DR. ANNA GALLER - Curriculum vitae

Address: Institute of Theoretical and Computational Physics, TU Graz
Petersgasse 16/II, 8010 Graz
Email: anna.galler@tugraz.at
ORCID: https://orcid.org/0000-0002-8596-7784

EDUCATION:

07/2017: **PhD in Theoretical Physics** completed with distinction *Promotio sub auspiciis Praesidentis (see awards)* at TU Wien, Supervisor: Prof. Karsten Held
Thesis: *Towards an ab-initio treatment of materials with local and non-local electronic correlations*

07/2016: **Bachelor of Arts in Philosophy** completed with distinction at Universität Wien
Bachelor thesis on *Adriana Cavarero's ethics of inclination*

06/2013: **Master of Science in Technical Physics** completed with distinction at TU Wien
Master thesis on *Magnetism in the intermetallic FeAl*, supervised by Prof. Karsten Held

10/2010: **Bachelor of Science in Technical Physics** completed with distinction at TU Wien
Bachelor thesis on *Hall effect in Nb and Ag*, supervised by Prof. Silke Bühler-Paschen

07/2007: **School leaving exam** with distinction *100/100 cum laude* at Realgymnasium Bozen

ACADEMIC POSITIONS:

01/2024–: **Elise Richter Fellow** at the Institute of Theoretical and Computational Physics, TU Graz (Austria)

01/2024–: **Visiting Researcher** at the Max Planck Institute (MPI) for the Structure and Dynamics of Matter, Hamburg (Germany)

02/2025–03/2025 (1 month): **Visiting Researcher** at Georgetown University, research group of Prof. James K. Freericks, Washington DC (USA)

02/2022–12/2023: **Postdoctoral Researcher** at the MPI for the Structure and Dynamics of Matter, research group of Prof. Ángel Rubio, Hamburg (Germany)
Career break: part-time work due to health reasons (50%, *01/2023–12/2023*)

01/2021–01/2022: **Erwin Schrödinger Fellow (Return Phase)** at the Institute of Solid State Physics, TU Wien (Austria)

03/2020–04/2020 (2 months): **Visiting Researcher** at Georgetown University, research group of Prof. James K. Freericks, Washington DC (USA)

09/2017–12/2020: **Postdoctoral Researcher** at Centre de Physique Théorique, Ecole Polytechnique, research group of Prof. Silke Biermann, Paris (France)
Erwin Schrödinger Postdoctoral Fellowship granted by the FWF (*01/2019–12/2020*)

RESEARCH INTERESTS:

- Electronic structure of correlated materials.
- Method development: diagrammatic extensions of DMFT.
- Light-matter interaction in solids.
- Further topics: electronic entanglement, historical and philosophical aspects of quantum mechanics.

APPROVED RESEARCH GRANTS:

- **Elise Richter Grant** V-988 awarded by the Austrian Science Fund FWF (01/2024–12/2027)
  Topic: *Transition-metal dichalcogenides in and out of equilibrium*
  Amount: 458.168 EUR
  Role: Principal investigator
- **Initial funding program of TU Graz, 21st call** (06/2024)
  Topic: *Electron correlation and dynamics in 2D quantum materials*
  Amount: 8.380 EUR
  Role: Principal investigator
- **Erwin Schrödinger Fellowship** J-4267 awarded by the FWF (01/2019–01/2022)
  Topic: *Optical properties of correlated pigment materials*
  Amount: 159.580 EUR
  Role: Principal investigator

AWARDS:

- **FUTURA Career Award** by the Futura Foundation, Bozen, Italy (6.666 EUR, 12/2020)
- **Promotio sub auspiciis Praesidentis**, highest honour for PhD studies in Austria, PhD promotion with the Austrian Federal President on 22/10/2018
- **Scholarship of Excellence** granted by the Austrian Federal Ministry of Education and Research (9.000 EUR, 11/2018)
- **Proexcellentia II** award for academic achievements, Bozen, Italy (3.000 EUR, 11/2011)
- **Five merit scholarships** by the Autonomous Province Bozen-Südtirol (5.000 EUR, 2009-2013)
- **Proexcellentia I** award for the best secondary school graduates in the Autonomous Province Bozen-Südtirol, Italy (1.000 EUR, 10/2007)
- **Excellence Award** by the Italian Republic for an exceptional high school leaving exam (09/2007)

SUPERVISION OF STUDENTS:

- Supervision of the bachelor student Maximilian Schuster, TU Graz (06/2025–)
- Supervision of the master student Elias Greil, TU Graz (05/2025–)
- Supervision of the master student Niklas Notter, TU Graz (09/2024–)
- Supervision of the master student Valentin Ransmayr, TU Wien (03/2021–06/2022)
  Thesis on the correlated pigment material $YIn_{1-x}Mn_xO_3$ published in PRM 6, 105003 (2022)
- Co-supervision of the master students Matthias Pickem and Josef Kaufmann, TU Wien (2016–2017)

TEACHING:

- Lecturer for *Special Topics in Theoretical Solid State Physics: Ultrafast light-matter interaction*, Graz University/TU Graz (summer term 2025, 1h/week)
- French national qualification as *Maître de conférences* (university teaching position) (04/2019)
  Ranked 2nd in the competition for a MdC position at Sorbonne University, Paris
- Teaching assistant for Quantum Mechanics II, TU Wien (two terms, 2h/week, 2012–2014)
- Teaching assistant for Quantum Mechanics I, TU Wien (one term, 2h/week, 2013)
- Teaching assistant for Mathematics II for Geodesy, TU Wien (one term, 2h/week, 2012)

- Teaching assistant for Calculus I for Technical Physics, TU Wien (three terms, 2h/week, 2010–2012)

PUBLICATIONS:

(* = equal contribution, underlined = supervised student)

1. **A. Galler** and O. Neufeld: *Bulk photogalvanic current control and gap spectroscopy in 2D hexagonal materials*, submitted (2025)
   https://arxiv.org/abs/2504.14236
2. M. Kim*, T. Kim*, **A. Galler***, D. Kim, A. Chacon, K. Watanabe, T. Taniguchi, BJ Kim, S. Chae, M.-H. Jo, A. Rubio, O. Neufeld and J. Kim: *Quantum interference and occupation control in high harmonic generation from monolayer WS_2*, submitted (2025)
   https://arxiv.org/abs/2503.04335
3. M. Vandelli, **A. Galler**, A. Rubio, A. I. Lichtenstein, S. Biermann and E. A. Stepanov: *Doping-dependent charge- and spin-density wave orderings in a monolayer of Pb adatoms on Si(111)*, npj Quantum Materials 9 (1), 19 (2024)
   https://doi.org/10.1038/s41535-024-00630-w
4. **A. Galler**, A. Rubio and O. Neufeld: *Mapping light-dressed Floquet bands by highly nonlinear optical excitations and valley polarization*, J. Phys. Chem. Lett. 14, 50, 11298–11304 (2023)
   https://doi.org/10.1021/acs.jpclett.3c02936
5. J. Canfield, **A. Galler** and J. K. Freericks: *The Laplace method for energy eigenvalue problems in quantum mechanics*, Quantum Rep. 5(2), 370-397 (2023)
   https://doi.org/10.3390/quantum5020024
6. V. Ransmayr, Jan M. Tomczak and **A. Galler**: *Relation between crystal structure and optical properties in the correlated blue pigment $YIn_{1-x}Mn_xO_3$*, Phys. Rev. Materials 6, 105003 (2022)
   https://doi.org/10.1103/PhysRevMaterials.6.105003
7. **A. Galler** and L. V. Pourovskii: *Electronic structure of rare-earth mononitrides: quasiatomic excitations and semiconducting bands*, New J. Phys. 24, 043039 (2022)
   https://doi.org/10.1088/1367-2630/ac6317
8. J. Boust, **A. Galler**, S. Biermann and L. V. Pourovskii: *Combining semi-local exchange with dynamical mean-field theory: electronic structure and optical response of rare-earth sesquioxides*, Phys. Rev. B 105, 085133 (2022)
   https://doi.org/10.1103/PhysRevB.105.085133
9. **A. Galler**, S. Ener, F. Maccari, I. Dirba, K. P. Skokov, O. Gutfleisch, S. Biermann and L. V. Pourovskii: *Intrinsically weak magnetic anisotropy of cerium in potential hard-magnetic intermetallics*, npj Quantum Materials 6, 2 (2021)
   https://doi.org/10.1038/s41535-020-00301-6
10. **A. Galler** and P. Thunström: *Orbital and electronic entanglement in quantum teleportation schemes*, Phys. Rev. Research 3, 033120 (2021)
    https://doi.org/10.1103/PhysRevResearch.3.033120
11. **A. Galler**, J. Boust, A. Demourgues, S. Biermann and L. V. Pourovskii: *Correlated electronic structure and optical response of rare-earth based semiconductors*, Phys. Rev. B (Letter) 103, L241105 (2021)
    https://doi.org/10.1103/PhysRevB.103.L241105
12. **A. Galler**, J. Canfield and J. K. Freericks: *Schrödinger's original quantum-mechanical solution for hydrogen*, Eur. J. Phys. 42, 035405 (2021)
    https://doi.org/10.1088/1361-6404/abb9ff
13. **A. Galler**, P. Thunström, J. Kaufmann, M. Pickem, J. M. Tomczak and K. Held: *The AbinitioDΓA*

project v1.0: Non-local correlations beyond and susceptibilities within dynamical mean-field theory, Computer Physics Communications 245, 106847 (2019)
https://doi.org/10.1016/j.cpc.2019.07.012

14. **A. Galler**, J. Kaufmann, P. Gunacker, M. Pickem, P. Thunström, J. M. Tomczak and K. Held: *Towards ab initio calculations with the dynamical vertex approximation*, J. Phys. Soc. Jpn. 87, 041004 (2018)
https://doi.org/10.7566/JPSJ.87.041004

15. **A. Galler**, P. Thunström, P. Gunacker, J. M. Tomczak and K. Held: *Ab initio dynamical vertex approximation*, Phys. Rev. B 95, 115107 (2017)
https://doi.org/10.1103/PhysRevB.95.115107

16. **A. Galler**, C. Taranto, M. Wallerberger, M. Kaltak, G. Kresse, G. Sangiovanni, A. Toschi and K. Held: *Screened moments and absence of ferromagnetism in FeAl*, Phys. Rev. B 92, 205132 (2015)
https://doi.org/10.1103/PhysRevB.92.205132

CONFERENCE PROCEEDINGS:

17. **A. Galler**, A. Rubio and O. Neufeld: *Direct signatures of light-driven bands in ultrafast nonlinear optical excitations*, High-Brightness Sources and Light-Driven Interactions Congress, Technical Digest Series, paper EW2A.2, Optica Publishing Group (2024)

INVITED TALKS:

1. **Materials Research Society (MRS) Fall Meeting**, Symposium dedicated to "Rare earth nitrides: From fundamental advances to device applications" (Boston, USA, 11/2025)
Evolution of the electronic structure and optical gaps in rare-earth mononitrides

2. **Psi-k Conference**, Symposium dedicated to "Advances and applications of non-perturbative many-body methods" (Lausanne, Switzerland, 08/2025)
Tackling electronic correlation effects in two-dimensional quantum materials

3. **Spring Meeting of the German Physical Society (DPG)**, Atomic, Molecular, Quantum Optics and Photonics Section (SAMOP) (Bonn, Germany, 03/2025)
Strong-field physics and nonlinear optical phenomena in two-dimensional hexagonal materials

4. **New Generation in Strongly Correlated Electron Systems Conference (NGSCES 2024)** (Platja d'Aro, Spain, 10/2024)
A first-principles approach to the colour of correlated pigment materials

5. **DMFT-QE Symposium**, Center for Computational Quantum Physics, New York (online, 09/2024)
Semi-local exchange and dynamical mean-field theory approach to the electronic structure of rare-earth semiconductors

6. **31st Conference of the Condensed Matter Division (CMD31)** of the European Physical Society (Braga, Portugal, 09/2024)
Intrinsically weak magnetic anisotropy of cerium in potential hard-magnetic intermetallics

7. **CECAM Workshop** on Green's function methods (Toulouse, France, 11/2022)
Two-particle Green's functions for realistic materials' computations

8. **Young Researchers' Meeting 2021** of the European Theoretical Spectroscopy Facility (ETSF) (Cagliari, Italy, 09/2021)
Ab-initio calculations for materials with correlated 3d and 4f shells

9. **Workshop on Correlations in Novel Quantum Materials (CNQM)**, Max Planck Institute for Solid State Research, Stuttgart (online, 06/2021)
Tackling electronic correlations in rare-earth compounds

10. **Summer school 'Bandstructure meets quantum field theory'** (Wien, Austria, 07/2018)
    Tutorial on the AbinitioDΓA computer program
11. **Young Scientists' Meeting** of the Marie Curie CCQED network (Landeck, Austria, 03/2014)
    Electronic structure of solids: The LDA+DMFT approach

INVITED SEMINAR TALKS:

1. **Institut de Physique et Chimie des Matériaux de Strasbourg** (France, 02/2024)
   From colour pigments to laser-driven 2D materials: a glimpse into the optical response of solids
2. **University of Bremen** (Germany, 11/2023)
   A glimpse into the optical response of solids: from colour pigments to laser-driven 2D materials
3. **Friedrich-Alexander University of Erlangen-Nürnberg** (Germany, 11/2023)
   A glimpse into the optical response of solids: from colour pigments to laser-driven 2D materials
4. **Johannes Gutenberg University Mainz** (Germany, 06/2023)
   Electronic structure of correlated materials: new methods and applications
5. **University of Bristol** (UK, 05/2023)
   Electronic structure of correlated materials: new methods and applications
6. **Victoria University of Wellington**, New Zealand (online, 03/2023)
   A first-principles approach to the electronic structure of rare-earth semiconductors
7. **ETSFlab seminar** of the European Theoretical Spectroscopy Facility ETSF (online, 05/2022)
   Tackling nonlocal electronic correlations with the dynamical vertex approximation
8. **MPI for the Structure and Dynamics of Matter**, Hamburg (online, 05/2021)
   Electronic structure of correlated materials: new methods and applications
9. **Institute of Theoretical Nanophysics, LMU Munich** (online, 11/2020)
   Orbital and electronic entanglement in quantum teleportation schemes
10. **Institut de Physique et Chimie des Matériaux de Strasbourg** (online, 06/2020)
    Intrinsically weak magnetic anisotropy of cerium in potential hard-magnetic intermetallics
11. **Laboratoire de Physique des Solides (LPS), Université Paris-Sud** (online, 06/2020)
    Intrinsically weak magnetic anisotropy of cerium in potential hard-magnetic intermetallics
12. **Institut de Minéralogie, de Physique des Matériaux et de Cosmochimie, Sorbonne Université** (France, 03/2019)
    Electronic structure of correlated materials from first principles: new methods and applications
13. **Institut Néel, Université Grenoble-Alpes** (France, 02/2019)
    Electronic correlations in potential new rare-earth permanent magnet materials
14. **Radboud University Nijmegen** (Netherlands, 09/2018)
    Electronic structure of correlated materials from first principles: new methods and applications
15. **University of Innsbruck** (Austria, 02/2017)
    Towards a realistic description of materials with nonlocal electronic correlations
16. **Dahlem Center for Complex Quantum Systems, FU Berlin** (Germany, 02/2017)
    Towards a realistic description of materials with nonlocal electronic correlations
17. **Uppsala University** (Sweden, 12/2016)
    Towards a realistic description of materials with nonlocal electronic correlations"

CONTRIBUTED TALKS:

1. **TRIQS Meeting** (Paris, France, 06/2025)
   Correlation effects in two-dimensional charge density wave materials
2. **Global Physics Summit of the American Physical Society (APS)** (Anaheim, USA, 03/2025)
   Direct signatures of light-driven bands in ultrafast nonlinear optical excitations
3. **13th Nonequilibrium Quantum Workshop** (Krvavec, Slovenia, 12/2024)
   Direct signatures of light-driven bands in ultrafast nonlinear optical excitations
4. **Computational Materials Science Workshop** (Weiz, Austria, 09/2024)
   First-principles insights into the magnetic anisotropy of Ce-Fe intermetallics
5. **TRIQS Meeting** (Paris, France, 07/2024)
   A first-principles approach to the electronic structure of rare-earth semiconductors
6. **DPG Spring Meeting**, Condensed Matter Section (Berlin, Germany, 03/2024)
   Orbital and electronic entanglement in quantum teleportation schemes
7. **Optica High-Brightness Sources and Light-Driven Interactions Congress** (Wien, 03/2024)
   Direct signatures of light-driven bands in ultrafast nonlinear optical excitations
8. **Alpe-Adria Condensed Matter Theory Seminar** (Ljubljana, Slovenia, 02/2024)
   Direct signatures of light-driven bands in ultrafast nonlinear optical excitations
9. **CMD30-FisMat Conference** of the Condensed Matter Division of the European Physical Society (Milano, Italy, 09/2023)
   Mapping light-dressed Floquet bands by highly nonlinear optical excitations
10. **March Meeting of the American Physical Society (APS)** (Las Vegas, USA, 03/2023)
    Electronic structure and optical response of rare-earth semiconductors obtained by semi-local exchange and dynamical mean-field theory
11. **Psi-k Conference** (Lausanne, Switzerland, 08/2022)
    A first-principles approach to the colour of correlated pigment materials
12. **NGSCES 2019 Conference** (Pescara, Italy, 09/2019)
    Correlated pigment materials: a dynamical mean-field study
13. **APS March Meeting** (Boston, USA, 03/2019)
    Electronic correlations in potential new rare-earth permanent magnet materials
14. **NGSCES 2018 Conference** (Donostia-San Sebastián, Spain, 09/2018)
    Electronic correlations in rare-earth permanent magnets
15. **DPG Spring Meeting** Condensed Matter Section (Berlin, Germany, 03/2018)
    Ab-initio treatment of electronic correlations with the dynamical vertex approximation
16. **Summer school** on UV and X-ray spectroscopies of correlated electron systems (Les Houches, France, 09/2017)
    Ab-initio dynamical vertex approximation
17. **NGSCES 2016 Conference** (Trieste, Italy, 09/2016)
    Ab-initio treatment of nonlocal electronic correlations with the dynamical vertex approximation
18. **Summer school** of the FWF doctoral school Solids4fun (Waidhofen, Austria, 07/2016)
    AbinitioDΓA: a new method for materials with nonlocal electronic correlations
19. **APS March Meeting** (Baltimore, USA, 03/2016)
    Ab-initio treatment of nonlocal electronic correlations with the dynamical vertex approximation
20. **Solids4fun summer school** (Hernstein, Austria, 07/2015)

Screened moments and absence of ferromagnetism in FeAl

21. **Summer school** of the Simons Collaboration on the Many Electron Problem (Stony Brook, USA, 06/2015)
Screened moments and absence of ferromagnetism in FeAl
22. **DPG Spring Meeting**, Condensed Matter Section (Berlin, Germany, 03/2015)
Magnetic properties of FeAl: an LDA+DMFT study

CONTRIBUTED POSTERS:

1. **APS March Meeting** (Boston, USA, 03/2019)
Ab-initio study of new, correlated colour pigments
2. **International Workshop** on the ab-initio description of iron and steel: thermodynamics, kinetics and defects (Ringberg castle, Germany, 11/2018)
(De)localization in Ce-compounds—a dynamical mean-field view
3. **Winter school** of the CNRS groupement de recherche: Matériaux, Etats Electroniques, Interactions et Couplages non-Conventionnels (Banyuls sur mer, France, 02/2018)
Ab-initio study of correlated pigment materials
4. **Theory winter school** on the modeling of correlated electron materials, National high magnetic field laboratory (Tallahassee, USA, 01/2017)
Ab-initio dynamical vertex approximation
5. **Young scientists meeting** of the DFG research unit: Dynamical mean-field approach with predictive power for strongly correlated materials (Würzburg, Germany, 02/2015)
Correlation effects in the intermetallic $CrSb_2$
6. **Workshop "Quantum Critical Matter–from Atoms to Bulk"** (Obergurgl, Austria, 08/2014)
Correlation effects in the intermetallic $CrSb_2$
7. **Summer school** of the doctoral school Solids4fun (Hernstein, Austria, 07/2014)
The correlated semiconductor $CrSb_2$
8. **ViCom Young Researchers Meeting** (Wien, Austria, 04/2014)
The correlated semiconductor $CrSb_2$
9. **DPG Spring Meeting**, Condensed Matter Section (Dresden, Germany, 04/2014)
The correlated semiconductor $CrSb_2$
10. **DPG Spring Meeting**, Condensed Matter Section (Regensburg, Germany, 03/2013)
Electronic correlations in FeAl: an LDA+DMFT study

PROFESSIONAL SERVICES AND AFFILIATIONS:

1. **Reviewer for:**
- Journals: Physical Review B, Physical Review Letters, SciPost Physics
- Grants: National Science Centre (Poland)
- Workshops: Centre Européen de Calcul Atomique et Moléculaire (CECAM)
- Awards: University of Liège (Belgium)

2. **Member:** American Physical Society (APS), German Physical Society (DPG)
3. **Session chair:** APS March Meeting (Anaheim, 2025), DPG Spring Meeting (Bonn, 2025), NGSCES (Platja d'Aro, 2024), Optica HILAS (Vienna, 2024)
3. **Host of research visits:** Dr. Anna Kauch (TU Wien, 05/2025), Dr. Denitsa Baykusheva (ISTA Wien, 04/2024)

PROFESSIONAL DEVELOPMENT:

- **Individual career coaching**, incl. academic career planning and leadership training, TU Graz (Austria, 2025–)
- **Mentoring** program for early-career scientists, TU Graz (Austria, 2024–2025)
- **DynaMENT** mentoring program of DESY and Hamburg University (Germany, 2022–2024)
  Career development for women in science, incl. negotiation, agile work and mental health workshops.

LANGUAGES:

- **English**: fluent (University of Cambridge Examinations, First Certificate in English, 2006)
- **French**: fluent (Diplôme d'études en langue française, DELF B2, 2021)
- **Italian**: fluent
- **German**: mother tongue

OUTREACH:

- **Podcast** episode for the podcast *Bridge the gap*, TU Graz (03/2025)
  https://open.spotify.com/episode/5twLKl9hmGolbMs8KThy85
- **Podcast** episode for the podcast *Talk science to me*, TU Graz (06/2024)
  https://open.spotify.com/episode/6sXYAghh8vvxub8Am0YEIF
- **News article** on my FWF Elise-Richter research project, TU Graz (05/2024)
  Playing with material properties
  https://www.tugraz.at/en/news/article/das-spiel-mit-materialeigenschaften
- **Film portrait** about my research in the television channel *RAI Südtirol* (Italy, 05/2022)
- **General public presentation** for the student foundation *ProScientia* (Wien, 06/2021)
  Die Physik der Farben
- **Interview** on my research for the *Südstern* network (Bozen, Italy, 01/2021)
  Bei Elektronen und Atomen ist sie daheim
  https://www.suedstern.org/stories/show/546-bei-elektronen-und-atomen-ist-sie-daheim
- **Article** for Scilog, the online magazine of the Austrian Science Fund FWF (12/2020)
  The colours of Paris

updated 06/2025