

# Curriculum Vitae

## Dr. Michael Lupberger

### Personal data

**Data of birth** 24/06/1983  
**Place of birth** Freiburg im Breisgau, Germany  
**Marital status** Married, two child (born December 2016 and February 2020)  
**Nationality** German  
**ORCID** 0000-0002-5480-3576, **INSPIRE-HEP ID** 1468297

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### Brief summary

- Physicist | Field: Experimental particle physics | Core research: Detectors and readout electronics
  - Currently: Postdoctoral researcher and BMBF co-project leader
  - Previously: EU Marie Curie Fellow (2020-2022) and CERN Fellow (2016-2019)
  - PhD defence 08/03/2016, University of Bonn
  - Third party funds: 175 k€ + 1.71 M€ (my projects with other PIs), Internal funds:  $\approx$  45 k€
  - 44 publications (4 in *large* collaborations, 10 first or corresponding author, inspirehep h-index: 9)
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### Professional development

**Since 06/2022** **Postdoctoral researcher**, Helmholtz-Institut für Strahlen- und Kernphysik, University of Bonn  
Supervised staff: two Bachelor students

**Since 05/2019** **Postdoctoral researcher/co-project leader** in neutron detector/electronics development  
(with Dr. Kaminski), group Prof. Desch, Physikalisches Institut, University of Bonn  
Supervised staff: one PostDoc, two PhD students

**04/2020 - 06/2022** **Marie Curie Fellow**, Helmholtz-Institut für Strahlen- und Kernphysik, University of Bonn  
in the group of Prof. Ketzer

**2020 - 2021** Total of six month **parental leave**, of which four month with part time work

**05/2016 - 04/2019** **CERN Fellow** in the Experimental Physics Detector Technology division,  
European Organisation for Nuclear Research (CERN), Geneva

**2010 - 2016** **Research assistant** at the University of Bonn, as PhD student and PostDoc

**2009 - 2010** **Stagiare**, CEA Saclay, France in the group of Dr. Paul Colas, research for the diploma thesis

**2005 - 2007** **Student assistant**, Fraunhofer-Institute for short-time dynamics, Freiburg, group space-  
craft technology: satellite component impact tests, ESA- and EADS-ASTRIUM-projects

### Academic Education

**08/03/2016** **Doctoral degree in natural science/physics, Dr. rer. nat**, final grade: magna cum laude  
PhD thesis title: *The Pixel-TPC: A feasibility study*,  
supervisor: Prof. Dr. Klaus Desch (University of Bonn)

**2010 - 2015** **PhD student** in the detector development group of Prof. Dr. Klaus Desch  
Physikalisches Institut, University of Bonn

**28/09/2010** **Diploma in physics**, final grade: sehr gut  
Diploma thesis title: *Avalanche statistics and single electron counting with a  
Timepix-InGrid detector*, supervisors: Dr. Paul Colas (CEA Saclay, France),  
Prof. Dr. Markus Schumacher (University of Freiburg)

**2004 - 2010** **Studies of physics** at the University of Freiburg  
Stays abroad (each nine months):  
CEA Saclay, France: Research for the diploma thesis  
University of Aberdeen, Scotland: ERASMUS Diploma Science

**2004** **Correspondence course Physics/Mathematics** at the TU Kaiserslautern

## Research funding

<i>Applied</i>	<b>DFG Emmy Noether group</b> <i>Intelligent smart-data acquisition</i> , (1.9 M€ PI)
<i>Applied</i>	<b>BMBF consortium project funding</b> <i>Machine Learning on FPGA</i> (ErUM Data), (256 k€ PI)
<b>2022</b>	<b>BMBF project funding</b> <i>Instrumentation for Next Generation Neutron Science</i> (ErUM Matter, 849 k€, with Dr. Kaminski as PI)
<b>2022</b>	DFG research grant <i>GEMs with self-triggered readout</i> , (273 k€, with Prof. Ketzer as PI, not successful)
<b>2022</b>	DFG research group <i>AMBER proton radius measurement</i> , (4.1 M€, draft not successful) PI for sub-project <i>muon kinematics</i> (1.3 M€)
<b>2019</b>	<b>BMBF project funding</b> <i>Next Generation Readout Infrastructure for Neutron Detectors</i> (ErUM Matter, 857 k€, with Dr. Kaminski as PI)
<b>2019</b>	<b>Marie Curie Fellowship</b> from the European Union (175 k€)
<b>2019</b>	NRW Rückkehrprogramm: Invitation to final selection interview (1.25 M€, not successful)

## Internal funding/Awards/Grants

<b>2022</b>	<b>Seed Funding for ERC-STG</b> by the Transdis. Reasearch Area Matter, University of Bonn (20 k€)
<b>2022</b>	<b>Funding</b> to prepare a grant application with CEA Saclay, University of Bonn (20 k€)
<b>2021</b>	<b>Funding</b> for one student assistant to mitigate pandemic effects, University of Bonn (2 k€)
<b>2020</b>	<b>Argelander Grant</b> for remote conference participation, University of Bonn (300 USD)
<b>2020</b>	<b>DAAD RISE grant</b> to invite an undergraduate student (cancelled due to Covid-19)
<b>2019</b>	<b>International cooperation grant</b> from the University of Bonn (1 k€)
<b>2016</b>	<b>CERN Fellowship</b>
<b>2015</b>	Conference <b>Trainee Grant</b> and Valentin T. Jordanov Radiation Instrumentation <b>Travel Grant</b> for the IEEE NSS conference in San Diego, USA
<b>2015</b>	Physics graduate school <b>grant</b> to participate in the TWEPP2015 conference in Lisbon, Portugal
<b>2014</b>	Physics graduate school <b>grant</b> to participate in the TIPP2014 conference in Amsterdam, Netherlands
<b>2013</b>	<b>Georges Charpak Young Scientist Award</b> granted during the MPGD2013 conference in Zaragoza, Spain for my contributions to the field of modern gas detector technologies, CERN Courier Vol. 53 No. 9 33-34 (2013)
<b>2009</b>	<b>Stipends</b> by DAAD and the Freiburg University Club for stay abroad in Saclay, France
<b>2008</b>	Two semesters at the University of Aberdeen, Scotland through the <b>ERASMUS</b> programme

## Scientific supervision of students

<b>Currently</b>	Helmholtz-Institut für Strahlen- und Kernphysik (HISKP): 2 Bachelor Physikalisches Institut: 2 PhD
<b>Past</b>	1 PhD, 1 visiting CERN PhD 1 Diploma, 8 Master, 2 Bachelor 2 Student assistant, 1 ERASMUS internship, 3 CERN summer students, 1 CERN internship

### Details:

ongoing	<i>Effect of an active voltage divider on GEMs</i> Bachelor thesis of Benjamin Roth on halt due to illness, HISKP, University of Bonn
ongoing	<i>VMM data analysis</i> Bachelor thesis of Virginia Klapper Started 09/2022, HISKP, University of Bonn
ongoing	<i>Machine learning on Xilinx ACAPs</i> PhD Thesis by Patrick Schwäbig Started 02/2020, Physikalisches Institut, University of Bonn
ongoing	<i>Timepix3 readout</i> PhD Thesis by Markus Gruber Started 01/2019, Physikalisches Institut, University of Bonn
2022	<i>GEM-based neutron detector</i> Master Thesis by Laura Rodriguez Gomez (University of Bonn); Now: Application for PhD in science outreach, University of Bonn
2022	<i>VMM data analysis</i> Student assistant project by Virginia Klapper (University of Bonn); Now: bachelor student on the same subject
2021/2022	<i>VMM data analysis</i> Student assistant project by Lukas Bayer (University of Bonn);

- Now: master student in COMPASS data analysis
- 2021 *TIGER and VMM readout for GEM detectors* ERASMUS internship (3 months) by Chiara Alice (INFN/University of Torino); Now: PhD student, INFN/University of Torino
- 2020/2021 *Investigations on ASIC for Triple-GEM Detectors* Master thesis by Emorfil Terzimpasoglou; Now: Prisma Electronics (Greece)
- 2020/2021 *Development of an automated quality control test system for the VMM hybrid* Master thesis by Finn Jaekel; Now: PhD student (TU Dresden)
- 2019/2020 *Improving the performance of high-speed multi-channel readout electronics: the VMM3a ASIC in the Scalable Readout System* Master thesis by Patrick Schwäbig; Now: PhD student on another subject
- 2018/2019 *Firmware Design of High-Speed Data Readout for VMM Front-End Electronics* Master thesis by Yan Huang (Central China Normal University) at CERN (10 months); Now: DJI, China
- 2018 *VMM time calibration* CERN summer student project (13 weeks) by Muhammad Usman (Sabancı University, Turkey); Now: University of Montreal, Canada
- 2017/2018 *SRS FPGA firmware improvements* visiting PhD project (2 × 2 months) at CERN by Freddy Fuentes Rabayo (Universidad Antonio Nariño, Columbia); Now: University of Bristol
- 2017 *Studies on Cooling of the VMM Readout ASIC* internship project (2 months) by Lucian Scharenberg (University of Bonn), CERN; Now: CERN PhD student
- 2017 *VMM data analysis* CERN summer student project (13 weeks) by Lara Bartels (University of Göttingen); Now: University of British Columbia, Canada
- 2017 *Slow Control Software for VMM* CERN summer student project (13 weeks) by Manuel Guth (University of Freiburg); Now: University of Geneva
- 2015/2016 *Timepix3 readout for ILD* PhD thesis by Tobias Schiffer, started 11/2015, Physikalisches Institut, University of Bonn; Now: Thesis ongoing on IAXO, supervision by Prof. Desch
- 2014/2015 *Readout system for a large Pixel-TPC-module and test-beam analysis* Master thesis by Daniel Danilov completed 10/2015, Physikalisches Institut, University of Bonn; Now: outside academia
- 2014/2015 *Stromversorgung, Temperaturüberwachung und Vermessung einer TPC-Ausleseinheit mit 160 GridPix* Diploma thesis by Alexander Hamann completed 10/2015, Physikalisches Institut, University of Bonn; Now: CEO Vodka Hot Feeling GmbH
- 2013/2014 *Implementation of a track finding algorithm for an InGrid based detector* Master thesis by Martin Rogowski completed 11/2014, Physikalisches Institut, University of Bonn; Now: outside academia
- 2014 *Untersuchung der Feldverzerrungen bei InGrid-basierten Pixelchips* Bachelor thesis by Katrin Kohl completed 08/2014, Physikalisches Institut, University of Bonn; Now: PhD defence 03/2022, Prof. Schmieden, University of Bonn
- 2014 *CAD Design eines 96 Chip Modulträgers für den Large Prototype* Bachelor thesis by Johann Tomtschak completed 08/2014, Physikalisches Institut, University of Bonn; Now: outside academia
- 2012/2013 *InGrid based TPC readout* Master thesis by Robert Menzen completed 09/2013, Physikalisches Institut, University of Bonn; Now: NTT DATA

## Further support to early career researchers

- 2020** Recruitment and integration of a PostDoc from Turkey to Germany and the research group
- 2019** Recruitment and integration of a PhD student from India to Germany and the research group
- Since 2019** Collection of Conferences and Summer schools, promotion of participation to students
- 2011 - 2016** Pro-Buddy programme at the University of Bonn (foreign PhD student assistance)

## Teaching: Training and Experience

- 2017** Training course *Communication: Science or Art?* (1 day), CERN
- 2013** Seminar *Teaching Competencies* (2 days), University of Bonn
- 2012** Workshop *Educational Teaching in Particle Physics* (3 days), *Netzwerks Teilchenwelt*

<b>2022/23</b>	Detector Physics, 4 SWS, <b>lecturer and head tutor</b> shared with Prof. Ketzer
<b>2022</b>	Bachelor seminar Presentation Techniques, <b>tutor</b> , 3 SWS
<b>2021/22</b>	Hands-on Master seminar: Detector Construction, <b>lecturer</b> , 3 SWS
<b>2021</b>	Advanced Gaseous Detectors - Theory and Practice (Master), <b>lecturer</b> , 4 SWS (cancelled) Pentecost break lecture on Special Relativity, Physics II, <b>lecturer</b> , 4 hours
<b>2020/21</b>	Physics I for Natural Scientists, <b>head tutor</b> , 4 SWS
<b>2020</b>	Master seminar Presentation Techniques, <b>tutor/co-organiser</b> , 3 SWS
<b>2019/20</b>	Particle Astrophysics (Master), <b>head tutor</b> , 4 SWS + <b>lecturer substitute</b> (2 hours)
<b>2014</b>	RD51 Electronics School, CERN, <b>lecture</b> on FPGA programming, 4 hours
<b>2010 - 2016</b>	<b>Tutorships</b> Physikalisches Institut, University of Bonn
<b>2008 - 2009</b>	<b>Tutorships</b> Physikalisches Institut, University of Freiburg

## Organisation of scientific meetings, convenership

<b>Since 2022</b>	<b>Organiser</b> of the Detector Physics Seminar, University of Bonn
<b>Since 2021</b>	<b>Chair</b> of the AG Ketzer hardware group meetings, University of Bonn
<b>Since 2021</b>	<b>Session Chair</b> on DPG Spring Conferences
<b>2017 - 2021</b>	<b>Convener</b> PICOSEC analysis group, chair of weekly meetings, CERN
<b>2016 - 2018</b>	<b>Convener</b> BrightnESS work package, chair of monthly meetings, CERN
<b>2011 - 2016</b>	<b>Convener</b> LCTPC-pixel working group, chair of monthly meetings, University of Bonn
<b>2012</b>	<b>Workshop</b> on GridPix detectors, University of Bonn

## Institutional responsibilities

<b>Since 2021</b>	Member of a <b>committee for a family-friendly work environment</b> , University of Bonn
<b>Since 2021</b>	Steering Committee member <b>Transdisciplinary Research Area Matter</b> , University of Bonn
<b>2021 - 20222</b>	Member of a <b>professor appointment committee</b> , University of Bonn
<b>2007</b>	Member of the <b>student council</b> at the University of Freiburg
<b>2005 - 2010</b>	Member of the <b>physics student association</b> , Freiburg: Participation in academic self-administration, professor appointment committees, bachelor and master degrees planning

## National/International Committees

<b>Since 2022</b>	Member of the <b>DRDC1 preparation committee (extended RD51 management board)</b>
<b>Since 2022</b>	Deputy Ex-Officio Member of the <b>Committee for Particle Physics (KET)</b> , Germany
<b>Since 2021</b>	Management Board Member of the <b>young High Energy Physics Association</b> , Germany

## Reviewer in scientific journals

<b>2022</b>	Manuscripts for Nuclear Inst. and Methods in Physics Research, A
<b>2021</b>	Manuscripts for Nuclear Science and Techniques
<b>2018, 2020</b>	Manuscripts for Nuclear Inst. and Methods in Physics Research, A
<b>2017</b>	Manuscript for Journal of Instrumentation
<b>2017</b>	Manuscript for IEEE Transactions on Nuclear Science

## Major collaborations

<b>Since 2021</b>	AMBER Collaboration, fundamental Hadron Physics
<b>Since 2019</b>	MAGIX Collaboration, fundamental Hadron and High Energy Physics
<b>Since 2015</b>	ATLAS Collaboration, fundamental High Energy Physics
<b>Since 2009</b>	LCTPC, future Linear Collider Time Projection Chamber R&D
<b>Since 2009</b>	RD51 Collaborations, R&D on Micro-Pattern Gaseous Detectors

## Memberships of scientific societies

- Since 2020** Transdisciplinary Research Area *Matter*, University of Bonn  
**2015 - 2017** IEEE  
**Since 2010** DAAD Alumni  
**Since 2003** German Physics Society

## Continuing education (selection)

- 2021** Compatibility of work and family, University of Bonn  
**2020** An eye on risks? - Export control, foreign trade law & dual-use, University of Bonn  
**2020** Leading for Tomorrow, German Physics Society  
**2018** CERN training: IQ versus EQ  
**2017** CERN trainings: Leading for Success; Being a Skilled Facilitator  
**2014 - 2015** Mentoring Programme, German Physics Society  
**2014** 46<sup>th</sup> School for High Energy Physics, Maria Laach  
**2012** Hadron Collider Physics Summer School, FermiLab, USA

## Outreach and science communication

- 2020** Supervisor in a **Jugend Forscht** project  
**2019** Mediator at **Highlights der Physik**, Bonn  
**2019** Supervisor in a **Netzwerk Teilchenwelt** project at CERN  
**Since 2017** **CERN Guide**, regular tours until 2019  
**2015** **Press article** *InGrids on the rise*, B. Warmbein, Linear Collider Newline  
**2014 - 2017** **Netzwerk Teilchenwelt** school classroom lecturer

## Language skills

German: native, English: fluent, French: proficient

## Publications

- 44 peer-reviewed or book publications
  - 40 with direct involvement, thereof 10 as first or corresponding author
  - 4 by collaboration, involved at least in review
- h-index: 9 (inspirehep), 9 (google scholar)

### Ten most relevant publications (all peer-reviewed)

Yumi Aoki, ..., **M. Lupberger**, ... et al. (LCTPC Collaboration) *Double-hit separation and  $dE/dx$  resolution of a time projection chamber with GEM readout*  
arXiv preprint submitted to Nucl. Instr. Meth. A.

D. Pfeiffer, ..., **M. Lupberger**, ... et al., *Rate-capability of the VMM3a front-end in the RD51 Scalable Readout System*

Nucl.Instrum.Meth.A 1031 (2022) 165576.

**M. Lupberger** et al., *SRS VMM readout for Gadolinium GEM-based detector prototypes for the NMX instrument at ESS*

J.Phys.Conf.Ser. 1498 (2020) 1, 012050.

**M. Lupberger** et al., *The VMM front-end integration in the Scalable Readout System: On the way to a next generation readout system for generic detector R&D and experiment instrumentation*

PoS TWEPP2018 (2019) 136.

F.M. Brunbauer, **M. Lupberger**, ... et al., *3D printing of gaseous radiation detectors*

JINST 14 (2019) no.12, P12005.

**M. Lupberger** et al., *Implementation of the VMM ASIC in the Scalable Readout System*

Nucl. Instr. Meth. A903 (2018) 91-98.

J. Bortfeldt, ..., **M. Lupberger**, ... et al., *PICOSEC: Charged particle timing at sub-25 picosecond precision with a Micromegas based detector*

Nucl. Instr. Meth. A903 (2018) 317-325.

**M. Lupberger** et al., *Toward the Pixel-TPC: Construction and operation of a large area GridPix detector*

IEEE Transactions on Nuclear Science 64.5 (2017) 1159-1167.

C. Krieger, J. Kaminski, **M. Lupberger** and K. Desch, *A GridPix-based X-ray detector for the CAST experiment*  
Nucl. Inst. Meth. A867 (2017) 101-107.

**M. Lupberger**, K. Desch and J. Kaminski, *Implementation of the Timepix ASIC in the Scalable Readout System*  
Nucl. Inst. Meth. A830 (2016) 75-81.

## Talks

- 12 invited talks
- 41 talks at international conferences
- 3 posters at international conferences
- 9 talks at national conferences

### Five most relevant invited talks

- 2022**      **Rencontre du DEDIP**, CEA Saclay, France  
*Triggerless readout for AMBER GEMs and novel neutron detectors*
- 2021**      **COMPASS DAQFEET 2021**, Online  
*VMM3a: Progress in the development*
- 2018**      **PRISMA Detector Lab Technical Seminar**, Mainz, Germany  
*A next generation readout system and its application at the NMX instrument for ESS*
- 2018**      **Oberseminar des II. Physikalisches Instituts**, Göttingen, Germany  
*A next generation readout system and its application at the NMX instrument for ESS*
- 2018**      **GET workshop: General Electronics for Physics 2018**, Talence, France  
*The Scalable Readout System*

### Five most relevant talks at international conferences

- 2022**      **15th Pisa Meeting on Advanced Detectors**, La Biodola, Isola d'Elba, Italy  
*Particle Physics Readout Electronics and Novel Detector Technologies for Neutron Science*
- 2021**      **Topical Workshop on Electronics for Particle Physics 2021**, Online  
*The Scalable Readout System as a common initiative - a personal review*
- 2018**      **Topical Workshop on Electronics for Particle Physics 2018**, Antwerp, Belgium  
*The VMM front-end integration in the Scalable Readout System: On the way to a next generation readout system for generic detector R&D and experiment instrumentation*
- 2017**      **5th International Conference on Micro-Pattern Gas Detectors**, Philadelphia, USA  
*Implementation of the VMM in the Scalable Readout System*
- 2015**      **IEEE Nuclear Science Symposium & Medical Imaging Conference 2015**, San Diego, USA  
*The Pixel-TPC: A feasibility study*



Bonn, 30/11/2022