Abhishek Grewal

CONTACT INFORMATION

Heisenbergstrasse 1
DE 70569 Stuttgart
Germany

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RESEARCH INTERESTS

Nanooptics, time-resolved Scanning Probe Microscopy, exciton dynamics, plasmonics, single molecule spectroscopy

EDUCATION

Max Planck Institute for Solid State Research, DE 70569 Stuttgart, Germany
École Polytechnique Fédérale de Lausanne, CH 1015 Lausanne, Switzerland

Ph.D. Candidate, Physics, January 2018 (expected graduation date: March 2022)

- Dissertation Title (tentative): *STM-induced luminescence from single molecules*
- Supervisor: Klaus Kern, Klaus Kuhnke

Max Planck Institute for Solid State Research, DE 70569 Stuttgart, Germany
Universität Stuttgart, DE 70569 Stuttgart, Germany

M.Sc., Physics, October 2017

- Thesis Title: *Study of highly correlated systems on h-BN/Cu(111) using cryogenic STM/AFM*
- Supervisor: Klaus Kern, Jörg Wrachtrup, Markus Ternes

University of Delhi, IN-110007 New Delhi, India

B.Sc., Physics, June 2015

RESEARCH EXPERIENCE

Max Planck Institute for Solid State Research, DE 70569 Stuttgart, Germany

Graduate Student (Ph.D. Candidate) **January 2018 - present**
Low-temperature STM-induced luminescence, time-resolved STM, triplet emitters, intra-molecular energy conversion, tunnel junctions, and photon statistics

Research Assistant (Master's thesis) **August 2016 - December 2017**
Sub-Kelvin STM/AFM, qPlus sensor, KPFM, h-BN, magnetic atoms, Kondo effect, and precise physical and electronic characterization at sub-nanometer scale

RIKEN (理化学研究所), Wakō-shi, JP 351-0198 Saitama, Japan

Visiting Researcher **January 2020 - March 2020**
Single-molecule photoluminescence and electroluminescence, inter-system crossing and singlet-triplet emission

1. Physikalisches Institut, Universität Stuttgart, DE 70569 Stuttgart, Germany

Research Assistant **February - June 2016**
Electron spin resonance measurements, cryogenics, and co-planar metallic resonators

- Supervisor: Marc Scheffler, Martin Dressel

University of Delhi, IN 110007 New Delhi, India

Research Assistant **February - April 2015**
Discrete dipole approximation method, surface plasmon resonance, and silver nanoparticles

- Supervisor: Kuldeep Kumar Kapil

Research Assistant **September - December 2014**
Gutzwiller mean-field theory, 2D optical lattices, non-equilibrium dynamics, strongly-correlated

bosons, and Mott insulator to superfluid phase transition

- Supervisor: Sukanta Dutta, Mamta Dahiya

Indian Institute of Technology, IN 247667 Roorkee, India

Internship **December 2013**

Thin-film growth, PLD, SQUID measurements, functionalization using oxide layers

- Supervisor: Ramesh Chandra, Davinder Kaur

Skills

- Nanooptics, Scanning probe microscopy, vacuum technology, cryogenics, surface science
- Computer Skills: C++, Python, MATLAB, some use of Unix shell scripts
- Languages: English (first language), Hindi (first language), German (beginner)
- Hobbies: DIY electronics (table-top STM for physics lab), Blogging (physics outreach), Handball, Badminton

References

1. Prof. Dr. Klaus Kern, Director
   E-mail: k.kern@fkf.mpg.de *Phone:* +49 711 689-1660
   Max Planck Institute for Solid State Research, DE-70569 Stuttgart, Germany
   École Polytechnique Fédérale de Lausanne, CH-1015 Lausanne, Switzerland

2. Prof. Dr. Markus Ternes
   E-mail: ternes@physik.rwth-aachen.de *Phone:* +49 241 80 27099
   2. Physikalisches Institut B, RWTH Aachen, DE-52074 Aachen, Germany
   Peter Grünberg Institut (PGI-3), Forschungszentrum Jülich, DE-52425 Jülich, Germany

3. Dr. Yousoo Kim, Chief Scientist
   E-mail: ykim@riken.jp *Phone:* +81-48-467-4073
   Surface and Interface Science Laboratory, RIKEN, Saitama 351-0198, Japan

Publications

1. Leon, C. C.*, Rosławska, A.*, Grewal, A., Gunnarsson, O., Kuhnke, K., and Kern, K. Photon super-bunching from a generic tunnel-junction. *Sci. Adv.* 2019; 5: eaav4986.
2. Merino P., Rosławska, A., Leon, C. C., Grewal, A., Große, C., González, C., Kuhnke, K., and Kern, K. A Single Hydrogen Molecule as an Intensity Chopper in an Electrically Driven Plasmonic Nanocavity. *Nano Letters* 2019 *19*(1), 235-241.
3. Leon, C. C., Gunnarsson, O., de Oteyza, D. G., Rosławska, A., Merino, P., Grewal, A., Kuhnke, K., and Kern, K. Single Photon Emission from a Plasmonic Light Source Driven by a Local Field-Induced Coulomb Blockade. *ACS Nano* 2020 *14*(4), 4216-4223.
4. Lawrence, J., Brandimarte, J., Berdonces-Layunta, A., Mohammed, M. S. G., Grewal, A., Leon, C. C., Sánchez-Portal, D., and de Oteyza, D. G. Probing the Magnetism of Topological End States in 5-Armchair Graphene Nanoribbons. *ACS Nano* 2020 *14*(4), 4499-4508
5. Rosławska, A.*, Leon, C. C.*, Grewal, A., Merino, P., Kuhnke K., and Kern, K. Atomic-Scale Dynamics Probed by Photon Correlations. *ACS Nano* 2020 *14*(6), 6366-6375.