  *$SU(5)$  as a GUT,*  
Seminar: Flavour and Supersymmetry (Group Seminar), KIT
- Jul 2014 *An  $SU(5) \times A_5$  Flavour Model – Phenomenology,*  
**Invited** Bachelor-Workshop at the Institute for Theoretical Particle Physics, KIT
- Jun 2014 *Spontaneous Symmetry breaking,*  
Advanced students seminar: Theoretical and experimental methods in particle physics, KIT

## CONFERENCE TALKS

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- May 2021 *Coherent elastic neutrino nucleus scattering,*  
**Invited** plenary talk, Third Nuclear and Particle Theory Meeting (virtual due to Covid-19)
- Nov 2020 *Statistical analysis of  $CE\nu NS$  data,*  
**Invited** plenary talk, Magnificent  $CE\nu NS$  workshop (virtual due to Covid-19)
- Sep 2020 *An Attractive Scenario for Light Dark Matter Direct Detection,*  
**Invited** plenary talk, Anomalies 2020 symposium (virtual due to Covid-19)
- May 2020 *A testable hidden-sector model for Dark Matter and neutrino masses,*  
Phenomenology 2020 symposium (virtual due to Covid-19)
- Sep 2019 *IceCube bounds on sterile neutrinos above 10 eV,*  
BNL Forum 2019, Brookhaven National Laboratory
- Sep 2018 *IceCube bounds on sterile neutrinos above 10 eV,*  
Invisibles18 Workshop, Karlsruhe
- May 2018 *IceCube bounds on sterile neutrinos above 10 eV,*  
Planck 2018, Bonn
- Mar 2018 *Dynamical Inverse Seesaw,*  
Moriond-Electroweak 2018, La Thuile
- Jun 2017 *Dynamical Inverse Seesaw,*  
Invisibles17 Workshop, Zurich
- Feb 2016 *Corrections to Neutrino Mass Sum Rules,*  
DPG Spring Meeting, Hamburg
- Mar 2015 *Sum Rules in Flavour Models,*  
DPG Spring Meeting, Wuppertal



## POSTER PRESENTATIONS

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- Jun 2020     *Scrutinizing the CE $\nu$ NS analysis,*  
Neutrino 2020 (virtual due to Covid-19)
- Jun 2019     *Natural and dynamical neutrino mass model at the LHC,*  
Invisibles19 Workshop, Valencia
- Sep 2018     *IceCube bounds on sterile neutrinos above 10 eV,*  
Invisibles18 Workshop, Karlsruhe
- Jun 2017     *Dynamical Inverse Seesaw,*  
Invisibles17 Workshop, Zurich