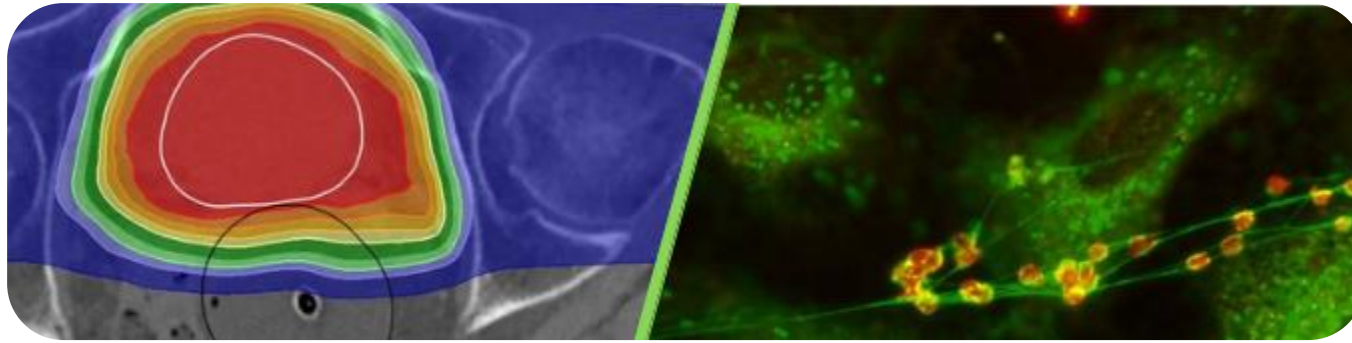


Welcome Class of 2028 !!!

Medical Physics and Physics of Living Systems M2PPLS



Dr. Anne Bialek

Prof. Armin Lühr (Track Medical Physics)

Prof. Matthias F. Schneider (Chair, Track Physics of Living Systems)

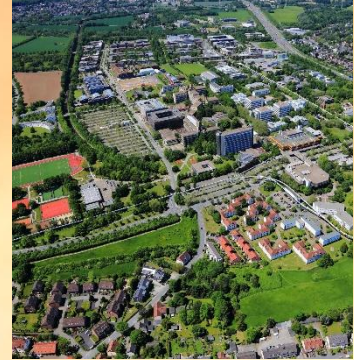
Prof. Jan Kierfeld (Dean of Physics Programs)

Dr. Jörg Bünemann

TU Dortmund University

- 30.300 Students
- 325 Professors
- 17 Faculties
- Budget EUR 433 Mio.

- Largest Technology park in Germany – 5th in Europe
- With 300 Companies & 13.000 Employees



Alliance btw Ruhr Universities
(120.000 students, 14.000 Researchers)



tu dortmund
university

RUHR
UNIVERSITÄT
BOCHUM

RUB

UNIVERSITÄT
DUISBURG
ESSEN

CONSORTIUM OF EXCELLENCE

**RUHR
INNOVATION
LAB**



CONSORTIUM OF EXCELLENCE



**RUHR
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LAB**



EXZELLENZSTRATEGIE: ZUSAMMEN HABEN WIR ES GESCHAFFT!

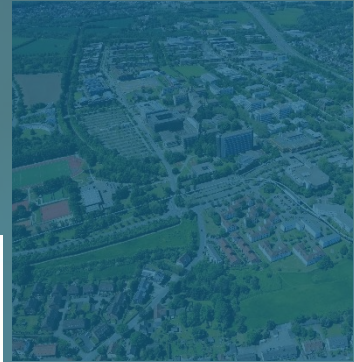
Townhall-Meeting zur Entscheidung der Exzellenzkommission

Major Success in the Excellence Strategy

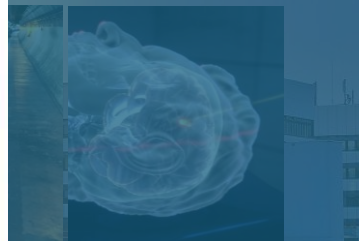
Together, TU Dortmund University and Ruhr University Bochum have successfully convinced the Committee of Experts in the Excellence Strategy: Their strategic partnership within the Ruhr Innovation Lab has been awarded funding as a Consortium of Excellence, placing it among the top 15 institutions in the German academic landscape. Having previously secured a total of three Clusters of Excellence, the two universities were eligible to participate in the top-class competition for research in Germany.



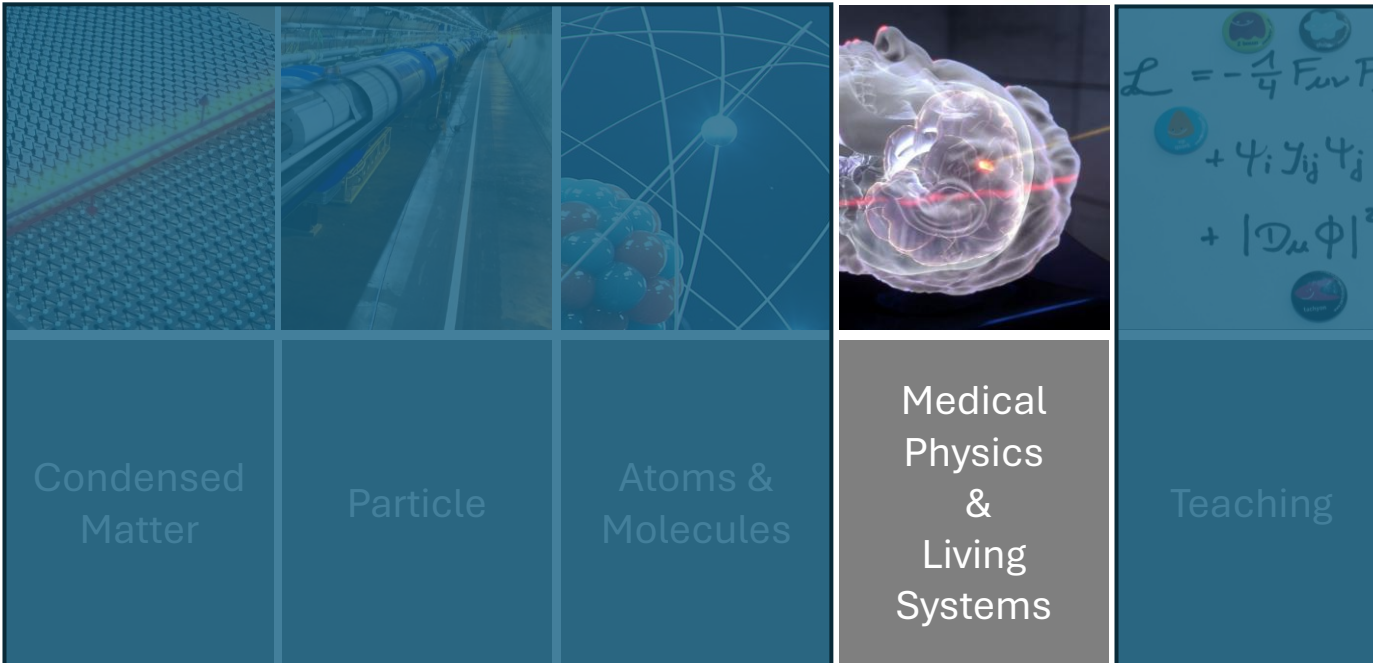
© Ruhr Innovation Lab



Ph Department
of Physics



Medical
Physics
Life Science



ccb fakultät für chemie
und chemische biologie

DOLCE - Dortmund Life Science Center

dhd drug discovery
hub dortmund

**International Master
Advanced Methods
in Particle Physics**



UA RUHR

IFADO LEIBNIZ RESEARCH CENTRE
FOR WORKING ENVIRONMENT
AND HUMAN FACTORS



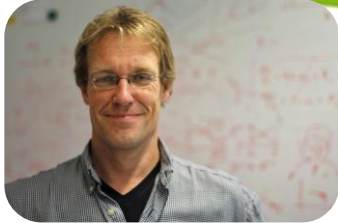
**MAX PLANCK INSTITUTE
OF MOLECULAR PHYSIOLOGY**

MMPPLS

The (many) faces of the program



Prof. Matthias F. Schneider
(Chair of MMPPLS)



Prof. Jan Kierfeld
(Dean of Programs)



Prof. Metin Tolan



Prof. Igor Shapiro



Prof. Andreas Block



PD. Dr.
Christian Bäumer



Prof. Armin Lühr



Prof. Benedikt Sabass



Prof. Jens Kleesieck



Prof. Jelger Risselada



Prof. Kevin Kröninger



PD Dr. Mona Ravesch



Dr. Anne Bialek
(Program
Coordination
MMPPLS)



PD Dr. Mona Ravesch



PD Dr. Jörg Bünemann
(Academic Advice)

Prof. Thorben Cordes (Chem)
Prof. Britta Trappmann (Chem)
Prof. Daniel Rauh (Chem)
PD. Dr. Frank Weichert (CS)
Prof. Tobias Glasmacher (CS, RUB)
Prof. Georg Schmitz (Imaging, RUB)
... many more

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The Idea

"... we have every reason to be satisfied with the success of the treatment of medicine that the scientific school has given it, and we can only recommend that the younger generation continue with* the same therapy."*



Hermann von Helmholtz 1877

- gain expertise in modern health sciences incl. cutting edge AI-Medicine
 - design novel tools in medical diagnostics and therapy
 - address fundamental questions on the physics of life and disease
 - tradition: more than 20 years of Medical Physics
 - expertise: more than 20 PIs on campus and 40 across the Ruhr alliance
 - diverse program: research from radiation therapy to the principles of life
 - practical applications: largest industrial campus in Germany
 - international: very good exchange with USA, Europe and more
 - expenses: No tuitions and inexpensive housing
- ... you choose your priority**

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Who are you?



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Who are you?



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Who are you?



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Who are you?



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The Tracks

Your focus or specialization (Track A or Track B) does NOT depend on the Study Plan you are in and is your personal choice entirely

- **Track A – Medical Physics:** Prepares students for a career as a Medical Physics Expert (MPE) in hospitals, or for work in the healthcare industry and related research. The track benefits from strong collaborations with clinics and medical research institutions.

Representative: Prof. Armin Lühr



- **Track B – Physics of Living Systems:** Focuses on applying physics to understand biological systems. Students deepen their knowledge in areas like neuroinformatics, biochemistry, and modern life science methods.

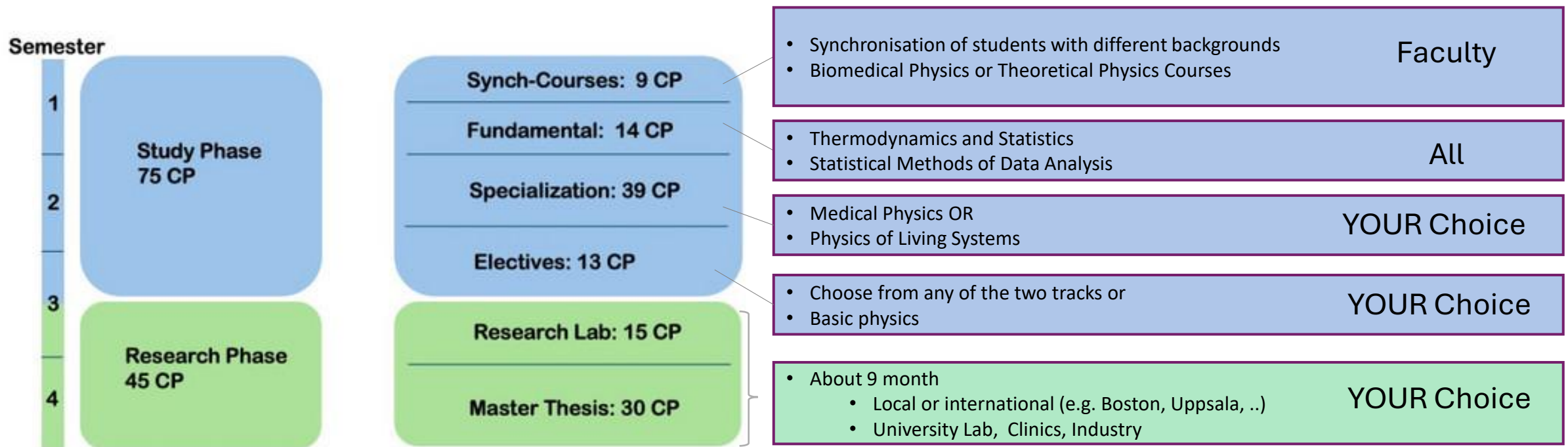
Representative: Prof. Matthias Schneider

“The track decision must be finalized before registering for the Master's thesis” §18 (5)

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The Structure

Solid Base + Personal Freedom



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The Study Plan

- Depending on their background, students are assigned to different study plans
- The decision is made at the time of approval and is also stated on the approval letter.
- Otherwise, check with the dean's office or contact Anne Bialek to get the information

Bachelor in	Medical Physics	Physics	Engineering
	Study Plan 1	Study Plan 2	Study Plan 3
Synch-Courses (9 CP Mandatory)	Electives	Biomedical Physics	Theoretical Physics

We are pleased to inform you that you are eligible to take up studies in the degree program **Master Medical Physics and Physics of Living Systems - 1. program semester** in the **Winter semester 2026/2027**. You fulfill the formal, subject-specific and language access requirements in accordance with the current examination and access regulations.

Enrollment is possible under the following conditions, which must be fulfilled during the course of study:

The student is assigned to Study Plan 2; the synchronization course in biomedical physics is required

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The Study Plan

- The synchronization courses are designed to bring everyone up to the same level.
- → **complete as early as possible!**

Bachelor in	Medical Physics	Physics	Engineering
	Study Plan 1	Study Plan 2	Study Plan 3
Synch-Courses (9 CP Mandatory)	Electives	Biomedical Physics	Theoretical Physics

The New Master Medical Physics and Physics of Living Systems MP²LS

The Study Plans

Bachelor in	Medical Physics	Physics	Engineering
	Study Plan 1	Study Plan 2	Study Plan 3
Synch-Courses (9 CP Mandatory)	Electives	Biomedical Physics	Theoretical Physics
Fundamentals (14 CP Mandatory)	TAS and SMD	TAS and SMD	TAS and SMD
Specialization (39 CP, with 3 mandatory)	Your Specialization Track A/B	Your Specialization Track A/B	Your Specialization Track A/B
Electives (13 CP)	Electives	Electives	Electives

TAS: Thermodynamics and Statistical Physics
 SMD: Statistical Methods of Data Analysis
 MP: Medical Physics
 PLS: Physics of Life Science

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The Tracks and their courses

Track A: Medical Physics

Mandatory courses	Sem.	CP
Advanced Clinical Medical Physics	WS	6 CP
Advanced Medical Imaging	WS	6 CP
AI for Medical Applications		
- Data Analysis Lab: Python for Machine Learning	WS	5 CP
- AI for Medical Applications	SS	4 CP
Elective courses		
<i>Radiotherapy and Dosimetry</i>		
Radiation applications in the clinic	WS	3 CP
Modern Radiation Therapy	WS	6 CP
Medical Physics and Technology in Particle Therapy	SS	3 CP
Applied Proton Therapy	SS	6 CP
TPS – Practical Course on Treatment Planning	WS + SS	6 CP
Basic radiation protection regulation for medical physics experts	SS	1 CP
Fundamentals of Detector Physics	SS	3 CP
<i>Angewandte Dosimetrie</i>	SS	3 CP
<i>Medical Imaging and Machine Learning</i>		
Advanced Magnetic Resonance Imaging	SS	6 CP
Image Processing in Medicine	SS	5 CP
Ultrasound in Medicine	WS	5 CP
Applications of Machine Learning in Medical Physics	WS	3 CP

Track B: Physics of Living Systems

Mandatory courses	Sem.	CP
Physics of life	WS	6 CP
Lab course: Physics of Living Systems	SS	5 CP
AI for Medical Applications		
- Data Analysis Lab: Python for Machine Learning	WS	5 CP
- AI for Medical Applications	SS	4 CP
Elective courses		
Soft Matter	SS	6 CP
MD Simulation of Biological Materials	WS	6 CP
Neuroinformatics	WS/SS	6 CP
Biomaterials	WS	4 CP
Tissue Engineering	SS	4 CP
Medicinal Chemistry 1	WS	4 CP
Medicinal Chemistry 2	SS	4 CP
Fundamental Immunology	SS	4 CP
Biomolecular Modelling	WS	4 CP

+ many more from physics, UKEssen, RUB

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Examples

	Semester	Fundamentals of Thermodynamics and statistics	Track A: Medical Physics	Electives/ Synchroni- sation courses	Master's thesis	Total
Study Phase	1		Advanced Clinical Medical Physics 6 CP	Synch. Course Theoretical Physics 9 CP		31 CP
			Advanced Medical Imaging 6 CP	Ultrasound in Medicine 5 CP		
			Python for Machine Learning 5 CP			
	2	Statistical Methods of Data Analysis A 5 CP	Advanced Magnetic Resonance Imaging 6 CP			30 CP
		Thermo- dynamics and Statistical Physics 9 CP	Applied Proton Therapy 6 CP			
			AI for Medical Applications 4 CP			
Research Phase	3		Radiation Applications in the Clinic 3 CP	Applied Physics in Clinical Medicine 3 CP	Research Internship 15 CP	30 CP
			Applied Dosimetry 3 CP	Physics of Life 6 CP		
	4				Master's thesis 30 CP	30 CP
	Sum:	14 CP	39 CP	22 CP	45 CP	120 CP

Background: BioMed Eng
Track: Medical Physics

Background: B.Sc. Physics
Track: Physics of Living Systems

	Semester	Fundamentals of Thermo- dynamics and Statistics	Track B: Physics of Living Systems	Electives/ Synchroni- sation courses	Master's thesis	Total CP
Study Phase	1		Physics of Life 6 CP	Synch. Course Biomedical physics 9 CP		29 CP
			Python for Machine Learning 5 CP	Advanced Medical Imaging 6 CP		
				Applied Dosimetry 3 CP		
	2	Thermodynamic and Statistical Physics 9 CP	Lab PLS 5 CP			33 CP
		Statistical methods of data analysis A 5 CP	Tissue Engineering 4 CP			
			Soft Matter 6 CP			
			AI for Medical Applications 4 CP			
	3		MD – Soft Matter and Biomaterials 6 CP	Detector systems in particle and medical physics 3 CP	Research Internship 15 CP	28 CP
			Biomaterials 4 CP			
Research Phase	4				Master's thesis 30 CP	30 CP
	Sum:	14 CP	40 CP	21 CP	45 CP	120 CP

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How to choose your courses?

Check your “must have” courses

- Synch Courses,
- Fundamentals (TAS = Thermodynamic and Statistics / SMD = Statistical Methods of Data Analysis)
- Everybody is required to take “AI for Medical Applications”

Explore your potential focus / track

- Check what is mandatory in each track
- We recommend to explore mandatory lectures in both tracks
- Courses not mandatory in your finale choice of track, are still part of your electives

!!! SEND YOUR PLANED PROGRAM TO FACULTY FOR FEEDBACK !!!

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How to find information?

Module Handbook: *Overview of the rules and suggested courses, including descriptions*

<https://physik.tu-dortmund.de/en/study/courses-and-qualification/master-of-medical-physics/module-handbook/>

LSF: *Courses offered by the department this semester*

<https://www.lsf.tu-dortmund.de/qisserver/rds?state=wtree&search=1&trex=step&root120252=195978|191518|193817&P.vx=kurz>

Moodle: *Current Course Organization*

<https://moodle.tu-dortmund.de>

you've already learned this when you met with the student council.

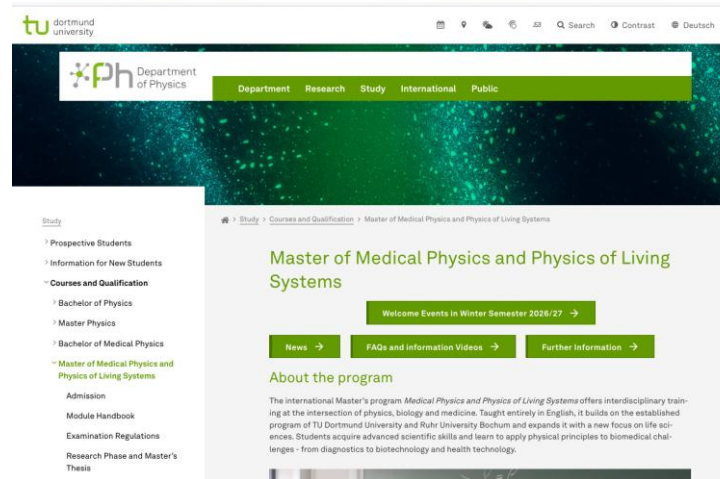
More Information:

<https://physik.tu-dortmund.de/en/international/useful-information-for-enroled-international-students/digital-tools-for-your-studies/>

MMPPLS

Where & Who to go to?

The Homepage: MMPPLS.de
News, FAQs, ...



<https://physik.tu-dortmund.de/en/study/courses-and-qualification/master-of-medical-physics/>

Anne Bialek, Matthias F. Schneider, Armin Lühr

→ Program Content, Choice of Courses, approvals ...

Jörg Bünemann

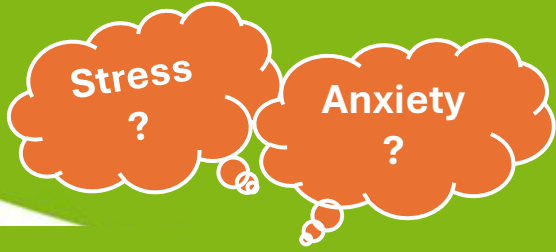
→ Course structure & regulations (exams)

Caroline Wortmann

→ Office of the dean

Fachschaft / Student Council

→ From “student-to-student” exchange



Psychological Student Advisory Service



University life is exciting – but it can also be overwhelming. We're here to help! Free and confidential.

Where you find us



Psychological Student Advisory Service/
Psychologische Studienberatung
Emil-Figge Str. 61
44227 Dortmund

Our services



One-on-one counselling



Workshops and coaching groups



Online materials



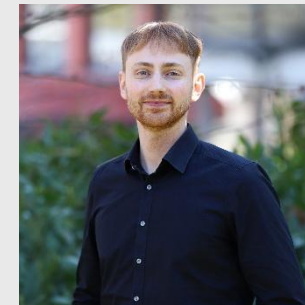
Ellen
Wiese



Christian
Kloß



Melanie
Buschmann



Julian
Hasselhorn

How to contact us

Walk-in consultation hours

Tuesday: 10:00 – 11:30

Telephone consultation hours

+49231 755 5050

Monday: 13:00 – 13:30

Wednesday: 15:00 – 15:30

Thursday: 15:00 – 15:30

Friday: 13:00 – 13:30

Individual appointment via email

psychologische-beratung@tu-dortmund.de



DoBuS

Disability and Studies

In the division "Disability and Studies" you will find all information and services regarding accessibility as well as study conditions with equal opportunities for students with disabilities and chronic illnesses.

<https://dobus.zhb.tu-dortmund.de/en/>



International Exchange

BRIDGE.nrw



**BOSTON-RUHR
INITIATIVE**
FOR UNDERGRADUATE AND
GRADUATE STUDENT EXCHANGE



**Massachusetts
Institute of
Technology**

**BOSTON
UNIVERSITY**



Massachusetts General Hospital
Founding Member, Mass General Brigham



Universitätsmedizin Essen
Institut für KI in der Medizin (IKIM)



Radiation Dosimetry

Theory and Measurement Methods

Time: 2 pm – 4 pm
Room: P1-01-306
Start: Tuesday, October 20



- **Absorbed dose**, equilibrium and **cavity theory**
- **Reference dosimetry** with ionization chambers
- **Primary standards** and **traceability**
- Solid-state, **high-LET** and **mixed-field** dosimetry



Prof. Niels Bassler
Aarhus University, Denmark

Guest Chair for Particle Sciences (AMTEC-PRO)

Winter semester · lecture 2 h/week · 3 CP (90 h) · English

Prerequisite: Strahlungsphysik I or equivalent (radiation physics, interaction of radiation with matter)

Lecture Course: High-Resolution Solid-State NMR: Principles and Application

The aim of the course is to familiarize the students with the basic concepts of modern high-resolution solid-state nuclear magnetic resonance (NMR). The course will start with a discussion of the description of spin systems (density operator) and spin Hamiltonians relevant for NMR spectroscopy.

In contrast to the high spectral resolution of NMR in solution, spectra in solid powder samples are typically broad due to the anisotropy of the interactions. Using sample rotation and different RF schemes, one can tailor the effective Hamiltonian during different time periods of the experiments to either facilitate high spectral resolution or the extraction of spin system parameters like dipolar couplings that encode distances. The lecture will emphasize the methods used to understand these experiments and introduce the most important experimental building blocks to facilitate a better understanding of the working of solid-state NMR pulse experiments. I will also give an overview over typical hardware requirements and setups to do state-of-the-art solid-state NMR experiments.

It is expected that the students are familiar with basic quantum mechanics (wave functions, operators, expectation values, Schrödinger equation). More specific concepts like spin operators, density operator formalism, product-operator formalism, and the Liouville von Neumann equation will be briefly introduced at the start of the course.

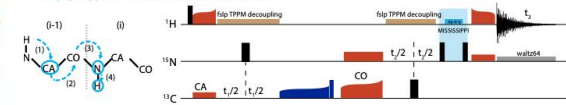
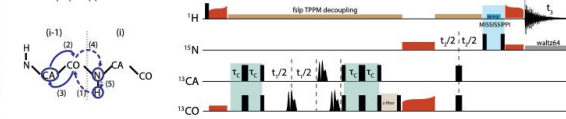
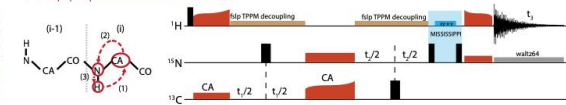
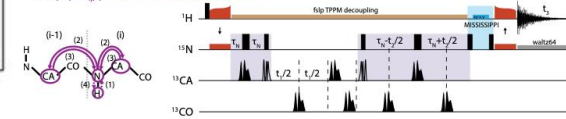
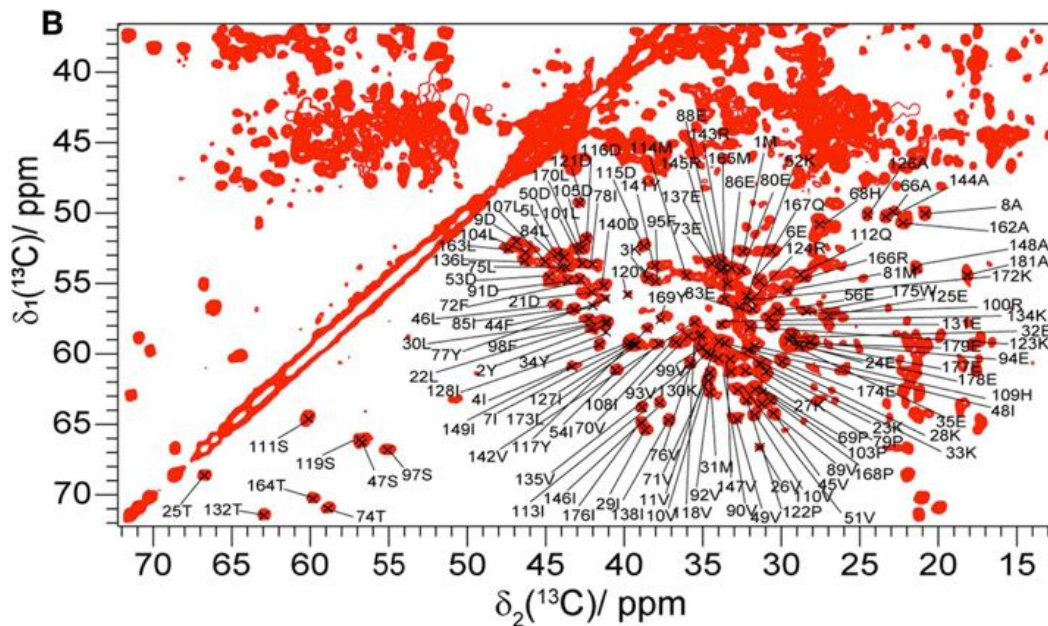
Location: Seminar Room CP-O3-190

Time: Wednesday 2pm-4pm (lecture),

Thursday 2pm-4pm (exercises and seminar)

6 credit points

Lecturer: Prof. Matthias Ernst, ETH Zürich



Advertisement

Networking Event for all Master Students in the Department of Physics

Get-to-know each other event for all Master students in the Department of Physics. Faculty members will also be on site, and there will be plenty of opportunities to ask questions.

When? Monday 02.11.26, 18:00h

Where? Physik – AV-room (P2-E0-414)



Photo-Time!



Questions?

