



Dipl.-Ing. Dr. rer. nat. Thomas SCHÄFER

HEAD OF THE INDEPENDENT MAX PLANCK RESEARCH GROUP "THEORY OF STRONGLY CORRELATED QUANTUM MATTER" (SCQM)

Max Planck Institute for Solid State Research (MPI-FKF), Heisenbergstr. 1, 70569 Stuttgart
Nationality: Austrian, Date of Birth: 5th April 1987
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Google Scholar: <https://scholar.google.com/citations?user=aJBvSKAAAAAJ&hl=en>

CURRICULUM VITAE AT A GLANCE

POSITIONS HELD AFTER PhD

- 2020 – today **Independent Max Planck Research Group leader** "Theory of Strongly Correlated Quantum Matter"
Max Planck Institute for Solid State Research (MPI-FKF), Stuttgart, Germany
- 2019 – 2020 **Erwin-Schrödinger Fellow** hosted by Prof. Antoine Georges, funded by the FWF
École Polytechnique and Collège de France, Paris, France
- 2017 – 2019 **Postdoctoral Researcher** hosted by Prof. Antoine Georges
École Polytechnique and Collège de France, Paris, France
- 2016 – 2017 **Postdoctoral Researcher** hosted by Prof. Alessandro Toschi
TU Wien, Vienna, Austria

UNIVERSITY EDUCATION

- 2013 – 2016 **Doctor rerum naturalium (PhD)** awarded with highest honors "*sub auspiciis praesidentis rei publicae*"
Thesis "*Classical and quantum phase transitions in strongly correlated electron systems*"
supervised by Prof. Karsten Held and Prof. Alessandro Toschi
TU Wien, Vienna, Austria
- 2010 – 2012 **Mathematical and Theoretical Physics - Master of Science** awarded with highest honors
Thesis "*Electronic correlations at the Two-Particle Level*" supervised by Prof. Alessandro Toschi
TU Wien, Vienna, Austria
- 2007 – 2010 **Technical Physics - Bachelor of Science** awarded with highest honors
Thesis "*Numerical Simulation of μ SR for specific Kondo-systems*" supervised by Prof. Herwig Michor
TU Wien, Vienna, Austria

PUBLICATION and DISSEMINATION OVERVIEW (as of 24th September 2024)

- **33 peer-reviewed Publications:** 1 Nature Communications, 1 Proceedings of the National Academy of Sciences, 2 Physical Review X, 9 Physical Review Letters, 1 Annual Review, 2 Physical Review Research, 1 SciPost Physics, 11 Physical Review B, 5 other journals (see Publication Activities attached)
- **Citations Metrics:** 2,064 citations, h-index 22 (Google Scholar) – 1,296 citations, h-index 19 (Web of Science)
- **Dissemination:** 23 invited and 23 contributed talks at (international) conferences, workshops, seminars or colloquia, 11 posters
- **Organizer** of the international workshop "Correlations in Novel Quantum Materials" CNQM2021/2022/2023 (100 participants each, 24 speakers each, <https://www.fkf.mpg.de/cnqm2023>)

TEACHING and SCIENTIFIC SUPERVISION

- **Lectures and exercises "Solid State Theory"**, International Master's Program Physics, University of Stuttgart (SS 2022/23)
- Co-lecturer at École Polytechnique (**Advanced Quantum Theory**, 2019) and TU Wien (**Advanced Theory of Superconductivity and Magnetism**, 2016)
- **Permission to hand in a Habilitation Thesis** at the University of Stuttgart (2024), **Permission as main PhD supervisor**
- Current **supervision** activity 2 PhD students (Erstbetreuer)
- Past (co-)supervision activity 2 Postdocs, 4 Master students, 3 Bachelor students, 4 internship students

FUNDING OF approx. 1.6M EUR

- 2020 – today Independent Max Planck Research Group | Budget: 1.4M EUR for 5 years | Max Planck Society
- 2022, 2023 Workshop "Correlations in Novel Quantum Materials" | Budget: 42k USD | ICAM
- 2019 – 2020 Erwin-Schrödinger Fellowship | Budget: 160k EUR | Austrian Science Fund (FWF)
- 2017 Excellence Scholarship of the Austrian Federal Ministry of Education, Science and Research | Budget: 9k EUR
| Austrian Federal Ministry of Education, Science and Research

AWARDS and OTHER SCIENTIFIC ACTIVITIES OVERVIEW

- Invitation to a Hearing for a Full Professorship on "Theoretical Solid State Physics", University of Innsbruck (October 2024)
- First place Tenure Track to Associate Professor in Condensed Matter Physics (RTDb), Università degli Studi Trieste (August 2024)
- Principal Investigator Max-Planck Graduate Center for Quantum Materials
- Principal Investigator of the International Max-Planck Research School for Condensed Matter Science
- External Reviewer for the National Science Center, Poland and Agence nationale de la recherche (ANR), France
- Referee for Nature, Nature Communications, Physical Review Letters, Physical Review B, Europhysics Letters, and other scientific journals
- Regular mid-term stays at the Center for Computational Quantum Physics (CCQ), Flatiron Institute, New York, USA
- "Emerging Leader" 2020 by the Journal of Physics, Condensed Matter
- Award for an outstanding diploma thesis of the City of Vienna 2013



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CURRICULUM VITAE

RESEARCH INTERESTS

Strongly Correlated Electron Systems

- (Twisted) moiré transition metal dichalcogenides, cuprates, ruthenates, nickelates, organic superconductors, heavy fermions
- Mott-Hubbard metal-insulator transition
- Physics of the Hubbard model
- Low-dimensional systems
- Spin-orbit coupling

Frustrated Magnetic Systems

- Geometric frustration
- Metal-insulator transitions
- Chirality

Quantum Criticality

- Quantum and classical critical phenomena
- Quantum magnetism
- Electronic Kohn anomalies

High-temperature Superconductivity

- Pseudogap physics
- Unconventional pairing mechanisms

Quantum Many-Body Techniques

- Multi-method, multi-messenger approach
- quantum Monte Carlo, impurity solvers
- Dynamical mean field theory (DMFT)
- Cluster (CDMFT, DCA) and diagrammatic (DGA, TRILEX) extensions of DMFT
- Many-particle Green functions and Luttinger-Ward formalism in the non-perturbative regime
- Fluctuation diagnostics and parquet decomposition

POSITIONS HELD AFTER PhD

2020 – today **Independent Max Planck Research Group leader** "Theory of Strongly Correlated Quantum Matter"
Max Planck Institute for Solid State Research (MPI-FKF), Stuttgart, Germany
hosted by the Max-Planck Institute for Solid State Research (MPI-FKF), Stuttgart (Germany)

appointed ("Ruf") initially for five years by the president of the Max-Planck society (MPG) following the suggestions of an independent search commission

- Funding: W2 salary for the head of the research group, coverage of one postdoc and one PhD position, competitive research expenditure coverage and initial equipment (spent on HPC cluster "Bordeaux"), amounting to a total budget of approx. 1.4M EUR (five years)
- Permission as a principal supervisor (Erstbetreuer) of PhD students granted by the University of Stuttgart, Member of the PhD Commission of the MPI-FKF
- Principal Investigator Max-Planck Graduate Center for Quantum Materials, <https://www.quantummaterials.mpg.de>
- Principal Investigator of the International Max-Planck Research School for Condensed Matter Science, <https://www.imprs-cms.mpg.de>

2019 – 2020 **Erwin-Schrödinger Fellow** hosted by Prof. Antoine Georges
École Polytechnique and Collège de France, Paris, France

FWF project J-4266, hosted by Prof. Antoine Georges (École Polytechnique and Collège de France, Paris, France with regular visits to the Center for Computational Quantum Physics, Flatiron Institute, New York, USA), principal investigator with a budget of 160k EUR

2017 – 2019 **Postdoctoral Researcher** hosted by Prof. Antoine Georges
École Polytechnique and Collège de France, Paris, France

2016 – 2017 **Postdoctoral Researcher** hosted by Prof. Alessandro Toschi
TU Wien, Vienna, Austria

CURRICULUM VITAE

EDUCATION

- 2013 – 2016 **Doctor rerum naturalium (PhD)** awarded with highest honors "*sub auspiciis praesidentis rei publicae*"
TU Wien, Vienna, Austria
Thesis "*Classical and quantum phase transitions in strongly correlated electron systems*" supervised by Prof. Karsten Held and Prof. Alessandro Toschi
"*Promotio sub auspiciis Praesidentis rei publicae*" on the 05/12/2017 (highest achievable honor for university and school studies, promotion by the federal president of Austria, Dr. Alexander Van der Bellen in person), every final grade in high school and university studies was the highest possible ("sehr gut", 1.0)
funded by Austrian Science Fund Doctoral School "Building Solids for Function",
<http://solids4fun.tuwien.ac.at>
- 2010 – 2012 **Mathematical and Theoretical Physics - Master of Science** awarded with highest honors
TU Wien, Vienna, Austria
Thesis "Electronic correlations at the Two-Particle Level" supervised by Prof. Alessandro Toschi awarded with the Award for an outstanding and excellent thesis of the City of Vienna (2013)
Diploma student funded by the FWF project "Quantum criticality in strongly correlated magnets (QMC)" (I 610-N16) under the supervision of Prof. Alessandro Toschi
- 2007 – 2010 **Technical Physics - Bachelor of Science** awarded with highest honors
TU Wien, Vienna, Austria
Thesis "Numerical Simulation of μ SR for specific Kondo-systems" under the supervision of Prof. Herwig Michor
- 2001 – 2006 **School leaving examinations - Reife- und Diplomprüfung** awarded with highest honors
HTBLuVA St. Pölten (Higher Technical College for Informatics), St. Pölten, Austria
- 1997 – 2001 **Grammar School**
Piaristengymnasium Krems, Krems an der Donau, Austria

REFERENCE CONTACTS AND COLLABORATION PARTNERS

Reference Contacts and Current and Former Collaboration Partners

- **Prof. Antoine Georges** (host Erwin-Schrödinger Fellowship, postdoctoral supervisor; research partner; Director CCQ, Flatiron institute, Collège de France and École Polytechnique)
ageorges@flatironinstitute.org
- **Prof. Karsten Held** (Doktorvater, research partner; TU Wien)
held@ifp.tuwien.ac.at
- **Prof. Roser Valentí** (research partner; Goethe-Universität Frankfurt am Main)
valenti@itp.uni-frankfurt.de
- **Prof. Andrew J. Millis** (research partner; Columbia University, Co-Director CCQ, Flatiron institute)
amilis@flatironinstitute.org
- **Prof. Bernhard Keimer** (research partner; Director Max-Planck-Institute for Solid State Research)
b.keimer@fkf.mpg.de
- **Prof. Alessandro Toschi** (supervisor Master, co-supervisor PhD thesis, research partner; TU Wien)
toschi@ifp.tuwien.ac.at
- **Prof. Giorgio Sangiovanni** (research partner; University of Würzburg)
sangiovanni@physik.uni-wuerzburg.de
- **Prof. Walter Metzner** (Director Max-Planck-Institute for Solid State Research)
metzner@fkf.mpg.de
- **Prof. Philipp Hansmann** (research partner; Friedrich-Alexander-Universität Erlangen-Nürnberg)
philipp.hansmann@fau.de
- **Prof. Sabine Andergassen** (research partner; TU Wien)
sabine.andergassen@tuwien.ac.at
- **Prof. Markus Aichhorn** (research partner; TU Graz)
aichhorn@tugraz.at

CURRICULUM VITAE

TEACHING

- 2024 **Invited Lectures**
School "Modeling strongly correlated electrons: Numerics, analytics, and quantum simulations"
Arnold Sommerfeld Center for Theoretical Physics, LMU in Munich
- 2024 **Invitation for Submitting a Habilitation Thesis**
University of Stuttgart
- 2022, 2023 **Lectures and exercises "Solid State Theory"**
International Master's Program in Physics, University of Stuttgart
- 2019 **Exercises on "Advanced Quantum Physics"**
Bachelor Programme, École Polytechnique
- 2018 – 2019 **Supervisor for Projet de Recherche en Laboratoire (PRL)**
École Polytechnique
- 2013 – 2016 **Organizer and teaching assistant** for the lectures "Quantum Theory I" (2013), "Quantum Theory II" (2014) and "Quantum Field Theory for Many-Body Systems" (2015), **Lecturer substitute for "Advanced Theory of Superconductivity and Magnetism"** (2016)
TU Wien
- 2009 – 2013 Extensive **Tutoring activities** at the TU Wien (7 distinct subjects)

SCIENTIFIC SUPERVISION

Current supervision activity 2 PhD students (Erstbetreuer), 1 Master student
Past (co-)supervision activity 2 Postdocs, 3 Master students, 3 Bachelor students, 4 internship students

- 2021 – today **Mário Malcolms de Oliveira: "Non-local correlations in frustrated magnetic systems"**
PhD student, SCQM, MPI-FKF
- 2022 – today **Michael Meixner: "Vertex divergencies on the real frequency axis"**
PhD student, SCQM, MPI-FKF, Stuttgart 2022-ongoing
- 2022 – today **Patrick Tschepe: "Interplay of disorder and strong correlations"**
Master Thesis, SCQM, MPI-FKF
- 2023 – 2023 **Dr. Henri Menke**
Postdoc, SCQM, MPI-FKF
now at Max Planck Computing and Data Facility (MPCDF) Garching
- 2020 – 2023 **Dr. Marcel Klett**
Postdoc, SCQM, MPI-FKF
now at Allianz Insurance
- 2020 – 2021 **Michael Meixner: "On the Phase Diagram of the Hubbard-Model in Real-Space Extensions of Dynamical Mean Field Theory"**
Master Thesis, SCQM, MPI-FKF
- 2022 **Patrick Tschepe: "Non-local correlations in Twisted Moiré Dichalcogenides"**
Bachelor Thesis, SCQM, MPI-FKF
- 2021 **Patrick Tschepe: "The Hubbard dimer in a magnetic field"**
Internship Project, SCQM, MPI-FKF
- 2015 – 2020 (Co-)supervision of 4 Master students, one Bachelor student, 3 internship students

CURRICULUM VITAE

SCIENTIFIC DISSEMINATION

23 invited and 23 contributed talks at (international) conferences, workshops, seminars or colloquia
11 contributed posters

Recent Highlights

- 2024 **Correlations and geometric frustration – a happy marriage?**
NAWI Physics Colloquium Graz, TU Graz
- 2022 **Multimethod, multimessenger approaches to strongly correlated systems**
Hauptvortrag (Invited Talk) at DPG Meeting Regensburg
- Multimethod, multimessenger approaches to strongly correlated systems**
Physikalisches Kolloquium Tübingen, Germany
- It Takes Two to Tango - Condensed Matter Physics Beyond Single-Particle Quantum Mechanics**
Trinity College Science Society, Cambridge University, United Kingdom
- 2021 **How to Read between the Lines of Electronic Spectra: the Diagnostics of Fluctuations in Strongly Correlated Electron Systems**
Collège de France, Public Seminar, Paris, France
- Taking locality to the next level: vertex-based extensions of DMFT and their application**
Stuttgarter Physikalisches Kolloquium, Stuttgart, Germany

FUNDING

- 2020 – today **Independent Max Planck Research Group | Budget: 1.4M EUR for 5 years | Max Planck Society**
W2 salary for the head of the research group, coverage of one postdoc and one PhD position, competitive research expenditure coverage and initial equipment (spent on HPC cluster "Bordeaux")
- 2022, 2023 **Workshop "Correlations in Novel Quantum Materials" | Budget: 42k USD | ICAM**
- 2019 – 2020 **Erwin-Schrödinger Fellowship | Budget: 160k EUR | Austrian Science Fund (FWF)**
Principal Investigator of the FWF project J-4266
"SuMo - Superconductivity in the vicinity of Mott insulators"
- 2017 **Excellence Scholarship of the Austrian Federal Ministry of Education, Science and Research | Budget: 9k EUR | Austrian Federal Ministry of Education, Science and Research**
Principal Investigator of "Quantum criticality in the two-dimensional periodic Anderson model"

HONORS AND AWARDS

- 2020 "Emerging Leader" 2020 by the Journal of Physics, Condensed Matter
- 2019 Erwin-Schrödinger Fellow funded by the Austrian Science Fund FWF
- 2018 Awardee of the Scholarship of Excellence of the Federal Ministry of Education
- 2018 Finalist of the Dissertation-Prize Symposium of the Condensed Matter Division of the DPG
- 2016 Admission to "Promotio sub auspiciis Praesidentis rei publicae"
- 2015 Young Scientist Attendee of the 65th Interdisciplinary Lindau Nobel Laureate Meeting
- 2013 Award for an outstanding and excellent diploma thesis of the City of Vienna
- 2011 Attendee of the official CERN summer student programme
- 2010/2012 Awardee of the Stiftungsstipendium of the TU Wien
- 2008/2009 Awardee of the student scholarships of the Faculty for Physics of the TU Wien

CURRICULUM VITAE

OTHER SCIENTIFIC ACTIVITIES AND MEMBERSHIPS

- Invitation to a Hearing for a Full Professorship on “Theoretical Solid State Physics”, University of Innsbruck (October 2024)
- First place Tenure Track to Associate Professor (RTDb), Università degli Studi Trieste (August 2024)
- External Reviewer for the National Science Center, Poland and Agence nationale de la recherche (ANR), France
- Referee for Nature, Nature Communications, Physical Review Letters, Physical Review B, Europhysics Letters, Physica Status Solidi and SN Applied Sciences
- Regular mid-term stays at the Center for Computational Quantum Physics, Flatiron Institute, New York, USA: February 2020, February 2019, October 2018, February 2018
- Member of the PhD Commission of the MPI-FKF
- Principal Investigator Max-Planck Graduate Center for Quantum Materials, <https://www.quantummaterials.mpg.de>
- Principal Investigator of the International Max-Planck Research School for Condensed Matter Science, <https://www.imprs-cms.mpg.de>

- Organizer of the International Monthly Symposium on DMFT/Quantum Embedding (online)
- Organizer of the International Workshop "Correlations in Novel Quantum Materials" at the MPI-FKF together with Elio König (online 2021, in person 2022 and 2023), <https://www.fkf.mpg.de/cnqm2023>
- Organizer of the joint "Seminar on Condensed Matter Physics", MPI-FKF and EKUT Tübingen (2020-2021)
- Organizer of the "Condensed Matter Theory Seminar", Collège de France (2019-2020)
- Organizer of the "Condensed Matter Theory Journal Club", Institute of Solid State Physics (2016)
- Student organizer of the “International Conference on the Applications of the Mössbauer Effect” (ICAME2009), TU Wien

- Member of the American Physical Society (APS)
- Member of the German Physical Society (DPG)
- Member of the Deutsche Hochschulverband

LANGUAGE SKILLS

- German: mother tongue
- English: C1 Level in Listening, Reading, Writing
- French: A2 Level in Listening, Reading, Writing

OTHER SKILLS

- Jury of the German Wine Ambassadors 2024 [German Wine Institute (DWI)]
- Jury of “The Best Wineries of Germany 2025” (Der FEINSCHMECKER magazine)
- Germany’s Wine Champion 2023 [German Wine Institute (DWI) and Der FEINSCHMECKER magazine]
- WSET Level 3 Award in Wines, pass with distinction
- Assistant Sommelier (WSET Level 2, pass with distinction)
- Scuba Diving License (PADI)
- Competitive Ballroom Dancing
- Delegate to the European Youth Parliament, Berlin November 2004

CURRICULUM VITAE

PUBLICATION RECORD (as of 24th September 2024)

- **33 peer-reviewed Publications:** 1 Nature Communications, 1 Proceedings of the National Academy of Sciences, 2 Physical Review X, 9 Physical Review Letters, 1 Annual Review, 2 Physical Review Research, 1 SciPost Physics, 11 Physical Review B, 5 other journals
- **Citations Metrics:** 2,064 citations, h-index 22 (Google Scholar) – 1,296 citations, h-index 19 (Web of Science) – 1,331 citations, h-index 19 (Scopus)
- Google Scholar: <https://scholar.google.com/citations?user=aJBvSKAAAAAJ&hl=en>
ORCID: [0000-0002-1105-5619](https://orcid.org/0000-0002-1105-5619), ResearcherID: B-9424-2017

Peer-reviewed Journal Publications (top 5 Publications after PhD are marked by an asterix *)

Superconductivity and Mottness in Organic Charge Transfer Materials

Henri Menke, Marcel Klett, Kazushi Kanoda, Antoine Georges, Michel Ferrero, and Thomas Schäfer
Physical Review Letters **133**, 136501 (2024), <https://doi.org/10.1103/PhysRevLett.133.136501>

Thermodynamic Stability at the Two-Particle Level

A. Kowalski, M. Reitner, L. Del Re, M. Chatzieftheriou, A. Amaricci, A. Toschi, L. de' Medici, G. Sangiovanni, and T. Schäfer
Physical Review Letters **133**, 066592 (2024), <https://doi.org/10.1103/PhysRevLett.133.066502>

Precise many-body simulations of antiferromagnetic phases using broken-symmetry perturbative expansions

R. Garioud, F. Šimkovic IV, R. Rossi, G. Spada, T. Schäfer, F. Werner, M. Ferrero
Physical Review Letters **132**, 246505 (2024), <https://doi.org/10.1103/PhysRevLett.132.246505>

Mott transition and pseudogap of the square-lattice Hubbard model: results from center-focused cellular dynamical mean-field theory

Michael Meixner, Henri Menke, Marcel Klett, Sarah Heinzlmann, Sabine Andergassen, Philipp Hansmann, and Thomas Schäfer
SciPost Physics **16**, 059 (2024), <https://doi.org/10.21468/SciPostPhys.16.2.059>

*** Magnetism and Metallicity in Moiré Transition Metal Dichalcogenides**

Patrick Tscheppe, Jiawei Zang, Marcel Klett, Seher Karakuzu, Armelle Celarier, Zhengqian Cheng, Thomas A. Maier, Michel Ferrero, Andrew J. Millis, and Thomas Schäfer
Proceedings of the National Academy of Sciences **121**, 3 (2024), <https://doi.org/10.1073/pnas.2311486121>

Mott insulators with boundary zeros

Niklas Wagner, Lorenzo Crippa, Adriano Amaricci, Philipp Hansmann, Marcel Klett, Elio König, Thomas Schäfer, Domenico Di Sante, Jennifer Cano, Andrew Millis, Antoine Georges, Giorgio Sangiovanni
Nature Communications **14**, 7531 (2023), <https://doi.org/10.1038/s41467-023-42773-7>

Strongly correlated superconductivity with long-range spatial fluctuations

Motoharu Kitatani, Ryotaro Arita, Thomas Schäfer, Karsten Held
J. Phys. Mater. **5**, 034005 (2022), <https://doi.org/10.1088/2515-7639/ac7e6d>

*** Magnetic correlations in infinite-layer nickelates: an experimental and theoretical multi-method study**

R. A. Ortiz, P. Puphal, M. Klett, F. Hotz, R. K. Kremer, H. Trepka, M. Hemmida, H.-A. Krug von Nidda, M. Isobe, R. Khasanov, H. Luetkens, P. Hansmann, B. Keimer, T. Schäfer, M. Hepting
Physical Review Research **4**, 023093 (2022), <https://doi.org/10.1103/PhysRevResearch.4.023093>

Magnetic properties and pseudogap formation in infinite-layer nickelates: insights from the single-band Hubbard model

Marcel Klett, Philipp Hansmann, and Thomas Schäfer
Frontiers in Physics **10**, 834682 (2022), <https://doi.org/10.3389/fphy.2022.834682>

CURRICULUM VITAE

PUBLICATION RECORD (continued)

*** The Hubbard model: A computational perspective**

Mingpu Qin, Thomas Schäfer, Sabine Andergassen, Philippe Corboz, Emanuel Gull

Annual Review of Condensed Matter Physics Vol. **13**, 275-302 (2022), <https://doi.org/10.1146/annurev-conmatphys-090921-033948>

Comparing the effective enhancement of local and non-local spin-orbit couplings on honeycomb lattices due to strong electronic correlations

Markus Richter, Johannes Graspentner, Thomas Schäfer, Nils Wentzell, Markus Aichhorn

Phys. Rev. B **104**, 195107 (2021), <https://doi.org/10.1103/PhysRevB.104.195107>

Mott insulating states with competing orders in the triangular lattice Hubbard model

Alexander Wietek, Riccardo Rossi, Fedor Šimkovic IV, Marcel Klett, Philipp Hansmann, Michel Ferrero,

E. Miles Stoudenmire, Thomas Schäfer, and Antoine Georges

Phys. Rev. X **11**, 041013 (2021), <https://doi.org/10.1103/PhysRevX.11.041013>

*** Tracking the Footprints of Spin Fluctuations: A Multi-Method, Multi-Messenger Study of the Two-Dimensional Hubbard Model**

Thomas Schäfer, Nils Wentzell, Fedor Šimkovic IV, Yuan-Yao He, Cornelia Hille, Marcel Klett, Christian J. Eckhardt,

Behnam Arzhang, Viktor Harkov, François-Marie Le Régent, Alfred Kirsch, Yan Wang, Aaram J. Kim, Evgeny Kozik,

Evgeny A. Stepanov, Anna Kauch, Sabine Andergassen, Philipp Hansmann, Daniel Rohe, Yuri M. Vilks, James P. F.

LeBlanc, Shiwei Zhang, A.-M. S. Tremblay, Michel Ferrero, Olivier Parcollet, and Antoine Georges

Phys. Rev. X **11**, 011058 (2021), <https://dx.doi.org/10.1103/PhysRevX.11.011058>

How to read between the lines of electronic spectra: the diagnostics of fluctuations in strongly correlated electron systems

Thomas Schäfer and Alessandro Toschi

J. Phys.: Condens. Matter **33**, 214001 (2021), Special Issue: Emerging Leaders 2020, <https://dx.doi.org/10.1088/1361-648X/abeb44>

Fingerprints of the local moment formation and its Kondo screening in generalized susceptibilities of many-electron problems

P. Chalupa, T. Schäfer, M. Reitner, D. Springer, S. Andergassen, and A. Toschi

Phys. Rev. Lett. **126**, 056403 (2021), <https://dx.doi.org/10.1103/PhysRevLett.126.056403>

Anisotropy of electronic correlations: On the applicability of local theories to layered materials

B. Klebel, T. Schäfer, A. Toschi, and J. M. Tomczak

Phys. Rev. B **103**, 045121 (2021), <https://doi.org/10.1103/PhysRevB.103.045121>

Real-space cluster dynamical mean-field theory: Center focused extrapolation

M. Klett, N. Wentzell, T. Schäfer, F. Šimkovic IV, O. Parcollet, S. Andergassen, and P. Hansmann

Phys. Rev. Research **2**, 033476 (2020), <https://doi.org/10.1103/PhysRevResearch.2.033476>

*** Quantum Criticality in the Two-Dimensional Periodic Anderson Model**

T. Schäfer, A. A. Katanin, M. Kitatani, A. Toschi, K. Held

Phys. Rev. Lett. **122**, 227201 (2019), <https://doi.org/10.1103/PhysRevLett.122.227201>

Why T_c is so low in high-T_c cuprates: importance of the dynamical vertex structure

M. Kitatani, T. Schäfer, H. Aoki, K. Held

Phys. Rev. B **99**, 041115(R) (2019), <https://doi.org/10.1103/PhysRevB.99.041115>

Divergences of the irreducible vertex functions in correlated metallic systems: insight from AIM

P. Chalupa, P. Gunacker, T. Schäfer, K. Held, and A. Toschi

Phys. Rev. B **97**, 245136 (2018), <https://doi.org/10.1103/PhysRevB.97.245136>

CURRICULUM VITAE

PUBLICATION RECORD (continued)

Complementary views on electron spectra: From Fluctuation Diagnostics to real space correlations

PhD

O. Gunnarsson, J. Merino, T. Schäfer, G. Sangiovanni, G. Rohringer, and A. Toschi
Phys. Rev. B **97**, 125134 (2018), <https://doi.org/10.1103/PhysRevB.97.125134>

Breakdown of traditional many-body theories for correlated electrons

O. Gunnarsson, G. Rohringer, T. Schäfer, G. Sangiovanni, and A. Toschi
Phys. Rev. Lett. **119**, 056402 (2017), <https://doi.org/10.1103/PhysRevLett.119.056402>

Interplay of correlations and Kohn anomalies in three dimensions: quantum criticality with a twist

T. Schäfer, A. A. Katanin, K. Held, and A. Toschi
Phys. Rev. Lett. **119**, 046402 (2017), <https://doi.org/10.1103/PhysRevLett.119.046402>

Non-perturbative landscape of the Mott-Hubbard transition: Multiple divergence lines around the MIT

T. Schäfer, S. Ciuchi, M. Wallerberger, P. Thunström, O. Gunnarsson, G. Sangiovanni, G. Rohringer, and A. Toschi
Phys. Rev. B **94**, 235108 (2016), <https://doi.org/10.1103/PhysRevB.94.235108>

Parquet decomposition calculations of the electronic self-energy

O. Gunnarsson, T. Schäfer, J. P. F. LeBlanc, J. Merino, G. Sangiovanni, G. Rohringer, and A. Toschi
Phys. Rev. B **93**, 245102 (2016) featured as Editor's Suggestion <http://dx.doi.org/10.1103/PhysRevB.93.245102>

Fluctuation Diagnostics of the Electron Self-Energy: Origin of the Pseudogap Physics

O. Gunnarsson, T. Schäfer, J. LeBlanc, E. Gull, J. Merino, G. Sangiovanni, G. Rohringer, and A. Toschi
Phys. Rev. Lett. **114**, 236402 (2015), <http://dx.doi.org/10.1103/PhysRevLett.114.236402>

Separability of dynamical and nonlocal correlations in three dimensions

T. Schäfer, A. Toschi, and Jan M. Tomczak
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