KONSTANTIN ANTONIOS LEO MERZ

PERSONAL INFORMATION

Born in Munich, Germany, December 10, 1991

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EDUCATION

October 2016 – July 2019 — Ludwig-Maximilians-Universität München

Ph.D. in Mathematics

Cumulative grade "magna cum laude"
Title of the thesis: *Über die Grundzustandsdichte relativistischer Coulomb-Systeme*
(English translation: *On the ground state density of relativistic Coulomb systems*)
Advisor: Prof. Dr. Heinz SIEDENTOP
Supported by Deutsche Forschungsgemeinschaft
Successful completion of the graduate training program at the International Max Planck Research School for Quantum Science and Technology (IMPRS-QST)

2014 – 2016 — Ludwig-Maximilians-Universität München

Master of Physics

Final grade 1.10
Specialization in theoretical and mathematical physics

Master's thesis

On the ground state energy of two-dimensional Coulomb systems (grade 1.0)
Advisor: Prof. Dr. Heinz SIEDENTOP

2011 – 2014 — Ludwig-Maximilians-Universität München

Bachelor of Physics

Final grade 1.29

Bachelor's thesis

Stochastic quantization in quantum mechanics (grade 1.0)
Advisor: Prof. Dr. Dieter LÜST

2002 – 2011 — Graf-Rasso-Gymnasium Fürstenfeldbruck

High School

Bavarian university entrance diploma with final grade 1.4
Mathematical and natural scientific branch, last G9 age group

TEACHING AND WORKING EXPERIENCE

October 2016 – April 2017 — Mathematical Institute of LMU München

Teaching assistant for "Analysis of Several Variables, Measure and Integration Theory"

April 2016 – July 2016 — Mathematical Institute of LMU München

Tutor for "Mathematical Quantum Mechanics 2"

2013 – 2016 — Physics Department of LMU München

Tutor for several lectures in theoretical physics, among others "Mathematical Methods for Theoretical Physics", "Theoretical Mechanics", and "Statistical Physics"

2012 – 2013 — Physics Department of LMU München

Working student

- Setup and execution of the ATLAS laser, design and setup of optical measurement devices
- Development of a Matlab program to determine the wavefronts measured by a Shak–Hartmann wavefront sensor

SCIENTIFIC PUBLICATIONS

[1] with R. L. Frank and H. Siedentop, *Equivalence of Sobolev norms involving generalized Hardy operators. Int. Math. Res. Not. IMRN*, rnz135 (2019) (arXiv 1807.09027).

[2] with H. Siedentop, *The atomic density on the Thomas-Fermi length scale for the Chandrasekhar Hamiltonian. Rep. Math. Phys.* **83** (2019), no. 3, 387–391 (arXiv 1810.00632).

[3] *On scales of Sobolev spaces associated to generalized Hardy operators*, arXiv 1904.07614, Submitted.

[4] with R. L. Frank, H. Siedentop, and B. Simon, *Proof of the strong Scott conjecture for Chandrasekhar atoms*, arXiv 1907.04894, Submitted.

TALKS AND POSTERS

November 2015 · Poster at the Vienna Central European Seminar on Particle Physics and Quantum Field Theory
Title: *On the Ground State Energy of the Statistical Model of the two-dimensional Atom using Phase Space Localization Techniques*

October 2016 · Talk at the workshop "Effective one-particle equations for fermionic many-particle Coulomb systems: derivation and properties" at Universität Mannheim
Title: *The atomic density on the length scale $Z^{-1/3}$*

January 2017 · Talk at the workshop "Mean Fields for Fermions" at LMU Munich
Title: *Radial coherent states and the Scott correction*

September 2017 · Poster at the Joint CoQuS & IMPRS-QST Vienna Summer School on Complex Quantum Systems
Title: *On the ground state density of relativistic models of atoms on the semiclassical length scale*

December 2017 · Talk at the workshop "Effective equations for many particle Coulomb systems" at Universität Mannheim
Title: *On the atomic density on the semiclassical length scale in relativistic quantum mechanics*

March 2018 · Talk at the Joint DMV and GDM annual meeting in Paderborn
Title: *On the atomic density on the semiclassical length scale in relativistic quantum mechanics*

June 2018 · Talk at the workshop "Analysis of Effective One-Particle Equations and their Derivation" at LMU Munich
Title: *On the strong Scott conjecture for the Chandrasekhar model*

July 2018 · Talk at the Young Researchers Symposium preceding the XIX International Congress on Mathematical Physics in Montréal
Title: *On the strong Scott conjecture for Chandrasekhar atoms*

April 2019 · Seminar talk at the Institute of Analysis and Algebra at TU Braunschweig
Title: *On the strong Scott conjecture for Chandrasekhar atoms*

May 2019 · Talk at the Workshop of the GAMM Activity Group "Applied Operator Theory" in Kaiserslautern
Title: *Equivalence of Sobolev norms involving generalized Hardy operators*

July 2019 · Talk at the Oberseminar "Calculus of Variations and Applications" in Munich
Title: *On the ground state density of relativistically described atoms*

September 2019 · Talk at the program "Density Functionals for Many-Particle Systems: Mathematical Theory and Physical Applications of Effective Equations" at the Institute for Mathematical Sciences in Singapore
Title: *On the strong Scott conjecture for Chandrasekhar atoms*

CONFERENCES, SCHOOLS, SEMINARS, WORKSHOPS, AND RESEARCH STAYS

September 2015 · Summer School and Workshop on the Standard Model and Beyond on Corfu

November 2015 · Vienna Central European Seminar on Particle Physics and Quantum Field Theory in Vienna

February 2016 · Mathematical Challenges in Quantum Mechanics in Bressanone

March 2016 · Joint DMV and GAMM annual meeting in Braunschweig

March 2016 · Workshop on Quantum Dynamics and Functional Inequalities in Blaubeuren

July 2016 · EMS – IAMP Summer School in Mathematical Physics – Universality, Scaling Limits and Effective Theories in Rome

August 2016 · Conference on Methods of Modern Mathematical Physics – A Young Researcher Symposium on the Occasion of the 70th Birthday of Barry Simon in Toronto

October 2016 · Workshop on Effective one-particle equations for fermionic many-particle Coulomb systems in Mannheim

January 2017 · Workshop on Mean Fields for Fermions in Munich

March 2017 · Workshop on Macroscopic Limits of Quantum Systems in Munich

April 2017 · Spectral Days in Stuttgart

July 2017 · Quantum Mean Field and Related Problems in Paris

July 2017 · Summer School on Current topics in mathematical physics in Zurich

September 2017 · Joint CoQuS & IMPRS-QST Vienna Summer School on Complex Quantum Systems

December 2017 · Mini-Workshop: Effective equations for many particle Coulomb systems in Mannheim

February 2018 · Winter School and Workshop: Mathematical Challenges in Quantum Mechanics in Rome

March 2018 · Joint DMV and GDM annual meeting in Paderborn

May 2018 · Conference: "Recent Results in Quantum Many-Body Systems" in honor of Professor Heinz Siedentop in Herrsching

June 2018 · Workshop: Analysis of Effective One-Particle Equations and their Derivation in Munich

July 2018 · XIX International Congress on Mathematical Physics and the preceding Young Researchers Symposium in Montréal

September 2018 · Workshop: Many-Body Quantum Mechanics in Montréal

April 2019 · Research stay: "Spectral Methods in Mathematical Physics" at Institut Mittag–Leffler in Djursholm

May 2019 · Conference: Parabolic Evolutions, Harmonic Analysis and Spectral Theory in Bad Herrenalb

May 2019 · Workshop of the GAMM Activity Group "Applied Operator Theory" in Kaiserslautern

September 2019 · Research stay: "Density Functionals for Many-Particle Systems: Mathematical Theory and Physical Applications of Effective Equations" at the Institute for Mathematical Sciences in Singapore

FURTHER INFORMATION

Services
Reviewer for zbMATH
Referee for Letters in Mathematical Physics

Memberships
International Association of Mathematical Physics
Deutsche Mathematiker-Vereinigung (DMV)
Deutsche Physikalische Gesellschaft e.V.

Grants
LMU Mentoring for highly qualified early-career researchers (2018 and 2019)

Languages
GERMAN · Mother tongue

ENGLISH · Fluent

FRENCH · Basic Knowledge

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