

GERHARD BRÄUNLICH

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FULL NAME | Gerhard Albert Walter Bräunlich
GENDER | Male
NATIONALITY | Swiss
BIRTHDAY | 27.10.1983
BIRTHPLACE | Zurich (Switzerland)
CURRENT POSITION | Software Developer - ETH Zürich



EDUCATION

10.2010 - 09.2014 | **PhD (Dr. rer. nat.)** at the mathematical institute of the University of Tübingen
10.2005 - 02.2008 | **Diploma in Physics** at the ETH Zurich
10.2004 - 10.2005 | **Military service / internship**
10.2002 - 02.2004 | **Intermediate diploma in physics** at the ETH Zurich

PROFESSIONAL EXPERIENCE

01.2019 - | **ETH Zürich - Scientific IT Services** - Software Developer
» Responsibilities: Software development, software architecture, code quality, continuous integration
» Selecta:
» imSim: Large Synoptic Survey Telescope (LSST) image simulation package
» GRIPHFITH: Library for the numerical implementation of the phase-field model of fracture to solve basic and advanced damage and fracture mechanics problems.
» sett: Data compression, encryption and transfer tool

05.2017 - 12.2018 | **Sustainable System Solutions (20 %)** - Software Engineer / System Administrator
» Conception / setup of a new IT infrastructure involving docker, nextcloud, kopano, gitlab
» Refactoring of the pascal legacy application EWS to a python module
» Responsibilities: Software development, software architecture, code quality, documentation, continuous integration, system administration

10.2016 - 12.2018 | **ZHAW (80 %)** - Research Assistant at the ZHAW Wädenswil
» Development of a model predictive controller for a heating system in python including forecast of the solar gain of collectors, forecast of the domestic hot water usage based on past measurements, writing a numeric C extension, using and extending the opensource library IPyOpt
» Development of a simulation framework in python supporting parallelized parameter variation
» Development of an interface between the controller and polysun or a simulated model house based on the simulation framework
» Administration of the module Basics in Renewable energies and ecological engineering
» Responsibilities: Software development, software architecture, code quality, documentation, module administration (education)

01.2008 - | **Fachkommission für Hochspannungsfragen** - Freelancer as C/C++ developer
Development and support of C and C++ applications in the area of electromagnetic fields and magnetic interference

06.2005 - 08.2005 | **Kraftwerke Oberhasli** (2-month internship)
Development of a C++ application to calculate water hammers in pipelines. Suitable for the conception of pipeline systems for hydroelectric power plants to prevent damages by hydraulic shocks

PROJECTS

10.2010 - 09.2014 | **PhD Thesis** „Mathematical Aspects of the BCS Theory of Superconductivity and Related Theories“
Establishment of mathematical rigorous base for physical theories:
>> Mathematical rigorous derivation of a macroscopic, phenomenological theory of Bose Einstein condensation (Gross-Pitaevskii theory) from a microscopic theory (BCS theory)
>> Mathematical rigorous justification of the contributions of the so called *direct* and *exchange* interactions to the total energy in the BCS theory of superconductivity / superfluidity

10.2007 - 02.2008 | **Diploma Thesis** „Geometry and Transport“
Examination of transport phenomena of quantum pumps

03.2002 - 07.2002 | **Matura Thesis** „Elastic Collisions - Programming in Java“
>> Development of a java simulation to visualize elastic collisions of balls
>> Awarded as one of the top 5 theses of the year

EXTRA-CURRICULAR ACTIVITIES

CONTRIBUTION TO OPEN SOURCE | Contributor to the Gentoo Science Project

RUNNING | Team leader of a running relay team for the SOLA-Stafette since 2006. Development of a rust / VueJs web application for the management of the team.

PUBLICATIONS

- [1] | G. Bräunlich, R. Bräunlich. *Worst Case Evaluation of Magnetic Field in the vicinity of Electric Power Substations*. Electromagnetic Compatibility, 2009 20th International Zurich Symposium on (2009), pp. 289-292
- [2] | G. Bräunlich, G. Graf, G. Ortelli. *Equivalence of Topological and Scattering Approaches to Quantum Pumping*. Communications in Mathematical Physics **295** (2009), pp. 243-259
- [3] | G. Bräunlich, C. Hainzl, R. Seiringer. *On contact interactions as limits of short-range potentials*. Methods Funct. Anal. Topology **19.4** (2013), pp. 364-375
- [4] | G. Bräunlich, C. Hainzl, R. Seiringer. *Translation invariant quasi-free states for fermionic systems and the BCS approximation*. Reviews in Mathematical Physics **26.7** (2014), p. 1450012
- [5] | G. Bräunlich, C. Hainzl, R. Seiringer. *On the BCS gap equation for superfluid fermionic gases*. Mathematical Results in Quantum Mechanics (2014), pp. 127-137
- [6] | G. Bräunlich, C. Hainzl, R. Seiringer. *Bogolubov–Hartree–Fock Theory for Strongly Interacting Fermions in the Low Density Limit*. Mathematical Physics, Analysis and Geometry **19.2** (2016), pp. 1-27
- [7] | G. Bräunlich, D. Hasler, M. Lange. *On Asymptotic Expansions in Spin Boson Models*.