
Research and Professional Experience

- 09/2017 -today **Texas A&M University, College Station, TX 77843, USA.**
Associate Research Scientist
- 01/2014 -08/2017 **Brookhaven Natl. Lab./ Stony Brook University/ Texas A&M University.**
Postdoctoral Associate / Senior Postdoctoral Associate
Supervisor: Prof. Dr. Meigan Aronson
- Studied magnetism and quantum criticality in transition-metal compounds.
 - Discovered a potentially new kind of topological insulator state in surface states of Half-Heusler materials.
 - Mentored undergraduate and graduate students in materials synthesis and advanced electrical transport experiments.
- 09/2009 -12/2013 **Max Planck Institute for Chemical Physics of Solids, 01187 Dresden, Germany.**
Research Associate (Postdoc)/ Guest Scientist
Supervisors: Prof. Dr. Frank Steglich, Dr. Manuel Brando
- Co-discovered a superconducting phase in YbRh_2Si_2 at ultra-low temperatures and developed an ac susceptometer setup for advanced magnetic characterizations at these extreme conditions. This project included one year of work operating a PrNi_5 nuclear demagnetization cryostat.
(Joint project with Walther Meissner Institute, Garching, Germany)
 - Studied magnetic and quadrupolar ordering in the ternary clathrate $\text{Pr}_3\text{Pd}_{20}\text{Si}_6$.
 - Discovered a valley-dependent imbalance in the density of states in bulk bismuth, suggesting a new electronic phase at low temperatures.
 - Mentored a Master's student on a project involving transport and magnetic characterizations of heavy Fermion materials at ultra-low temperatures.
- 03/2005 -09/2009 **Walter Schottky Institute for Fundamental Research in Semiconductor Electronics, 85748 Garching, Germany.**
Research Assistant (Ph.D. student), Chair f. Experimental Semiconductor Physics 1
Supervisors: Prof. Dr. Gerhard Abstreiter, Dr. Matthew Grayson
Thesis: "Magnetotransport of coupled quantum Hall edges in a bent quantum well"
- Developed methods for fabrication and characterization of high-mobility GaAs/AlGaAs heterostructures grown by molecular beam epitaxy with cleaved-edge overgrowth and corner overgrowth techniques.
 - Characterized quantum Hall edge states at low temperatures and high magnetic fields with transport and tunnel spectroscopy.
 - Developed software for MATLAB-based Hartree simulations of electronic states in GaAs/AlGaAs heterostructures.

- Mentored a Master's student on a one-year project studying tunneling between high-mobility 2D electron systems in the quantum Hall regime.
- Co-wrote grants that successfully funded my position and lab equipment for two years, and authored multiple successful instrument time grants at high magnetic field laboratories in Grenoble (France), Nijmegen (Netherlands), and Tallahassee (USA).

2000 - 2004 **Filser Electronic GmbH, 86875 Waal, Germany.**

- Authored and translated technical manuals for GPS navigation instruments for small aircrafts.
- Worked in repairs and customer service during semester breaks.
- Represented the company at national pilot's meetings and exhibitions like Aero Friedrichshafen and the Paris Air Show.

Education and Training

09/2009 **Technical University of Munich.**

Ph. D. in Physics (Dr. rer. nat.), Grade: 1.0 (GPA equiv. 4.0, summa cum laude).

12/2004 **Technical University of Munich.**

Diplom (comparable to M. Sc.) in Physics, Grade: 1.0 (GPA equiv. 4.0, passed with distinction).

06/1999 **Frobenius Gymnasium Hammelburg.**

Abitur (German High School Diploma), Grade: 1.2 (equivalent to a GPA of 3.8/4.0).

Teaching and Mentoring

- **Supervising tutor of the diploma thesis "Tunneling between perpendicular two-dimensional electron systems" by Marco Neumair (Technical University of Munich) (12/2005-12/2006).** In Germany, it is customary for a Master's (formerly Diploma) student to work in close collaboration with a PhD student on a one year research project that becomes the subject of the student's Master's thesis. As the graduate student in this project, I served as the primary supervisor for his day-to-day research and the writing of his thesis.
- **Lab Course of Physics (summer term 2005 and 2006).**
- **English language physics tutorial for mechanical engineers (winter term 06/07).**
- **Mentored undergraduate and graduate students in scientific projects**
 - **Construction of a $^3\text{He}/^4\text{He}$ dilution refrigerator,** students **Sebastian Jakob** and **Simone Lingitz** (Technical University of Munich) (01/2005-03/2007)
 - **Synthesis and characterization of novel intermetallic compounds,** Students: **Shelby Zellman, Ashley Zebro, Benjamin Schweid, Jedediah Kistner-Morris, Plamen Kamenov, Akshat Puri, Gayle Geschwind, Haiming Deng** (Stony Brook University), **Claire Weaver** (Hofstra University), **Matthew Green, Mason Klemm** (Texas A&M University).

- **Construction of a compact magnetic AC susceptometer for use in Quantum Design PPMS systems.**
Adam Bender, Farmingdale State College.
(**Outstanding poster award** won by undergraduate Student **Adam Bender** at the 2015 International Energy and Sustainability Conference, Farmingdale State College, Nov 2015)
- **Photoinduced enhancement of quantum oscillations in pyrolytic graphite at low temperatures.**
Sravani Jaligama, Texas A&M University.

Awards

- 04/2017 **Outstanding Scholarly Publication Award 2016, Farmingdale State College.**
for the article "CaMn₂Al₁₀: Itinerant Mn magnetism on the verge of magnetic order", Phys. Rev. B **92**, 020413(R) (2015), co-authored with J. W. Simonson *et al.*
- 10/1999 **Advancement Award of the FAG Kugelfischer Foundation.**
for outstanding achievements in the subjects mathematics and physics.
- 06/1999 **Frobenius-Award of the T. A. Schachenmayer publishing company.**
for the best overall achievement in the 1999 Abitur exam.

Languages

- German native language
English fluent in written and spoken
French good reading, fair speaking
Spanish basic knowledge

Selected Conference Participations and Contributions

Gordon Research Conference on Correlated Electron Systems

Mount Holyoke College in South Hadley, USA, 24. - 29. June 2018. (invited talk)

2017 SPICE Workshop: Topology Matters

Mainz, Germany, 25. - 28. July 2017. (invited talk)

2017 Workshop on Strongly Correlated Materials: Topology and Quantum Phase Transitions

Rice University, Houston, USA, 23. - 24. January 2017. (invited talk)

2015 APS March meeting

San Antonio, USA, 2. - 6. March 2015. (invited talk)

2013 3rd International Workshop on McPhase

Berlin, Germany, 6. - 9. August 2013. (invited talk)

2012 International Conference on Quantum Criticality and Novel Phases

Dresden, Germany, 26. - 29. August 2012. (poster presentation)

2011 Spring Meeting of the German Physical Society

Dresden, Germany, 13. - 18. March 2012. (oral presentation)

2008 APS March Meeting

New Orleans, USA, 10. - 14. March 2008. (oral presentation)

2007 APS March Meeting

Denver, USA, 5. - 9. March 2007. (oral presentation)

ICPS 2006, 28th International Conference on the Physics of Semiconductors

Vienna, Austria, 24. - 28. July 2006. (oral presentation)

EP2DS 2005, 16th International Conference on Electronic Properties of Two-Dimensional Systems

Albuquerque, USA, 10. - 15. July 2005. (poster presentation)

EPQHS 2005, International Workshop on Emergent Phenomena in Quantum Hall Systems

Taos, USA, 7. - 9. July 2005. (poster presentation)

First Author Publications

L. Steinke, J. J. Kistner-Morris, T. F. Lovorn, H. He, A. D. Hillier, P. Miao, S. Zellman, M. Klemm, M. Green, O. Gonzalez, A. H. MacDonald and M. C. Aronson,

"Chiral transport and electronic correlations in surface states of HfNiSn single crystals"
arXiv:1805.06337, submitted to PNAS (2018).

L. Steinke, E. A. Schuberth, S. Lausberg, M. Tippmann, A. Steppke, C. Krellner, C. Krellner, C. Geibel, F. Steglich, and M. Brando,

"Ultra-low temperature ac susceptibility of the heavy-fermion superconductor YbRh₂Si₂"
Journal of Physics: Conference Series **807**, 052007 (2017).

L. Steinke, J. W. Simonson, W.-G. Yin, G. J. Smith, J. J. Kistner-Morris, S. Zellman, A. Puri, and M. C. Aronson,

"CaMn₂Al₁₀: Itinerant Mn magnetism on the verge of magnetic order"
Physical Review B **92**, 020413(R) (2015). **Editors' Suggestion**

R. Küchler*, **L. Steinke***, R. Daou, M. Brando, K. Behnia, and F. Steglich,

"Thermodynamic evidence for valley-dependent density of states in bulk bismuth"
Nature Materials **13**, 461 (2014). (*shared first authorship) **Cover Article**

L. Steinke, K. Mitumoto, C. F. Miclea, F. Weickert, A. Dönni, M. Akatsu, Y. Nemoto, T. Goto, H. Kitazawa, P. Thalmeier, and M. Brando,

"Role of Hyperfine Coupling in Magnetic and Quadrupolar Ordering of Pr₃Pd₂₀Si₆"
Physical Review Letters **111**, 077202 (2013).

L. Steinke, P. Cantwell, E. Stach, D. Schuh, A. Fontcuberta i Morral, M. Bichler, G. Abstreiter, and M. Grayson,

"Hartree simulations of coupled quantum Hall edge states in corner-overgrown heterostructures"
Physical Review B **87**, 165428 (2013).

L. Steinke, P. Cantwell, D. Zakharov, E. Stach, N. J. Zaluzec, A. Fontcuberta i Morral, M. Bichler, G. Abstreiter, and M. Grayson,

"Nanometer-scale sharpness in corner-overgrown heterostructures"
Applied Physics Letters **93**, 193117 (2008).

Also featured in Virtual Journal of Nanoscale Science & Technology **18**, vol. 22 (2008).

L. Steinke, D. Schuh, M. Bichler, G. Abstreiter, and M. Grayson,
"Hopping conduction in strongly insulating states of a diffusive bent quantum Hall junction"
Physical Review B **77**, 235319 (2008).

Co-authored Publications

M. Smidmann, O. Stockert, J. Arndt, G. M. Pang, L. Jiao, H. Q. Yuan, H. A. Vieyra, S. Kitagawa, K. Ishida, K. Fujiwara, T. C. Kobayashi, E. Schuberth, M. Tippmann, **L. Steinke**, S. Lausberg, A. Steppke, M. Brando, H. Pfau, U. Stockert, P. Sun, S. Friedemann, S. Wirth, C. Krellner, S. Kirchner, E. M. Nica, R. Yu, Q. Si, and F. Steglich
"Interplay between unconventional superconductivity and heavy-Fermion quantum criticality: $CeCu_2Si_2$ versus $YbRh_2Si_2$ "
Philosophical Magazine (2018).

S. Hamann, J. Zhang, D. Jang, A. Hannaske, **L. Steinke**, S. Lausberg, L. Pedrero, C. Klingner, M. Baenitz, F. Steglich, C. Krellner, C. Geibel, and M. Brando,
"Evolution from Ferromagnetism to Antiferromagnetism in $Yb(Rh_{1-x}Co_x)_2Si_2$ "
arXiv:1806.05088 (2018).

A. A. Sirusi, A. Page, **L. Steinke**, M. C. Aronson, C. Uher, and J. H. Ross, Jr.,
"Unconventional Large Linear Magnetoresistance in $Cu_{2-x}Te$ "
AIP Advances **8**, 055135 (2018).

E. Schuberth, M. Tippmann, **L. Steinke**, S. Lausberg, A. Steppke, M. Brando, C. Krellner, C. Geibel, R. Yu, Q. Si, and F. Steglich,
"Emergence of superconductivity in the canonical heavy-electron metal $YbRh_2Si_2$ "
Science **351**, 485 (2016).

V. Thampy, M. P. M. Dean, N. B. Christensen, **L. Steinke**, Z. Islam, M. Oda, M. Ido, N. Momono, S. B. Wilkins, and J. P. Hill,
"Rotated stripe order and its competition with superconductivity in $La_{1.88}Sr_{0.12}CuO_4$ "
Physical Review B **90**, 100510(R) (2014). **Editors' Suggestion**

S. Lausberg, A. Hannaske, A. Steppke, **L. Steinke**, T. Gruner, C. Krellner, C. Klingner, R. Borth, T. Lühmann, C. Krellner,
"Doped $YbRh_2Si_2$: Not Only Ferromagnetic Correlations but Ferromagnetic Order"
Physical Review Letters **110**, 256402 (2013).

A. Steppke, R. Kuchler, S. Lausberg, E. Lengyel, **L. Steinke**, R. Borth, T. Lühmann, C. Krellner, M. Nicklas, M. Brando, C. Geibel, and F. Steglich,
"Ferromagnetic Quantum Critical Point in the Heavy-Fermion metal $YbNi_4(P_{1-x}As_x)_2$ "
Science **339**, 933 (2013).

M. Fehr, E. Uccelli, S. Dasgupta, M. Bichler, **L. Steinke**, G. Abstreiter, M. Grayson and A. Fontcuberta i Morral,
"Investigation of a contacting scheme for self-assembled cleaved edge overgrown InAs nanowires and quantum dot arrays"
Physica Status Solidi (a) **206**, 1620 (2009).

M. Grayson, **L. Steinke**, M. Huber, D. Schuh, M. Bichler, and G. Abstreiter,
"Sharp quantum Hall edges: Experimental realizations of edge states without incompressible strips"
Physica Status Solidi (b) **245**, 356 (2008).

M. Grayson, **L. Steinke**, M. Huber, D. Schuh, M. Bichler, G. Abstreiter, L. Hoeppel, J. Smet, K. von Klitzing, and D. K. Maude,
"Novel one-dimensional states in a bent quantum Hall junction"
Intern. Journal of Modern Physics B **21**, 1207 (2007).

M. Grayson, **L. Steinke**, D. Schuh, M. Bichler, L. Hoeppel, J. Smet, K. von Klitzing, D. K. Maude and G. Abstreiter,

"Metallic and insulating states at a bent quantum Hall junction"

Physical Review B **76**, 201304(R) (2007).

Patents

S. Jaligama, H. R. Harris, and **L. Steinke**,

"Optical enhancement of mobility in semiconductor devices, sensors and detectors"

Pending.