Theoretical quantum physicist (CNRS)

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Personal details

Name: Johannes Schachenmayer
Born: 19. July 1982, Deggendorf, Germany (Nationality: German)
Languages: English, French (intermediate), German (native)

Scientific education & career

- **Since Oct. 2016:**
  Chargé de recherche (CRCN, Section 4), CNRS, IPCMS & ISIS, Université de Strasbourg, France
- **June 2013 - Sept. 2016:**
  Postdoctoral Fellow, JILA, University of Colorado & NIST, Boulder, USA (Group of A. M. Rey)
- **May 2011 - May 2013:**
  Doctoral Research Scholar, University of Pittsburgh, USA (Group of A. J. Daley)
- **Apr. 2009 - Dec. 2012:**
  Doctoral student, Universität Innsbruck, Austria (Group of P. Zoller)

Diplomas

- **Degree:** Habilitation à diriger des recherches (HDR, 12. Nov. 2019)
  Institution: Université de Strasbourg
- **Degree:** Doktor der Naturwissenschaften (Dr. rer. nat., PhD degree, 20. Dec. 2012)
  Institution: Universität Innsbruck, Austria
  Grade/Honours: Sehr gut (best possible), "Mit Auszeichnung" (with distinction)
- **Degree:** Diplom-Physiker Univ. (Dipl.-Phys. Univ., 5 year Master's degree, 4. Nov. 2008)
  Institution: Technische Universität München (TUM), Germany
  Grade/Honours: 1.0 (best possible), "Mit Auszeichnung" (with distinction)

Summary: publications & talks

- **45 publications**: Nature Materials (1), Nature Communications (3), Phys. Rev. X (2), Phys. Rev. Lett. (9), ACS Photonics (1), New. J. Phys. (5), Phys. Rev. A/B (15), Springer book chapter (1), ...
- **2700+ citations, h-index: 24** (Google scholar, Jan. 2022)
- **50+ visits** to international conferences/research groups, **45+ talks**: 25+ invited talks/seminars

Research Grants & Prizes

- **Research Prize**: Prix espoirs de l'Université de Strasbourg, 10k€, Sep. 2021
- **ECOS Sud (PI)**: Bilateral network grant (France – Chile)
  Project: *"Quantum dynamics in cavity-coupled molecules - numerical simulations and applications"*
  Jan. 2021–Dec. 2023 (funding for exchange visits)
- **International Emerging Action (IEA) (PI)**: Bilateral network grant (France – Chile)
  Project: *"Quantum many-body dynamics in cavity-coupled molecules"*
  Jan. 2021–Dec. 2022 (funding for exchange visits & meetings)
- **QUSTEC 2019 (PI)**: PhD research grant, ∼140k€
  Project: *"Semi-classical modelling of open quantum technology platforms"*
  Feb. 2020–Feb. 2024 (funding for 4-year PhD project)

- **LabEx NIE 2018 (PI)**: PhD research grant, 111k€
  Project: *"Novel approaches to quantum many-body dynamics in molecular complexes"*
  Sep. 2018–Sep. 2021 (funding for 3-year PhD project)
- **IdEx 2017 Attractivité (PI)**: research grant, 107k€
  Project: *"Simulation of transport in engineered many-body quantum systems"* (STEMQuS)
  Oct. 2017–Dec. 2018
- **FAPESP** (partner): grant for visiting PhD student (from São Paulo, Brazil)
  Project: *"Blockade effects with light-mediated dipole-dipole interactions"*
  Sep. 2017–Mar. 2018, PI: R. Bachelard (São Paulo, Brazil)
- **EquipEx+** (partner): large-scale interdisciplinary infrastructure grant
  Project: *"Atomic quantum computing as a service"* (aQCess)
  2021–2028, PI: S. Whitlock (ISIS/UNISTRA)
- **QuantERA 2018** (partner): research grant
  Project: *"Towards Room Temperature Quantum Technologies"* (ROUTE)
  2018–2021, PI: T. Ebbesen (ISIS/UNISTRA)
- **Computational grants:** HPC UNISTRA CPU hours [4.5M hours 2018-2021]

Supervision of students and post-docs

- **PhD student**: Guillermo Preisser, Feb. 2020–Feb. 2024 (QUSTEC grant)
- **PhD student**: David Wellnitz Oct. 2018–Feb. 2022 (LabEx NIE grant)
- **Post-doc**: Stefan Schütz, Oct. 2017–Sep. 2018 (IdEx Attractivité grant)
- **Visiting PhD student**: Tiago Santiago do Espirito Santo, Sep. 2017–Mar. 2018 (with R. Bachelard)
- **PhD students (co-supervision)**:
  Vineesha Srivastava (2020–2024, with G. Pupillo); T. Ley, (2021–2023 with P. Collet),
- **Master student projects** (A. Kasri 2021, G. Percebois 2019)

Teaching activities

- **Atomic physics 2019,2020,2021,2022** (Université de Strasbourg, Master 1, 10 hours each)
- **Many-body physics 2018,2019,2020,2021** (Université de Strasbourg, Master 2, 10 hours each)

Advisory activities

- **Industry**: Lead scientific advisor for QuantFI SAS (start-up in quantum finance, Paris, since 2021)
- **Evaluator for faculty hirings**: European Science Foundation
- **Reviewer for research grants**:
  National Science Centre Poland, University of Trento (Italy), SIRTEQ (Île-de-France)
- **Referee for scientific journals**: Nature Communications, Phys. Rev. X, Phys. Rev. Lett., IOP QST, New J. Phys., Phys. Rev. A/B, EPJ, SciPost, ...

Other responsibilities & activities

- **PhD committee**
  Rapporteur: A. Dunnett, Sorbonne Université, Paris, supervisor: A. Chin, 2021
- **Referent d'axe** "Correlations quantiques" in proposed renewal of the GDR "atomes froides" (Directeur: T. Bourdel)
- **QMAT** graduate school supervisor
- **Public outreach**: Interview about quantum computing in University newspaper, "Savoirs 42"

List of publications and pre-prints

Articles are openly available as pre-prints under: https://arxiv.org/a/schachenmayer_J_1.html

[1] *"The rise and fall, and slow rise again, of operator entanglement under dephasing"*
D. Wellnitz, G. Preisser, V. Alba, J. Dubail, and **J. Schachenmayer**
pre-print: arXiv:2201.05099 (2022)

[2] *"Entanglement dynamics in spin chains with structured long-range interactions"*
G. S. Bentsen, A. J. Daley, and **J. Schachenmayer**
Invited book chapter: "Entanglement in Spin Chains – Theory and Quantum Technology Applications", (Springer, submitted, 2022)

[3] *"Disorder enhanced vibrational entanglement and dynamics in polaritonic chemistry"*
D. Wellnitz, G. Pupillo, and **J. Schachenmayer**
pre-print: arXiv:2107.06053 (accepted in Comm. Phys. 2022)

[4] *"Large Random Arrowhead Matrices: Multifractality, Semi-Localization, and Protected Transport in Disordered Quantum Spins Coupled to a Cavity"*
J. Dubail, T. Botzung, **J. Schachenmayer**, G. Pupillo, and D. Hagenmüller
pre-print: arXiv:2105.08444 (2021)

[5] *"A quantum optics approach to photoinduced electron transfer in cavities"*
D. Wellnitz, G. Pupillo, and **J. Schachenmayer**
J. Chem. Phys. 154, 054104 (2021)

[6] *"Dark state semilocalization of quantum emitters in a cavity"*
T. Botzung, D. Hagenmüller, S. Schütz, J. Dubail, G. Pupillo, and **J. Schachenmayer**
Phys. Rev. B 102, 144202 (2020)

[7] *"Photon blockade with ground-state neutral atoms"*
A. Cidrim, T. S. do Espirito Santo, **J. Schachenmayer**, R. Kaiser, and R. Bachelard
Phys. Rev. Lett. 125, 073601 (2020)

[8] *"Adiabatic preparation of entangled, magnetically ordered states with cold bosons in optical lattices"*
A. Venegas-Gomez, **J. Schachenmayer**, A. S. Buyskikh, W. Ketterle, M. L. Chiofalo, and A. J. Daley
Quantum Science and Technology 5, 045013 (2020)

[9] *"Collective Dissipative Molecule Formation in a Cavity"*
D. Wellnitz, S. Schütz, S. Whitlock, **J. Schachenmayer**, and Guido Pupillo
Phys. Rev. Lett. 125, 193201 (2020)

[10] *"Adiabatic elimination for ensembles of emitters in cavities with dissipative couplings"*
D. Hagenmüller, S. Schütz, G. Pupillo, C. Genes, and **J. Schachenmayer**
Phys. Rev. A 101, 013617 (2020)

[11] *"Dynamics of rotated spin states and magnetic ordering with two-component bosonic atoms in optical lattices"*
A. Venegas-Gomez, A. S. Buyskikh, **J. Schachenmayer**, W. Ketterle, and Andrew J. Daley
Phys. Rev. A 102, 023321 (2020)

[12] *"Collective Excitation Dynamics of a Cold Atom Cloud"*
T. S. do Espirito Santo, P. Weiss, A. Cipris, R. Kaiser, W. Guerin, R. Bachelard, and **J. Schachenmayer**
Phys. Rev. A 101, 013617 (2020) (Editors' Suggestion)

[13] *"Ensemble-induced strong light-matter coupling of a single quantum emitter"*
S. Schütz, **J. Schachenmayer**, D. Hagenmüller, V. Sandoghdar, T. W. Ebbesen, C. Genes, and G. Pupillo
Phys. Rev. Lett. 124, 113602 (2020)

[14] *"Exploring Superconductivity under Strong Coupling with the Vacuum Electromagnetic Field"*
A. Thomas, E. Devaux, K. Nagarajan, T. Chervy, M. Seidel, D. Hagenmüller, S. Schütz, **J. Schachenmayer**, C. Genet, G. Pupillo, and T. W. Ebbesen
arXiv:1911.01459 (2019)

[15] *"Collective Multi-mode Vacuum Rabi Splitting "*
W. Guerin, T. S. do Espirito Santo, P. Weiss, A. Cipris, **J. Schachenmayer**, R. Kaiser, and R. Bachelard
Phys. Rev. Lett. 123, 243401 (2019).

[16] *"Doublon dynamics of Bose-Fermi mixtures in optical lattices"*
M. Gärttner, A. Safavi-Naini, **J. Schachenmayer**, and A. M. Rey
Phys. Rev. A 100, 053607 (2019)

[17] *"A generalized phase space approach for solving quantum spin dynamics"*
B. Zhu, A. M. Rey, and **J. Schachenmayer**
New J. Phys. (Fast Track Communication) 21, 082001 (2019)

[18] *"Enhancement of the electron-phonon scattering induced by intrinsic surface plasmon-phonon polaritons"*
D. Hagenmüller, **J. Schachenmayer**, C. Genet, T. W. Ebbesen, and G. Pupillo
ACS Photonics 6, 1073 (2019)

[19] *"Out-of-equilibrium quantum magnetism and thermalization in a spin-3 many-body dipolar lattice system"*
S. Lepoutre, **J. Schachenmayer**, L. Gabardos, B. Zhu, B. Naylor, E. Marechal, O. Gorceix, A. M. Rey, L. Vernac, and B. Laburthe-Tolra
Nature Communications 10, 1714 (2019)

[20] *"Cavity-assisted mesoscopic transport of fermions: Coherent and dissipative dynamics"*
D. Hagenmüller, S. Schütz, **J. Schachenmayer**,C. Genes, and G. Pupillo
Phys. Rev. B 97, 205303 (2018)

[21] *"Exploring many body localization and thermalization using semiclassical method"*
O. L. Acevedo, A. Safavi-Naini, **J. Schachenmayer**, M. L. Wall, R. Nandkishore, and A. M. Rey
Phys. Rev. A 96, 033604 (2017)

[22] *"Cavity-enhanced transport of charge"*
D. Hagenmüller, **J. Schachenmayer**, S. Schütz, C. Genes, and G. Pupillo
Phys. Rev. Lett. 119, 223601 (2017)

[23] *"Laser noise imposed limitations of ensemble quantum metrology"*
D. Plankensteiner, **J. Schachenmayer**, H. Ritsch, and C. Genes
J. Phys. B 49, 245501 (2016)

[24] *"Spin-orbit coupled correlated metal phase in Kondo lattices: an implementation with alkaline-earth atoms"*
L. Isaev, **J. Schachenmayer**, and A. M. Rey
Phys. Rev. Lett. 117, 135302 (2016)

[25] *"Doublon dynamics and polar molecule production in an optical lattice"*
J. P. Covey, S. A. Moses, M. Gärttner, A. Safavi-Naini, M. T. Miecnikowski, Z. Fu, **J. Schachenmayer**, P. S. Julienne, A. M. Rey, D. S. Jin, and J. Ye
Nature Communications 7, 11279 (2016)

[26] *"Collective atomic scattering and motional effects in a dense coherent medium"*
S. L. Bromley, B. Zhu, M. Bishof, X. Zhang, T. Bothwell, **J. Schachenmayer**, T. L. Nicholson, R. Kaiser, S. F. Yelin, M. D. Lukin , A. M. Rey, and J. Ye
Nature Communications 7, 11039 (2016)

[27] *"Entanglement growth and correlation spreading with variable-range interactions in spin and fermionic tunnelling models"*
Anton S. Buyskikh, Maurizio Fagotti, **J. Schachenmayer**, Fabian Essler, and A. J. Daley
Phys. Rev. A 93, 053620 (2016)

[28] *"Adiabatic cooling of bosons in lattices to magnetically ordered quantum states"*
J. Schachenmayer, D. M. Weld, H. Miyake, G. A. Siviloglou, A. J. Daley, and W. Ketterle
Phys. Rev. A 92, 041602(R) (2015)

[29] *"Synchronization of interacting quantum dipoles"*
B. Zhu, **J. Schachenmayer**, M. Xu, F. Herrera, J. G. Restrepo, M. J. Holland, and A. M. Rey
New J. Phys. 17 083063 (2015)

[30] *"Dynamics of correlations in two-dimensional spin models with long-range interactions: A phase-space Monte-Carlo study"*
J. Schachenmayer, A. Pikovski, and A. M. Rey
New J. Phys. 17, 065009 (2015)

[31] *"Cavity-enhanced transport of excitons"*
J. Schachenmayer, C. Genes, E. Tignone, and G. Pupillo
Phys. Rev. Lett. 114, 196403 (2015)

[32] *"Conductivity in organic semiconductors hybridized with the vacuum field"*
E. Orgiu, J. George, J. A. Hutchison, E. Devaux, J. F. Dayen, B. Doudin, F. Stellacci, C. Genet, **J. Schachenmayer**, C. Genes, G. Pupillo, P. Samori, T. W. Ebbesen
Nature Materials 14, 1123–1129 (2015)

[33] *"The local density of states on a vibrational quantum dot out of equilibrium"*
K. F. Albrecht, A. Martin Rodero, **J. Schachenmayer**, L. Mühlbacher
Phys. Rev. B 91, 064305 (2015)

[34] *"Many-body quantum spin dynamics with Monte-Carlo trajectories on a discrete phase space"*
J. Schachenmayer, A. Pikovski, and A. M. Rey
Phys. Rev. X 5, 011022 (2015)

[35] *"Thermalization of strongly interacting bosons after spontaneous emissions in optical lattices"*
J. Schachenmayer, L. Pollet, M. Troyer and A. J. Daley
EPJ Quantum Technology, 2:1 (2015)

[36] *"Light scattering and dissipative dynamics of many fermionic atoms in an optical lattice"*
S. Sarkar, S. Langer, **J. Schachenmayer**, and A. J. Daley
Phys. Rev. A 90, 023618 (2014)

[37] *"Suppressing the loss of ultracold molecules via the continuous quantum Zeno effect"*
B. Zhu, B. Gadway, M. Foss-Feig, **J. Schachenmayer**, M. Wall, K. R. A. Hazzard, B. Yan, S. A. Moses, J. P. Covey, D. S. Jin, J. Ye, M. Holland, and A. M. Rey
Phys. Rev. Lett. 112, 070404 (2014)

[38] *"Spontaneous emissions and thermalization of cold bosons in optical lattices"*
J. Schachenmayer, L. Pollet, M. Troyer, and A. J. Daley
Phys. Rev. A 89, 011601(R) (2014)

[39] *"Entanglement growth in quench dynamics with variable range interactions"*
J. Schachenmayer, B. P. Lanyon, C. F. Roos, and A. J. Daley
Phys. Rev. X 3, 031015 (2013)

[40] *"Heating dynamics of bosonic atoms in a noisy optical lattice"*
H. Pichler, **J. Schachenmayer**, A. J. Daley, and P. Zoller
Phys. Rev. A 87, 033606 (2013)

[41] *"Noise- or disorder- resilient optical lattices"*
H. Pichler, **J. Schachenmayer**, J. Simon, P. Zoller, and A. J. Daley
Phys. Rev. A 86, 051605(R) (2012)

[42] *"Measuring entanglement growth in quench dynamics of bosons in an optical lattice"*
A. J. Daley, H. Pichler, **J. Schachenmayer**, and P. Zoller
Phys. Rev. Lett. 109, 020505 (2012)

[43] *"Atomic matter-wave revivals with definite atom number in an optical lattice"*
J. Schachenmayer, A. J. Daley, and P. Zoller
Phys. Rev. A 83, 043614 (2011)

[44] *"Dynamical crystal creation with polar molecules or Rydberg atoms in optical lattices"*
J. Schachenmayer, I. Lesanovsky, A. Micheli, and A. J. Daley
New J. Phys. 12, 103044 (2010)

[45] *"Time-dependent currents of 1D bosons in an optical lattice"*
J. Schachenmayer, G. Pupillo, and A. J. Daley
New J. Phys. 12, 025014 (2010)

Selected talks

1. *Invited talk*, Séminaire matière condensée, LPS Mar. 24, 2022, Saclay, France
   Title: *Dynamics of "entanglement" in ensembles of cold atoms or molecules out of equilibrium*
2. *Invited talk*, Conference, CoScaLi 2021, Sep. 12–Sep. 17, 2021, Porquerolles, France
   Title: *Collective dynamics of "molecules" in a cavity*
3. *Invited talk*, KITP Conference: Transport & Efficient Energy Conversion in Quantum Systems, Aug. 30–Sep. 2, 2021, Santa Barbara, CA, USA (held online)
   Title: *Modified transport properties of dark eigenstates under strong light-matter coupling*

4. *Invited talk*, Conference: Quantum simulations of molecular energy transport (CEFIPRA Symposium), Nov. 30–Dec. 1, 2020, IISER Bhopal, India (held online)
   Title: *Transport and localization properties of dark states under strong light-matter coupling*

5. *Invited talk*, Conference: CoOLMe 2020 (GdR atomes froids), Nov. 16–18, 2020, (held online)
   Title: *Entanglement dynamics and quantum thermalization with ultracold chromium atoms*

6. *Invited talk*, Conference: Long Range Interacting Quantum Systems (French-German WE-Heraeus seminar), Sep. 21–25, 2020, Bad Honnef, Germany (held online)
   Title: *Localization properties of dark eigenstates under strong light-matter coupling*

7. *Talk*, Conference: Molecular Quantum Technology 2019, Dec. 16–20, 2019, Puerto Natales, Chile
   Title: *The Fate of Anderson Localization Under Strong Coupling*

8. *Invited talk*, Conference: Atoms and photons 2019, Nov. 5-7, 2019, Nice, France
   Title: *The Fate of Anderson Localization Under Strong Coupling*

9. *Invited talk*, Conference: Quantum and Classical Systems with Long-Range Interactions, Jul. 15–19, 2019, Natal, Brazil
   Title: *Dynamics in dipolar lattice systems: A semi-classical perspective on entanglement build-up and thermalization*

10. *Invited talk*, Conference: Molecular Polaritonics 2019, Jul. 7-11, 2019, Miraflores de la Sierra, Spain
    Title: *Numerical simulations of ultra-cold atom experiments: Applications to molecular polaritonics?*

11. *Invited talk*, Colloquium: International Max Planck Research School, Mar. 21, 2019, Erlangen, Germany
    Title: *Thermalization in quantum spin models: A semi-classical perspective*

12. *Invited talk*, Seminar: Theory of Quantum Matter Group, ENS Lyon, Jan. 24, 2019, Lyon, France
    Title: *Dynamics of correlations and thermalization of dipolar quantum spin models: A semi-classical perspective*

13. *Invited talk*, Seminar: Institute for Molecular Science (IMS), Dec. 13, 2018, Okazaki, Japan
    Title: *Quantum thermalization in a spin-3 many-body model in an optical lattice*

14. *Invited talk*, Seminar: Computational Nonlinear & Quantum Optics Group, University of Strathclyde, Sep. 14, 2018, Glasgow, Scotland, UK
    Title: *Entanglement build-up and thermalization with Chromium atoms in an optical lattice*

15. *Invited talk*, Seminar: Max Planck Institute for the Science of light (MPL), Jul. 3, 2018, Erlangen, Germany
    Title: *Semi-classical approaches to many-body spin-dynamics*

16. *Invited talk*, CQD Colloquium, Physikalisches Institut, Universität Heidelberg, May. 16, 2018, Germany
    Title: *Semi-classical numerical approaches to many-body spin-dynamics*

17. *Invited talk*, Seminar: Theoretical Chemistry Group, UCSD, Mar. 11, 2018, San Diego, USA
    Title: *Semi-classical numerical approaches to many-body spin-dynamics*

18. *Invited talk*, Seminar: Groupe de Physique Statistique, Université de Lorraine, Feb. 8, 2018, Nancy, France
    Title: *Exploring dynamics and entanglement in quantum many-body lattice systems*

19. *Invited talk*, Conference: Entangled Interacting Quantum Matter (ENIQMA), Nov. 27-28, 2017, Lille, France
    Title: *Simulating quantum many-body dynamics with discrete Wigner functions*

20. *Invited talk*, Seminar: FOTONIKA-LV, Latvijas Universitate, Oct. 26, 2017, Riga, Latvia
    Title: *Phase-space dynamics of quantum many-body models*

21. *Invited talk*, OSA Latin America Optics & Photonics Conference, Aug. 22–25, 2016, Medellín, Colombia
    Title: *Exploring Quantum Many-Body Spin Dynamics with Truncated Wigner Methods*

22. *Invited talk*, Conference: CoScaLi 2016, May. 9–12, 2016, Ubatuba, Brazil
    Title: *Collective atomic emission and its interplay with motional effects*

23. *Invited talk*, Conference: APS March Meeting, Mar. 14–18, 2016, Baltimore, Maryland, USA
    Title: *Exploring Quantum Many-Body Spin Dynamics with Truncated Wigner Methods*

24. *Invited talk*, Conference: ICAM Energy Transport Workshop 2015, Dec. 14–16, 2015, Boulder, Colorado, USA
    Title: *Cavity and vacuum field effects on exciton and charge transport in organic semiconductors*

25. *Invited talk*, Seminar: Departamento de Física, Universidad de Santiago de Chile, Oct. 14, 2015
    Title: Numerical computations of quantum many-body dynamics & Cavity-assisted transport

26. *Invited talk*, Seminar: Institut für Theoretische Physik (ITP), Aug. 17, 2015, Innsbruck, Austria Title: *The discrete truncated Wigner approximation & Cavity enhanced transport*

27. *Talks*, Conference: APS DAMOP Meeting, Jun. 8–12, 2015, Columbus, Ohio, USA
Title: "Transport dynamics in quantum lattice models and the discrete truncated Wigner approximation"
Title: "Novel phase-space Monte-Carlo method for quench dynamics in 1D and 2D spin models'

28. *Invited talk*, Conference: Frontiers in Optics/Laser Science 2014, Oct. 19–24, 2014, Tucson, Arizona, USA
Title: *Simulating many-body dynamics in systems of cold atoms, molecules, and ions*

29. *Talk*, Conference: APS DAMOP Meeting, Jun. 2–6, 2014, Madison, Wisconsin, USA *Title: "The truncated Wigner approximation for spin dynamics in systems of trapped ions, atoms & molecules"*

30. *Talk*, Conference: APS March Meeting, Mar. 3–7, 2014, Denver, Colorado, USA
Title: "Spin dynamics and entanglement growth with trapped ions, atoms & molecules"

31. *Talk* Conference: APS DAMOP Meeting Jun. 3–7, 2013, Quebec City, Quebec, Canada
Title: "Dynamical entanglement creation and measurement with cold atoms or ions"

32. *Talk*, Conference: APS March Meeting, Mar. 18–22, 2013, Baltimore, Maryland, USA
Title: "Spin dynamics and entanglement growth with trapped ions, atoms & molecules"

33. *Talk*, APS March Meeting, Mar. 29–31, 2012, Boston, Massachusetts, USA
Title: "Cold bosons in noisy optical lattices"

Older scientific and non-scientific achievements and experiences

- **Research project**, Max Planck Institute of Quantum Optics
Theory Division, Garching (Group of J. I. Cirac)
"Numerical simulation of 1D hard-core bosons" (Mar. - Aug. 2007)

- **Research project**, Max Planck Institute for Extraterrestrial Physics
Theory and Complex Plasmas Group, Garching
"C & IDL code optimization" (Mar. – May 2006)

- **Alternative Civilian Service**, Bischof-Wittmann-Schule, Regensburg, Germany
School for mentally disabled children (2002-2003)

- **Repeated participation in "Start-Up Gründungswerkstatt"**
German-wide entrepreneurship competition
Placed 1st in 2001, 2nd in 2000 (now http://www.dgp-schueler.de)