Fabian Rennecke

Curriculum Vitae

Brookhaven National Laboratory
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Date of Birth: Jan. 26, 1987
Place of Birth: Hamburg, Germany
Nationality: German

Research Experience

10/2017 – present **Brookhaven National Laboratory**, USA
▹ Research Associate

09/2016 – 09/2017 **Heidelberg University**, Germany
▹ Postdoctoral Researcher

08/2015 – 08/2016 **University of Giessen**, Germany
▹ Postdoctoral Researcher

06/2014 – 09/2014 **Brookhaven National Laboratory**, USA
▹ Visiting Researcher

Education

02/2012 – 07/2015 **Heidelberg University**, PhD studies
Thesis title: *The Chiral Phase Transition of QCD*
Supervisor: Prof. Dr. Jan M. Pawlowski

09/2006 – 01/2012 **Heidelberg University**, Physik Diplom (Master's equivalent)
Thesis title: *Renormalization Group Study of the Chiral Phase Transition in QCD*
Supervisor: Prof. Dr. Jan M. Pawlowski

Grants and Scholarships

10/2017 – 10/2019 DFG Research Fellowship
Project: Signatures of the QCD Phase Diagram, Host: Robert D. Pisarski

02/2012 – 06/2015 PhD scholarship
Institution: Helmholtz Graduate School for Hadron and Ion Research (HGS-HIRe)

05/2014 – 08/2014 "HGS-HIRe Abroad" grant
Funding for a research stay at the Brookhaven National Laboratory, USA.
Institution: Helmholtz Graduate School for Hadron and Ion Research (HGS-HIRe)

Publications

Articles and Preprints

1. **The Myriad Uses of Instantons*
with R. D. Pisarski
submitted to Phys. Rev. Letters, arXiv:1910.14052 (2019)

2. *The QCD Phase Structure at Finite Temperature and Density*
with W.-j. Fu and J. M. Pawlowski
submitted to Phys. Rev. D, arXiv:1909.02991 (2019)
3. **Strangeness Neutrality and Baryon-Strangeness Correlations*
with W.-j. Fu and J. M. Pawlowski
submitted to Phys. Rev. Letters, arXiv:1809.01594 (2018)
4. **Strangeness Neutrality and QCD Thermodynamics*
with W.-j. Fu and J. M. Pawlowski
submitted to SciPost Physics, arXiv:1808.00410 (2018)
5. *Mass Sensitivity of the Three-Flavor Chiral Phase Transition*
with S. Resch and B.-J. Schaefer
Phys. Rev. D 99, 076005, arXiv:1712.07961 (2017)
6. **In-Medium Spectral Functions of Vector- and Axial-Vector Mesons from the Functional Renormalization Group*
with C. Jung, R.-A. Tripolt, L. von Smekal and J. Wambach
Phys. Rev. D 95, 036020, arXiv:1610.08754 (2016)
7. **Fluctuation-Induced Modifications of the Phase Structure in* (2+1)*-Flavor QCD*
with B.-J. Schaefer
Phys. Rev. D 96, 016009, arXiv:1610.08748 (2016)
8. *Baryon Number Fluctuations at Finite Temperature and Density*
with W.-j. Fu, J. M. Pawlowski and B.-J. Schaefer
Phys. Rev. D 94, 116020, arXiv:1608.04302 (2016)
9. *The Phase Diagram of QC_2D from Functional Methods*
with N. Khan, J. M. Pawlowski and M. M. Scherer
arXiv:1512.03673 (2015)
10. **Vacuum Structure of Vector Mesons in QCD*
Phys. Rev. D 92, 076012, arXiv:1504.03585 (2015)
11. **From Quarks and Gluons to Hadrons: Chiral Symmetry Breaking in Dynamical QCD*
with J. Braun, L. Fister and J. M. Pawlowski
Phys. Rev. D 94, 034016, arXiv:1412.1045 (2014)
12. **Higher Order Quark-Mesonic Scattering Processes and the Phase Structure of QCD*
with J. M. Pawlowski
Phys. Rev. D 90, 076002, arXiv:1403.1179 (2014)

Proceedings

13. **Strangeness neutrality and the QCD phase diagram*
with W.-j. Fu and J. M. Pawlowski
"Critical Point and Onset of Deconfinement (CPOD2019)"
arXiv:1907.08179 (2019)
14. **Review of Critical Point Searches and Beam-Energy Studies*
"Hot Quarks 2018"
MDPI Proc. 10, no.1, 8 (2019)
15. *Time-Evolution of Fluctuations as Signal of the Phase Transition Dynamics in a QCD-Assisted Transport Approach*
with M. Bluhm, Y. Jiang, M. Nahrgang, J. M. Pawlowski and N. Wink
"27th International Conference on Ultrarelativistic Nucleus-Nucleus Collisions (Quark Matter 2018)"
arXiv:1808.01377 (2018)
16. *Spectral Functions from the Functional Renormalization Group*
with J. Wambach, C. Jung, R.-A. Tripolt and L. von Smekal
"Critical Point and Onset of Deconfinement (CPOD2018)"
PoS CPOD2017, 077, arXiv:1712.02093 (2017)

17. *QCD-inspired determination of NJL model parameters*
with P. Springer, J. Braun and S. Rechenberger
"XIIth Quark Confinement and the Hadron Spectrum"
EPJ Web Conf. 137, 03022, arXiv:1611.06020 (2016)

*: first-authored

Scientific Presentations

Invited/Plenary Talks

01/04/2019 *Aspects of the QCD Phase Diagram*
Functional Methods in Strongly Correlated Systems
(Hirschegg, Austria)

26/09/2018 *Strangeness Neutrality and the QCD Phase Structure*
The Critical Point and Onset of Deconfinement Conference (CPOD2018)
(Corfu, Greece)

11/09/2018 *Review of Critical Point Searches and Beam-Energy Studies*
Hot Quarks 2018
(Texel, The Netherlands)

26/07/2018 *Strangeness Neutrality and the QCD Phase Structure*
Workshop on QCD Continuum Field Theory Approaches and their Applications
(Dalian, China)

03/04/2018 *Strangeness Neutrality and the QCD Phase Structure*
Workshop: From Correlation Functions to QCD Phenomenology
(Bad Honnef, Germany)

21/08/2017 *Towards Fluctuations in 2+1 Flavor QCD*
Functional Methods in Hadron and Nuclear Physics
(ECT* Trento, Italy)

Conferences/Seminars/Workshops

04/06/2019 *The QCD Phase Diagram and the Critical Endpoint*
RHIC/AGS Annual Users' Meeting
(Brookhaven National Laboratory, Upton, NY, USA)

14/12/2018 *Strangeness Neutrality and the QCD Phase Structure*
Nuclear Theory Seminar
(University of Illinois at Chicago, Chicago, USA)

27/11/2018 *Strangeness Neutrality and the QCD Phase Structure*
Nuclear Physics Seminar
(University of Minnesota, Minneapolis, USA)

19/09/2018 *Strangeness Neutrality and the QCD Phase Structure*
Theory Seminar
(Technical University Darmstadt, Germany)

18/09/2018 *Strangeness Neutrality and the QCD Phase Structure*
Nuclear Physics Colloquium
(Goethe University Frankfurt, Germany)

12/06/2018 *In-Medium Vector- and Axial Vector Spectral Functions*
RHIC/AGS Annual Users' Meeting
(Brookhaven National Laboratory, Upton, NY, USA)

19/01/2017 *Vector Mesons and Chiral Symmetry Restoration*
RIKEN Lunch Seminar
(Brookhaven National Laboratory, Upton, NY, USA)

19/09/2016	*Fluctuations and the Critical Endpoint in* (2+1)*-Flavor QCD* 8th International Conference on the Exact Renormalization Group (Trieste, Italy)
09/02/2016	*From Quarks and Gluons to Hadrons: Chiral Symmetry Breaking in QCD* Helsinki Institute of Physics Seminar (Helsinki, Finland)
12/06/2015	*The Vacuum Structure of Vector Mesons in QCD* Lunch Club Seminar (Giessen, Germany)
01/03/2015	*The Vacuum Structure of Vector Mesons in QCD* 53. Internationale Universitätswochen für Theoretische Physik (Schladming, Austria)
29/01/2015	*QCD-Flows for Vector Mesons* FRG-QCD Meeting (Frankfurt, Germany)
22/09/2014	*The Chiral Phase Transition of QCD* 7th International Conference on the Exact Renormalization Group (Lefkada, Greece)
12/08/2014	*The Chiral Phase Transition of QCD* Nuclear Physics Seminar (Brookhaven National Laboratory, Upton, NY, USA)
04/02/2014	*The Chiral Phase Transition of QCD* Cold Quantum Coffee (Heidelberg, Germany)
28/02/2013	*Higher Order Mesonic Scattering Processes in the QCD Phase Diagram* 51. Internationale Universitätswochen für Theoretische Physik (Schladming, Austria)
21/01/2013	*Higher Order Mesonic Scattering Processes in the QCD Phase Diagram* 6th HGSFP Winterschool (Obergurgl, Austria)
23/03/2012	*Higher Order Mesonic Scattering Processes in the QCD Phase Diagram* Spring Meeting of the German Physical Society (Mainz, Germany)

Teaching Experience

11/2016 – 01/2017	Seminar adviser in *Advanced Quantum Mechanics*, Heidelberg University
04/2016 – 07/2016	Lecturer (substitute) for *The Theory of Electrodynamics and Thermodynamics*, University of Giessen
08/2015 – 08/2016	Mentoring of the Master's Thesis "*Mass Sensitivity of the QCD Phase Structure*" by Simon Resch, University of Giessen
11/2015	Lecturer (substitute) for *The Theory of Thermodynamics*, University of Giessen
04/2012 – 04/2013	Mentoring of the Master's Thesis "*On the Chiral Phase Transition in QCD by means of the Functional Renormalisation Group*" by Andreas Risch, Heidelberg University
10/2012 – 02/2013	Tutor in *Non-Perturbative Aspects of Gauge Theories*, Heidelberg University
09/2012 – 10/2012	Tutor in *Preliminary Mathematics Course for Physicists*, Heidelberg University
04/2012 – 07/2012	Tutor in *Quantum Field Theory II*, Heidelberg University
04/2011 – 07/2011	Tutor in *Analytical Mechanics and Elementary Thermodynamics/Statistics*, Heidelberg University
2008 – 2010	Tutor in *Mathematics for Natural Scientists I & II*, Heidelberg University

References

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Other Professional Experience

since 10/2015	Referee for Physical Review D
09/2012 – 09/2014	Co-organizer of the weekly Seminar *Cold Quantum Coffee*, Institute for Theoretical Physics, Heidelberg University