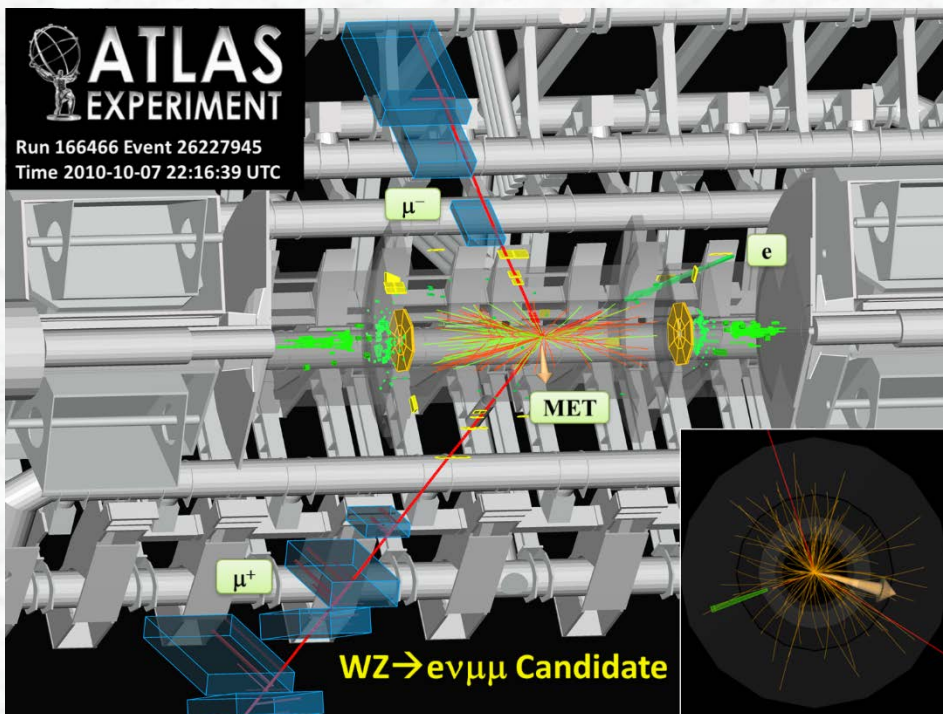


Advanced Particle Physics



- Objective of the lectures
- Course / dates
- Exercises
- Final marks / evaluation

Objective of the lectures

“Advanced Particle Physics”

Master of Science (M. Sc.) Course: Advanced Experiment

Building on the knowledge acquired in the course Experimental Physics V (*Kerne und Teilchen*), the Standard Model of particle physics is discussed in detail.

Besides the phenomenology, experimental tests at colliders are presented, including recent measurements performed at the CERN Large Hadron Collider.

Problems of the Standard Model which motivate the search for extensions will be discussed as well, together with the present status of these searches.

- Prerequisites:
- Experimental Physics V (Kerne und Teilchen)
 - Relativistic kinematics
 - Detector physics (useful, but not necessary)
(this semester, by Prof. Landgraf)

Theoretical lecture (in parallel): Quantum Chromodynamics and Collider Physics
(Prof. S. Dittmaier)

Lecture Plan, Particle Physics II

WS 2013/14

			week	# lecture hours	balance
Mo.	21. Oct. 13		1		-1
Di.	22. Oct. 13	Introduction, Neutrino physics		2	
Mo.	28. Oct. 13		2		-1
Di.	29. Oct. 13	Neutrino physics		2	
Mo.	04. Nov 13		3		-1
Di.	05. Nov 13	Neutrino physics, Dirac equation		2	
Mo.	11. Nov 13	Dirac equation, QED	4	2	1
Di.	12. Nov 13	Feynman calculus		2	
Mo.	18. Nov 13	Feynman calculus	5	2	1
Di.	19. Nov 13	High energy tests of QED		2	
Mo.	25. Nov 13		6		-1
Di.	26. Nov 13	Structure of QCD		2	
Mo.	02. Dez 13	Deep inelastic scattering, hadron structure	7	2	1
Di.	03. Dez 13	Experimental test of QCD		2	
Mo.	09. Dez 13	Experimental test of QCD, II	8	2	1
Di.	10. Dez 13	Physics of heavy quarks (b, top)		2	
Mo.	16. Dez 13		9		-1
Di.	17. Dez 13	Physics of heavy quarks (b,top)		2	
Mo.	23. Dez 13	Weihnachtspause			
Mo.	06. Jan 14	Feiertag	10		
Di.	07. Jan 14	Electroweak interaction		2	
Mo.	13. Jan 14	Electroweak interaction, exp. test	11	2	1
Di.	14. Jan 14	Test of the electroweak interaction		2	
Mo.	20. Jan 14	Higgs mechanism	12	2	1
Fr.	21. Jan 14	Exp. search for the Higgs boson		2	
Mo.	27. Jan 14		13		-1
Di.	28. Jan 14	Supersymmetry		2	
Mo.	03. Feb 14	Exp. search for supersymmetry	14	2	1
Di.	04. Feb 14	Other extensions of the Standard Model		2	
Mo.	10. Feb 14		15		-1
Di.	11. Feb 14	Other extensions of the Standard Model		2	

Summe: 44 0

Course of the lecture

Dates: Mon. 10:15 – 12:00 am (see plan on previous slide), SR I
Tue. 8.15 - 10:00 am, Hörsaal II

Lecturer: Prof. K. Jakobs
Gustav-Mie Haus, 3. Stock, Zi. 03-021
Consultation hours: Fr. 11.00 – 12.00 am
Phone: 203 – 5713

Secretariat: Frau Ch. Skorek, Tel. 203-5715
email: christina.skorek@physik.uni-freiburg.de or
karl.jakobs@uni-freiburg.de

Style: Mainly “Black Board”,
Slides containing diagrams, plots or summaries will be provided for
download via internet:

<https://portal.uni-freiburg.de/jakobs/Lehre/ws-13-14/advpartphys13>

Übungen

Termine: Vermutlich eine Übungsgruppe

Möglicher Termin: Fr. 14-16 Uhr (SR I),

Ausweichtermin: Mi. 10-12 Uhr (Seminarraum WB)

Übungsleiter: Claudia Giuliani, Dr. Romain Madar

email: claudia.giuliani@physik.uni-freiburg.de

romain.madar@physik.uni-freiburg.de

Übungsaufgaben: - Müssen wöchentlich gelöst werden (Hausaufgaben) ;

- Abgabe bis spätestens Mittwochs 10:00 Uhr
(Briefkasten, Erdgeschoss Gustav-Mie Haus)

- Maximal zwei Personen können zusammenarbeiten

- Teilweise werden Computer-Aufgaben gestellt
PYTHIA Monte-Carlo-Programm, Simulationsrechnungen,
CIP-Pool account

Übungen: - Dienen zur Besprechung der Aufgaben, korrigierte Blätter werden vom Assistenten zurückgegeben, mit Punkten bewertet;

- Jeder, der Aufgaben richtig gelöst hat, muss in der Lage sein, diese an der Tafel vorzurechnen !

Examinations, Marks

1. Exercises and written examination (Klausur)

1. Requirement for “pass”: **50% of achievable points**

Weighting:	Exercises	25 %
	Written examination	75 %

-
- Date of written examination: Tue. 18. February 2014, 9:00 – 11:00 am
2nd pass (Nachklausur), Tue. 08. April 2014 9:00 – 11:00 am
(The points achieved in exercises will be counted with the same weight as before)
 - Registration for written examination will be done online, [web-interface](#)

Literature

- F. Halzen und A.D. Martin, *Quarks & Leptons*, John Wiley Verlag
- P. Schmüser, *Feynman-Graphen und Eichtheorien für Experimentalphysiker*, Springer Verlag.
- D. Griffiths, *Einführung in die Elementarteilchenphysik*, Akademie Verlag.