

Vita Prof. Dr. Michael Bonitz

Professional career

1981-1987: Study of Physics at Moscow State Lomonosov University, Russia, diploma (with distinction), advisor: Yuri L. Klimontovich
1991: PhD at Rostock University, Germany, advisor: Dietrich Kremp
1993-1994: postdoc at Optical Sciences Center, University of Arizona, USA
1998: habilitation at Rostock University
2003: Visiting professor at University of Florida, USA
2009 spring: Visiting professor, University of Florida, Gainesville (sabbatical)
2010 (fall) Visiting scientist, Kavli Institute for Theoretical Physics, Santa Barbara
2014 spring: Visiting professor, University of Florida, Gainesville and Lawrence Livermore National Laboratory (sabbatical)
2019 spring: Visiting professor, Lawrence Livermore National Laboratory (sabbatical)

Affiliation

since 2003: C4 Professor of Theoretical Physics, Chair Statistical Physics
Institute of Theoretical Physics and Astrophysics, Kiel University, Germany
advisor for 32 bachelor, 33 master and 22 PhD theses

Research Interests

quantum kinetic theory, nonequilibrium Green functions
dense, nonideal plasmas, quantum plasmas
strongly correlated electrons in solids
high performance computing
quantum hydrodynamics
first-principle computer simulations (molecular dynamics, quantum Monte Carlo)

as of Oct. 2023:

h-index: 53 (66), Web of Science (Google Scholar), I10-index: 290
ca. 420 refereed scientific publications
10 monographs, including

M. Bonitz and D. Semkat (eds). *Introduction to Computational Methods in Many-Body Physics*, Rinton Press, Princeton 2006

M. Bonitz, *Quantum Kinetic Theory*, Teubner 1998, 2nd ed. Springer 2016.

K. Balzer and M. Bonitz, *Nonequilibrium Green's Functions Approach to Inhomogeneous Systems*, Lecture Notes in Physics, Springer 2013

Awards

Dawson award for Excellence in Plasma Physics Research of APS (2021)
Dr. honoris causa of Russian Academy of Sciences (2013), terminated March 2022 in response to Russian invasion into Ukraine
Fellow of the American Physical Society (2011)
Gustav-Hertz prize of the German Physical Society (2002)
DAAD postdoc awards (1992, 1995)

Professional Service

1999 Organizer conference „Progress in Nonequilibrium Green functions“, Rostock
2002 Organizer conference „Progress in Nonequilibrium Green functions II“, Dresden
2004 Organizer of International workshop “Kinetic Theory of Nonideal Plasmas” at CAU
2005 Organizer conference „Progress in Nonequilibrium Green functions III“, Cau Kiel

2006–2008 Chair of Physics Department at CAU Kiel
 2007–2017 Member of board of special research area SFB-TRR 24
 2008–2016 Organizer of German-American graduate summer institutes „Complex Plasmas“ (in Hoboken, South Orange, Greifswald and Kiel, 2-year interval)
 2008–2012 Member of University Senate of CAU
 2010–2014 Member of DPG plasma physics board (Fachbeirat Plasmaphysik)
 since 2014: *Contributions to Plasma Physics*: Editor in chief
 2014–2018 Member of „FLASH“ Proposal Review Panel at DESY, Hamburg
 2015 Member of Plasma Science Frontiers Panel of APS/DOE (USA)
 2015 Organizer of Heraeus Seminar “Isolated Quantum Many-Body Systems out of Equilibrium” (with M. Haque and S. Kehrein)
 since 2016: Springer Book Series *Plasma Science and technology*: editor
 2016–2018 Member of University Senate of CAU
 2017 Organizer International Conference “Strongly Coupled Coulomb Systems”, Kiel

Referee for 30+ journals,

Referee for science funding agencies, in Germany (DFG, AvH, DAAD, Helmholtz, DLR) and foreign agencies, including NSF, DOE, RSF, FWF, FWO, CzSF

Conference Series *Physics of Nonideal Plasmas*: Chair of program committee

Conference Series *Strongly Coupled Coulomb Systems*: Chair of executive committee

Conf. Series *Progress in Nonequilibrium Green functions*: Chair of program committee

Public outreach

- 2013: Organization of Max-Planck museum at Kiel Physics Department

<https://www.itap.uni-kiel.de/theo-physik/bonitz/planck.html>

- since 2009: public lectures about quantum theory (with Schleswig-Holstein Universitätsgesellschaft)

- Organization of “March for science” in Kiel (2017-2019)

- Organization of interdisciplinary public lecture series “Wissenschaft und Alternative Fakten” (currently 13th semester),

<https://www.itap.uni-kiel.de/theo-physik/bonitz/m4s.html>

10 Most important peer-reviewed publications

1. A.V. Filinov, M. Bonitz, and Yu.E. Lozovik, *Wigner crystallization in mesoscopic 2D electron systems*, Phys. Rev. Lett. **86**, 3851 (2001), paper featured in Physical Review Focus.
2. N.H. Kwong, and M. Bonitz, *Real-time Kadanoff-Baym Approach to Nonlinear Plasma Oscillations in Correlated Coulomb Systems*, Phys. Rev. Lett. **84**, 1768 (2000).
3. D. Kremp, Th. Bornath, M. Bonitz, and M. Schlanges, *Quantum Kinetic Theory of Plasmas in Strong Laser Fields*, Phys. Rev. E **60**, 4725 (1999).
4. M. Bonitz, V.S. Filinov, V.E. Fortov, P.R. Levashov, and H. Fehske, *Crystallization in Two-Component Coulomb Systems*, Phys. Rev. Lett. **95**, 235006 (2005), paper featured in Physical Review Focus.
5. M. Bonitz, C. Henning, and D. Block, *Complex plasmas - a laboratory for strong correlations*, Rep. Prog. Phys. **73**, 066501 (2010).
6. T. Schoof, S. Groth, J. Vorberger, and M. Bonitz, *Ab initio thermodynamic results for the degenerate electron gas at finite temperature*, Phys. Rev. Lett. **115**, 130402 (2015).
7. T. Dornheim, S. Groth, T. Sjostrom, F.D. Malone, W.M.C. Foulkes, and M. Bonitz,

Ab initio Quantum Monte Carlo simulation of the warm dense electron gas in the thermodynamic limit, [Phys. Rev. Lett. **117**, 156403 \(2016\)](#)

8. T. Dornheim, S. Groth, J. Vorberger, and M. Bonitz, *Path Integral Monte Carlo Results for the Dynamic Structure Factor of Correlated Electrons: From the Electron Liquid to Warm Dense Matter*, *Phys. Rev. Lett.* **121**, 255001 (2018)
9. T. Dornheim, S. Groth, and M. Bonitz, *The Uniform Electron gas at warm dense matter conditions*, **744**, 1-86 (2018)
10. N. Schlünzen, J.-P. Joost, and M. Bonitz, *Achieving the Scaling Limit for Nonequilibrium Green Functions Simulations*, *Phys. Rev. Lett.* **124**, 076601 (2020)

Contact

Institut für Theoretische Physik und Astrophysik, CAU Kiel
Leibnizstraße 15, Raum LS 15-248, Tel. +(0)431-880-4122

<https://www.itap.uni-kiel.de/theo-physik/bonitz/index.html>

e-mail: bonitz@theo-physik.uni-kiel.de

ORCID: 0000-0001-7911-0656