

Curriculum Vitae

Personal Data

Title	Dr.
First name	Matthias
Last name	Opel
Current position	Permanent Staff Scientist (wissenschaftlicher Angestellter)
Current institution(s)/site(s), country	Walther-Meißner-Institut Bayerische Akademie der Wissenschaften Walther-Meißner-Straße 8 85748 Garching, GERMANY
Identifiers/ORCID	ORCID-ID: 0000-0003-4735-9574 ResearcherID: L-8784-2016 arXiv Id: opel_m_1

Qualifications and Career

Stages	Periods and Details
University qualification	Allgemeine Hochschulreife May 1988, Gymnasium Münchberg, GERMANY
Degree programme	Physics (Diplom, allgemeine Fachrichtung) November 1989 – January 1996 Technische Universität München, GERMANY
Doctorate	1996 – 2000: PhD student at the Walther-Meißner-Institut (WMI), Bayerische Akademie der Wissenschaften and the Lehrstuhl E23 für Technische Physik, Technische Universität München (TUM) with Prof. Dr. Klaus Andres, supported by a scholarship (Promotionsstipendium) of the TUM 27 April 2000: PhD Thesis: „Eigenschaften des Elektronensystems und seiner Wechselwirkungen in antiferromagnetischen und supraleitenden Kupraten: Eine Raman-Studie“ (ISBN 3-8265-7514-8)
Stages of academic/professional career	2006 – present: Permanent Senior Staff Scientist and Group Leader for “Magnetism and Spintronics” (together with Dr. Matthias Althammer, Dr. Stephan Geprägs, and Dr. Hans-Gregor Hübl) 2000 – 2005: Wissenschaftlicher Mitarbeiter (Staff Scientist) for “Magnetism & Spintronics” with Prof. Dr. Rudolf Gross at the Walther-Meißner-Institut, Bayerische Akademie der Wissenschaften, Garching, GERMANY

Activities in the Research System

2000 – present	Head of the IT group at the Walther-Meißner-Institut, Garching
2016 – present	Representative of the scientific staff at the WMI and elected member of the Executive Board (Kollegium) of the Walther-Meißner-Institut, Garching
2015 – present	Elected member of the Speaker Council (Sprecherkollegium) for the scientists of the Bayerische Akademie der Wissenschaften, München

Areas of research: experimental condensed matter physics, superconductivity, magnetism, thin film technology, oxide electronics, antiferromagnetic spintronics, and altermagnetism

Scientific Results

Category A – Articles in peer-reviewed journals, contributions to peer-reviewed conferences or to anthology volumes, and book publications

1. Spin Hall magnetoresistance at the altermagnetic insulator/Pt interface

Miina Leiviskä, Reza Firouzmandi, Kyo-Hoon Ahn, Peter Kubaščík, Zbynek Soban, Satya Prakash Bommanaboyena, Christoph Müller, Dominik Kriegner, Sebastian Sailer, Michaela Lammel, Kranthi Kumar Bestha, Libor Šmejkal, Jakub Zelezny, Anja U. B. Wolter, Monika Scheufele, Johanna Fischer, Matthias Opel, Stephan Geprägs, Matthias Althammer, Bernd Büchner, Tomas Jungwirth, Lukáš Nádvorník, Sebastian T. B. Goennenwein, Vilmos Kocsis, Helena Reichlová

Physical Review Materials **9**, 084403 (2025). DOI: [10.1103/hksk-qxl5](https://doi.org/10.1103/hksk-qxl5)

Significance: First description of the SMR effect in an altermagnetic candidate

My contribution: discussed the data, adapted the theory, discussed the manuscript

2. Large Spin Hall Magnetoresistance in Antiferromagnetic α -Fe₂O₃/Pt Heterostructures

Johanna Fischer, Matthias Althammer, Nynke Vlietstra, Hans Huebl,

Sebastian T.B. Goennenwein, Rudolf Gross, Stephan Geprägs, Matthias Opel

Phys. Rev. Applied **13**, 014019 (2020). DOI: [10.1103/PhysRevApplied.13.014019](https://doi.org/10.1103/PhysRevApplied.13.014019)

Significance: Largest SMR amplitude reported so far

My contribution: designed the experiment, performed the experiment, collected the data, analysed the data, adapted the theory, discussed the data, wrote the manuscript

3. Spin Hall magnetoresistance in antiferromagnet/heavy-metal heterostructures

J. Fischer, O. Gomonay, R. Schlitz, K. Ganzhorn, N. Vlietstra, M. Althammer, H. Huebl, M. Opel, R. Gross, S.T.B. Goennenwein, S. Geprägs

Phys. Rev. B **97**, 014417 (2018). DOI: [10.1103/PhysRevB.97.014417](https://doi.org/10.1103/PhysRevB.97.014417)

Significance: Second description of the SMR effect in antiferromagnets (after Geert Hoogeboom et al.)

My contribution: performed the experiment, collected the data, analysed the data, validated and adapted the theory, discussed the data, wrote the manuscript

4. **Spin Hall magnetoresistance induced by a nonequilibrium proximity effect**
H. Nakayama, M. Althammer, Y.-T. Chen, K. Uchida, Y. Kajiwara, D. Kikuchi, T. Ohtani, S. Geprägs, M. Opel, S. Takahashi, R. Gross, G.E.W. Bauer, S.T.B. Goennenwein, E. Saitoh
Phys. Rev. Lett. **110**, 206601 (2013). DOI: [10.1103/PhysRevLett.110.206601](https://doi.org/10.1103/PhysRevLett.110.206601)
Significance: Discovery of the SMR effect including pioneering experiments and a novel theory based on exchange of angular momentum across interfaces
My contribution: supervised the experiment, discussed the data, discussed the manuscript
5. **Investigation of induced Pt magnetic polarization in Pt/Y₃Fe₅O₁₂ bilayers**
S. Geprägs, S. Meyer, S. Altmannshofer, M. Opel, F. Wilhelm, A. Rogalev, R. Gross, S.T.B. Goennenwein
Appl. Phys. Lett. **101**, 262407 (2012), DOI: [10.1063/1.4773509](https://doi.org/10.1063/1.4773509)
Significance: Absence of proximity magnetism in Pt on ferrimagnetic insulating Y₃Fe₅O₁₂ in contrast to Pt on metallic Fe
My contribution: applied for beamtime, performed the experiment, collected the data, analysed the data, discussed the data, discussed the manuscript
6. **Spintronic oxides grown by laser-MBE**
Matthias Opel
J. Phys. D: Appl. Phys. **45**, 033001 (2012). DOI: [10.1088/0022-3727/45/3/033001](https://doi.org/10.1088/0022-3727/45/3/033001)
Significance: Review on PLD-grown oxide thin films for spintronics
My contribution: collected the data, wrote the manuscript
7. **Novel multifunctional materials based on oxide thin films and artificial heteroepitaxial multilayers**
M. Opel, S. Geprägs, E.P. Menzel, A. Nielsen, D. Reisinger, K.-W. Nielsen, A. Brandlmaier, F.D. Czeschka, M. Althammer, M. Weiler, S.T.B. Goennenwein, J. Simon, M. Svete, W. Yu, S.-M. Hühne, W. Mader, R. Gross
Phys. Status Solidi A **208**, 232 (2011). DOI: [10.1002/pssa.201026403](https://doi.org/10.1002/pssa.201026403)
Significance: Final report for our project in the DFG SPP 1157 “Elektrokeramische Funktionsstrukturen”
My contribution: supervised the project (SPP 1157), designed the experiment, discussed the data, wrote the manuscript
8. **(Open Access) Advanced spectroscopic synchrotron techniques to unravel the intrinsic properties of dilute magnetic oxides: the case of Co:ZnO**
A. Ney, M. Opel, T.C. Kaspar, V. Ney, S. Ye, K. Ollefs, T. Kammermeier, S. Bauer, K.-W. Nielsen, S.T.B. Goennenwein, M.H. Engelhard, S. Zhou, K. Potzger, J. Simon, W. Mader, S.M. Heald, J.C. Cezar, F. Wilhelm, A. Rogalev, R. Gross, S.A. Chambers
New J. Phys. **12**, 013020 (2010). DOI: [10.1088/1367-2630/12/1/013020](https://doi.org/10.1088/1367-2630/12/1/013020)
Significance: Unambiguous evidence against ferromagnetism in Co:ZnO – the material is either paramagnetic if Co is distributed homogeneously in ZnO or superparamagnetic with nanocrystalline Co clusters
My contribution: applied for beamtime, designed the experiment, performed the experiment, discussed the data, wrote the manuscript

9. Carrier relaxation, pseudogap, and superconducting gap in high- T_c cuprates: A Raman scattering study

M. Opel, R. Nemetschek, C. Hoffmann, R. Philipp, P.F. Müller, R. Hackl, I. Tüttö, A. Erb, B. Revaz, E. Walker, H. Berger, L. Forró

Phys. Rev. B **61**, 9752 (2000). DOI: [10.1103/PhysRevB.61.9752](https://doi.org/10.1103/PhysRevB.61.9752)

Significance: Review on my PhD thesis

My contribution: performed the experiment, collected the data, analysed the data, discussed the data, discussed the manuscript

10. Pseudogap and Superconducting Gap in the Electronic Raman Spectra of Underdoped Cuprates

R. Nemetschek, M. Opel, C. Hoffmann, P.F. Müller, R. Hackl, H. Berger, L. Forró, A. Erb, E. Walker

Phys. Rev. Lett. **78**, 4837 (1997). DOI: [10.1103/PhysRevLett.78.4837](https://doi.org/10.1103/PhysRevLett.78.4837)

Significance: First observation of the pseudogap via Raman spectroscopy

My contribution: performed the experiment, collected the data, discussed the data, discussed the manuscript

Category B – Any other form of published results

11. Comment on 'Pt magnetic polarization on $Y_3Fe_5O_{12}$ and magnetotransport characteristics'

Stephan Geprägs, Sebastian T.B. Goennenwein, Marc Schneider, Fabrice Wilhelm, Katharina Ollefs, Andrei Rogalev, Matthias Opel, Rudolf Gross

arXiv:1307.4869 (2013). DOI: [10.48550/arXiv.1307.4869](https://doi.org/10.48550/arXiv.1307.4869)

*Significance: Comment on Lu et al., PRL **110**, 147207 (2013), who reported that Pt on $Y_3Fe_5O_{12}$ shows a finite magnetic moment from XMCD. They claimed that the observed magnetoresistance is due to magnetic proximity, in contradiction to our findings (Refs. 4. and 5.). We presented new data in this comment. However, the PRL editor did not want to publish it.*

My contribution: analysed the data, discussed the data, wrote the manuscript, discussed with the PRL editor

Other Information

I am continuously active in public relations issues. I show experiments in low-temperature physics including the use of liquid nitrogen to high school students several times per year. I am actively participating in Open House events at the Walther-Meißner-Institut or at the Bayerische Akademie der Wissenschaften. I organize seminar series in-house or for a public audience.