

Prof. Dr. Cornelius Krellner – Curriculum Vitæ



Personal Information

1978 born in Dresden, Germany, male, German citizen, Married, 2 children.

Work address:

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Professional career

Since 07/2012	Full Professor (W3) for Experimental Physics at Goethe-University Frankfurt/Main, Germany, Group leader of the “Crystal and Materials Laboratory”
09/2011 – 06/2012	Research Associate, University of Cambridge, UK Cavendish Laboratory, University of Cambridge, United Kingdom <i>Research project: “Inkjet printing of organic molecular crystals”</i>
07/2009 – 08/2011	Research Associate, Max Planck Institute CPfS, Dresden, Germany Max-Planck-Institute for Chemical Physics of Solids, Dresden, Germany <i>Project leader of an interdisciplinary research project: “Synthesis, crystal growth, and characterization of new intermetallic superconductors”</i>
01/2005 – 06/2009	Postgraduate, Max Planck Institute CPfS, Dresden, Germany
2004	Scientific assistant, Laboratory for Solid State Physics, ETH Zurich, Switzerland

Education

06/2009	Dissertation in Physics (summa cum laude), TU Dresden, supervised by Prof. Frank Steglich, <i>Title: “Ferromagnetic correlations in Kondo lattices: YbT₂Si₂ and CeTPO (T = transition metal)”</i>
12/2004	Diploma in Physics, TU Dresden, Diploma thesis supervised by Prof. Karl Leo (TU Dresden) and Prof. Bertram Batlogg (ETH Zurich), <i>Title: “Transport and defects in organic single crystals”</i>
10/2002 – 12/2004	Studies of Physics, ETH Zurich, Switzerland
10/1999 – 07/2002	Studies of Physics, TU Dresden, Germany
09-1987 – 07/1997	Kreuzschule Dresden, Abitur, Member of the Dresdner Kreuzchor

Fellowships and Awards

2018	Lehrpreis der Walter Greiner Gesellschaft zur Förderung der physikalischen Grundlagenforschung
2011/2012	Otto-Hahn-Fellowship of the Max Planck Society
2010	Otto-Hahn-Medal of the Max Planck Society
2010	ThyssenKrupp Electrical Steel Dissertation Award of the DPG
2002/2003	Scholarship, German Academic Exchange Service (DAAD), Germany

Supervision of Graduate Students and Postdoctoral Fellows

2012 – 4 Postdocs/ 7 PhD/ 16 Master Students at the Physics Department, Goethe-University

Teaching Activities

2015 – Responsible, New organization of the basic physics lab course (~500 students annually), Goethe-University Frankfurt
2016, 2019 Responsible, Lecture *Magnetism Basics-Methods-Materials*, Goethe-University Frankfurt
2013 – Responsible, Lecture *Crystal Growth Basics*, Goethe-University Frankfurt
2012 – Responsible, Seminar, *Advances in Crystal Growth*, Goethe-University Frankfurt
2013 – 2015 Responsible, Advanced physics lab course, Goethe-University Frankfurt

Third-party funding

2018 – 2021 DFG research grant *Exotic magnetism and electron-correlation phenomena at the surface and in the bulk of rare-earth based materials*, (~ 210 kEUR)
2017 – 2020 PI in ANR-DFG research group *Fermi-NESt*, (~30 kEUR)
2016 – 2019 DFG research grant *Ferromagnetic quantum criticality and superconductivity in Yb-based heavy-fermion systems*, (~ 240 kEUR)
2015 – 2019 PI of project B4 in SFB/TR49, *Single crystal growth of tunable quantum spin systems*, (~320 kEUR)
2015 – 2019 PI of a Sino-German Science Center, *Emergent Correlated Materials*, (~20 kEUR)
2015 – 2017 Heraeus Hüttenseminar, AG Krellner, (~10 kEUR)
2013 Major Research instrumentation of the DFG (Art. 91b GG), *PPMS* (~192 kEUR)
2010 – 2016 Research grant within DFG Priority Programme 1458, *High Temperature Superconductivity in Iron Pnictides*, (~375 kEUR)

Organisation of Scientific Meetings

2013, 2017 Workshop chair, DGKK workshop meeting “Intermetallische und oxydische Systeme mit Spin- und Ladungskorrelationen”, Frankfurt am Main, Germany
2015 Conference chair, *Deutsche Kristallzüchtungstagung DKT 2015* (120 participants), Frankfurt am Main, Germany

Institutional Responsibilities

2017 – 2019 Member of the extended senate of the Goethe-University Frankfurt, Germany
2014 – 2016 Managing Director of the Institute of Physics, Goethe-University Frankfurt, Germany
2013 – Member of the extended Faculty Committee, Goethe-University Frankfurt, Germany
2012 – Faculty member, Goethe-University Frankfurt, Germany

Commissions of Trust and Membership of Scientific Societies

- Reviewer of several international journals and founding agencies
- Member of the German Physical Society and the German Society of Crystal Growth

Research interests

- Crystal growth and characterization of strongly correlated electron materials
- Unconventional superconductivity in the vicinity of a quantum criticality point
- Materials: Iron-pnictide superconductors, heavy-fermion systems, ThCr₂Si₂ – type materials, Cu-based quantum spin systems, 2D materials, and organic semiconductors

Publications

- Author and Co-Author of more than 160 articles in international peer-reviewed journals, among them 2 in Nature, 3 in Science, 2 in Nature Physics, 2 in Nature Communications, 1 in PNAS, 1 in Angewandte Chemie, 1 in Physical Review X, 15 in Physical Review Letters.
- h-Index: 30, more than 3200 citations (source: ISI WoK), Researcher ID: A-5389-2009

10 selected Publications

1. C. Wetli, S. Pal, J. Kroha, K. Kliemt, **C. Krellner**, O. Stockert, H. v. Löhneysen, and M. Fiebig, *Time-resolved collapse and revival of the Kondo state near a quantum phase transition*, **Nature Physics in press** (2018), <https://doi.org/10.1038/s41567-018-0228-3>.
2. K. Kummer, C. Geibel, **C. Krellner**, G. Zwicknagl, C. Laubschat, N. B. Brookes, D. V. Vyalikh, *Similar temperature scale for valence changes in Kondo lattices with different Kondo temperatures*, **Nature Commun.** **9**, 2011 (2018).
3. H. Pfau, R. Daou, S. Friedemann, S. Karbassi, S. Ghannadzadeh, R. Kuechler, S. Hamann, A. Steppke, D. Sun, M. Koenig, A. P. Mackenzie, K. Kliemt, **C. Krellner**, M. Brando, *Cascade of magnetic field induced Lifshitz transitions in the ferromagnetic Kondo lattice material YbNi_4P_2* , **Phys. Rev. Lett.** **119**, 126402 (2017).
4. 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**, 6272 (2016).
5. A. Steppke, R. Kuechler, S. Lausberg, E. Lengyel, L. Steinke, R. Borth, T. Lühmann, **C. Krellner**, M. Nicklas, C. Geibel, F. Steglich, M. Brando, *Ferromagnetic Quantum Critical Point in the Heavy-Fermion Metal $\text{YbNi}_4(\text{P}_{1-x}\text{As}_x)_2$* , **Science** **339**, 933 (2013).
6. H. Pfau, S. Hartmann, U. Stockert, P. Sun, S. Lausberg, M. Brando, S. Friedemann, **C. Krellner**, C. Geibel, S. Wirth, S. Kirchner, E. Abrahams, Q. Si, and F. Steglich, *Thermal and Electrical Transport across a magnetic Quantum Critical Point*, **Nature** **484**, 493 (2012).
7. S. Ernst, S. Kirchner, **C. Krellner**, C. Geibel, G. Zwicknagl, F. Steglich, and S. Wirth, *Emerging local Kondo screening and spatial coherence in the heavy-fermion metal YbRh_2Si_2* , **Nature** **474**, 362 (2011).
8. S. Friedemann, T. Westerkamp, M. Brando, N. Oeschler, S. Wirth, P. Gegenwart, **C. Krellner**, C. Geibel, and F. Steglich, *Detaching the antiferromagnetic quantum critical point from the Fermi-surface reconstruction in YbRh_2Si_2* , **Nature Physics** **5**, 465 (2009).
9. **C. Krellner**, T. Förster, H. Jeevan, C. Geibel, and J. Sichelschmidt, *Relevance of ferromagnetic correlations for the Electron Spin Resonance in Kondo lattice systems*, **Phys. Rev. Lett.** **100**, 066401 [**Editors' Suggestion**] (2008).
10. P. Gegenwart, T. Westerkamp, **C. Krellner**, Y. Tokiwa, S. Paschen, C. Geibel, F. Steglich, E. Abrahams, and Q. Si; *Multiple energy scales at a quantum critical point*, **Science** **315**, 969 (2007).