

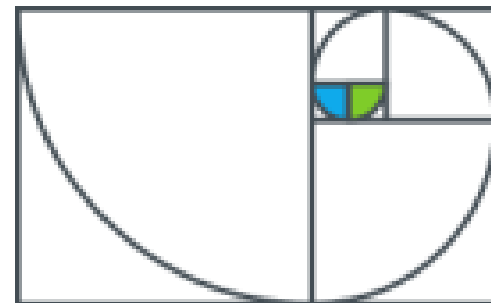
Studying biophysics at Heidelberg

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Institute for Theoretical Physics and BioQuant

Presentation at Student Days April 10 2012



BioQuant
MODEL base of LIFE

The two most important questions

- **How much biology do I need to do biophysics ?**
 - Biophysics covers a broad range of subjects, the answer strongly depends on the research area
 - Usually the relevant biology can be learned on-the-fly for a given research project
 - Thus biology is not the bottleneck
 - Most important is the motivation to work at the interface between physics and biology
- **Which physics do I need to do biophysics ?**
 - Theory: Statistical mechanics, statistics and data analysis, computer physics, stochastic and non-linear dynamics, soft matter physics, etc
 - Experiment: Atomic and molecular physics, optics, solid state physics, physical chemistry, etc

Vertiefungsfach Biophysik

- **Bachelor**

- Experimentelle Methoden der Biophysik (WPBP1+2)
- Grundlagen der Zell- und Molekularbiologie (UKBio1+2)
- PSEM, z.B. „Biophysics of Sensing and Signaling“ oder „Physics of the Cell“

- **Master**

- Statistical Physics (MKTP1)
- Condensed Matter Physics (MKEP2)
- Wintersemester: Experimental Biophysics (MVBP1)
- Sommersemester: Theoretical Biophysics (MVBP2)
- MVSpec, z.B. „Stochastic dynamics“
- MVSem, z.B. „Noise in biochemical networks “

BSc-Modellstudienplan Biophysik

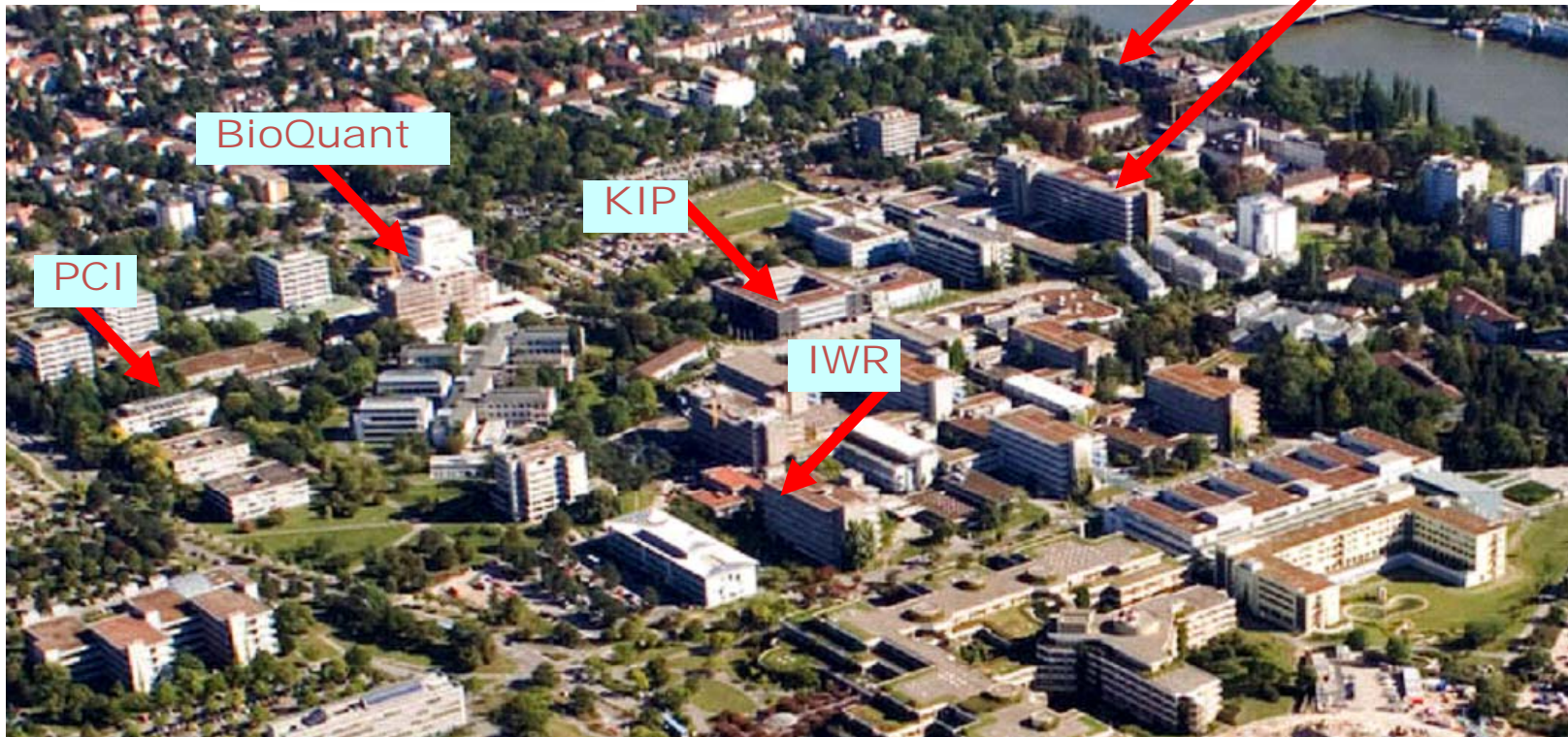
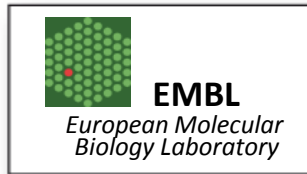
Studienblock	1. Semester	2. Semester	3. Semester	4. Semester	5. Semester	6. Semester
Pflichtmodule (Grundkurse)	Experimentalphysik I 7LP (PEP1) Theoretische Physik 1 8LP (PTP1)	Experimentalphysik II 7LP (PEP2) Theoretische Physik II 8LP (PTP2) Praktikum für Anfänger I LP6 (PAP1)	Experimentalphysik III 7LP (PEP3) Theoretische Physik III 8LP (PTP3)	Experimentalphysik IV 7LP (PEP4) Theoretische Physik IV 8LP (PTP4) Praktikum für Anfänger II 7LP (PAP2)	Experimentalphysik V 7LP (PEP5) Fortgeschrittenen-Praktikum I 4LP (PFP1) Pflichtseminar 2LP (PSEM)	Bachelorarbeit 12LP (PBA) Fortgeschrittenen-Praktikum II 7LP (PFP2)
Wahlpflicht Mathematik	Lineare Algebra I 8LP (PMA1)	Höhere Mathematik für Physiker II 8LP (PMP2) oder Analysis II* 8LP (PMA2)	Höhere Mathematik für Physiker III 8LP (PMP3) oder Analysis III* 8LP (PMA3)			
Persönlich. Schlüsselk.	Basiskurs für ein nachhaltiges Studium 4LP (UKS1)				Präsentation (nur mit PSEM) 1LP (UKS2)	
Berufsb. SK & Fachsp. ZQ	Mathematischer Vorkurs 3LP (UKV)	Programmieren in C++ 1LP (UKB11)	Numerical Methods 3LP (UKNum)	Grundlagen der Zell- und Molekularbiologie 6LP (UKBio1)	Methoden der molekularen der Zellbiologie 7LP (UKBio2) Datenanalyse 1LP (UKB12)	Englisch für Physiker 1LP (UKBEng)
Wahlbereich			Einführung in die und experimentelle Methoden der Biophysik I 4LP (WPBP1)	Experimentelle Methoden der Biophysik II 2LP (WPBP2)	Introduction to Biophysics 6LP (MVBio1) Spezialvorlesung Physik 2LP (WPSpez)	Spezialvorlesung Physik 4LP (WPSpez) Projektpraktikum 6LP (WPProj)
Summe	30 LP	30 LP	30 LP	30 LP	30 LP	30 LP

* Studierende, die planen im zweiten Semester den stärker mathematischen orientierten Zweig mit den Modulen Analysis II(PMA2) und Analysis III (PMA3, Höhere Analysis) zu wählen, sollten im ersten Semester zusätzlich das Modul UKMath1 (Analysis I) absolvieren..

MSc-Modellstudienplan Biophysik

Study block	1st Semester	2nd Semester	3rd Semester	4th Semester
Core courses & research modules	Theoretical Statistical Physics (8 CP MKTP1)	Condensed Matter Physics (8 CP MKEP2)	Scientific Specialization (15 CP MFS) Methods and Project Planning (15 CP MFP)	Master Thesis (30 CP MFA)
Specialization		Advanced Seminar (6 CP MVSem)		
	MVMod: 16 CP + 6 P = 22 CP			
	Introduction to Biophysics (6CP MVBP1)* Advanced Lecture on Special Topics (2 CP MVSpec)	Theoretical Biophysics (6CP MVBP2) Advanced Lecture on Special Topics (2 CP MVSpec)		
		Oral examination 6 CP		
Options	Advanced Atomic, Molecular and Optical Physics (8 CP MKEP3) Physics of imaging1 (4CP MWInf5)*			
	Interdisciplinary courses, transferable skills, professional key competences and specific additional technical competences			
Total CPs	min. 60 CP		30 CP	30 CP

Biophysics at Heidelberg



Biophysics groups at Heidelberg

- according to institutions -

- **KIP:** Meier, Haussmann, Petrich, Pucci, Cremer
- **BioQuant:** Schröder, Rippe, Hertel, Erfle, Hell, Höfer, Schwarz, Bischofs, Sourjik, Garcia, Kummer, Eils
- **PCI:** Spatz, Tanaka, Motzkus
- **MPI MF:** Schlichting, Denk
- **DKFZ:** Semmler, Bachert, Schlegel, Ölfke, Hell, Langowski
- **ITP:** Heermann, Schwarz
- **HITS:** Wade, Gräter
- **IWR:** Dreuw, Hamprecht, Smith
- **EMBL:** Nedelec, Hufnagel

Not complete

Biophysics groups at Heidelberg

- according to subjects -

- **Structure:** Schröder, Schlichting
- **Imaging:** Hell, Herten, Cremer
- **Spectroscopy:** Motzkus, Dreuw
- **Diagnostics:** Haussmann, Petrich, Pucci
- **Molecular biophysics:** Smith, Wade, Gräter
- **Organization of the genome:** Heermann, Rippe, Langowski
- **Cytoskeleton:** Nedelec, Schwarz
- **Cellular biophysics:** Spatz, Tanaka, Schwarz, Hufnagel
- **Systems biology:** Höfer, Eils, Kummer, Bischofs, Erfle
- **Neurosciences:** Meier, Denk, Hamprecht
- **Astrobiology:** Haussmann, Grebel

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Annual spring meeting of the DPG

Berlin 2012 - Mozilla Firefox

berlin12.dpg-tagungen.de/index.html

Deutsche Physikalische Gesellschaft e.V.


Position: berlin12.dpg-tagungen.de > index.html

Druckversion

Startseite
Schwarzes Brett
Wissenschaftliches Programm
Veranstaltungen
Anmeldung
Reisekostenzuschuss
Tagungsort
Sponsoren
Kontakt/Impressum

76. Jahrestagung der DPG und DPG-Frühjahrstagung

Berlin, 25. - 30. März 2012



DPG-Frühjahrstagung der Sektion Kondensierte Materie (SKM) mit den folgenden Fachverbänden/-gruppen und Arbeitskreisen/-gruppen

- Biologische Physik
- Chemische Physik und Polymerphysik
- Dielektrische Festkörper
- Dünne Schichten
- Dynamik und Statistische Physik
- Halbleiterphysik
- Magnetismus
- Metall- und Materialphysik
- und die Arbeitsgemeinschaft Metall- und Materialphysik
- Mikrosonden
- Oberflächenphysik
- Physik sozio-ökonomischer Systeme
- Strahlen- und Medizinphysik
- Tiefe Temperaturen
- Umweltphysik
- Vakuumphysik und Vakuumtechnik
- Fachgruppe Kristallographie
- Arbeitskreis Chancengleichheit
- Arbeitskreis Industrie und Wirtschaft
- Arbeitskreis Energie
- Arbeitsgruppe Information
- Arbeitsgruppe jDPG
- Arbeitsgruppe Philosophie der Physik
- Arbeitsgruppe Physik und Abrüstung

Fachverband Biologische Physik = BP

zotero

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Plenary talks BP Berlin 2012

Soft matter physics
(polymers,
membranes)

Systems biology,
game theory

Continuum
mechanics, complex
fluids

Plenary, Keynote and Prize Talks related to BP

PV I	Mon	8:30– 9:15	H 0105	Survival in the face of the unknown: some lessons from bacteria — •STANISLAS LEIBLER
PV III	Mon	14:00–14:45	ER 270	Soft Matter and Life Sciences: Research with Neutrons — •DIETER RICHTER
PV XIX	Thu	13:15–14:00	H 0105	Mechanics and Growth of Tissues — •JEAN-FRANCOIS JOANNY
PV XX	Thu	14:00–14:45	H 0105	How superficial is adhesion? Common fundamentals of gecko, bacteria, protein and thin film adhesion — •KARIN JACOBS
PV XXII	Thu	14:00–14:45	EW 201	3D imaging of lung tissue during total liquid ventilation — •CHRISTIAN SCHNABEL, SVEN MEISSNER, MARIA GAERTNER, EDMUND KOCH
PV XXIV	Fri	8:30– 9:15	H 0105	Role of van der Waals Interactions in Physics, Chemistry, and Biology — •MATTHIAS SCHEFFLER

Surface
physics

Imaging,
medical
physics

Theoretical chemistry, molecular
biophysics, density functional theory

DPG Schools on Physics 2012

In September 2012, three DPG Schools on Physics will take place at the Physikzentrum Bad Honnef:

- 1. Efficient Algorithms in Computational Physics**, 9. - 14. September, Alexander K. Hartmann (U Oldenburg), A. Peter Young (University of California)
- 2. Heavy Particles at the LHC**, 16. - 21. September, Tilman Plehn (Heidelberg), Thomas Schoerner-Sadenius (Hamburg)
- 3. Forces and Flow in Biological Systems**, 23. - 28. September, Ulrich Schwarz (Heidelberg), Gerhard Gompper (Jülich)



DPG Schools of Physics offer introductions for physics students into a research field of large current interest

Website for registration now open at

www.dpg-physik.de

DPG - School on Physics
supported by the Wilhelm and Else Heraeus-Foundation

Forces and Flow in Biological Systems

23 - 28 September, 2012, Physikzentrum Bad Honnef, Germany

Ulrich Schwarz (Heidelberg) and Gerhard Gompper (Jülich)

Confirmed speakers & subjects

Andreas Bausch (TU Munich)	Cytoskeletal pattern formation: Self-organization of driven filaments
Dirk Drasdo (Paris)	Quantitative modeling of tissue organization on histological scales
Erwin Frey (LMU Munich)	Collective phenomena in active cytoskeletal systems
Ray Goldstein (U Cambridge)	Green algae as model organisms for biological fluid dynamics
Ramin Golestanian (U Oxford)	Active hydrodynamics at small scales: self-propulsion and coordination
Gerhard Gompper (FZ Jülich)	Mesoscale hydrodynamic simulations
Nir Gov (Weizmann Inst. Israel)	Modeling active particles, membranes and gels
Stephan Grill (MPI Dresden)	Cellular polarization by coupling an active fluid to a pattern forming system
Jean-Francois Joanny (Paris)	Mechanics and growth of tissues
Frank Jülicher (MPI Dresden)	Dynamic organisation of developing tissues
George Karniadakis (U Brown)	Multiscale modeling of hematologic disorders
Tom Powers (U Brown)	Swimming in viscoelastic media
Ulrich Schwarz (U Heidelberg)	Active contractility of cells and tissue
Holger Stark (TU Berlin)	Hydrodynamic interactions in soft matter and active particle systems

Force and movement are central elements of life. In contrast to traditional man-made material, however, biomaterials have unusual elastic and viscous properties and therefore deform and flow differently. In order to understand the physics related to forces and flow in biological systems, one has to extend traditional approaches like continuum mechanics to address the fact that they are complex, hierarchical, thermally fluctuating, and active. Recent advances in the physics of soft condensed matter and non-equilibrium physics provide rewarding avenues for meeting this challenge. Moreover large and complex systems can be approached today with computer simulations to much more quantitative detail than formerly possible. This school will bring together some of the leading physicists working with analytical and computational approaches to study forces and flow in cellular systems.

Fees:

Covering full board and lodging at the Physikzentrum Bad Honnef
475 € (for DPG members 375 €)
for students 315 € (for DPG members 215 €)
without lodging 210 €.



Application & more information:

www.pbh.de

Physikzentrum
Bad Honnef

Deutsche Physikalische Gesellschaft

