International Max Planck Research School on Elementary Particle Physics

Report for the Evaluation

4 December 2009

Welcome to Reviewer Committee

- Prof. Gisela Anton
  Univ. Erlangen
- Prof. Wilfried Buchmüller
  DESY Hamburg
- Prof. Michael Hauschild
  CERN, Geneva
- Prof. James Stirling
  Univ. Cambridge, UK

- Prof. Wolfgang Hackbusch
  MPI Mathematics in Natural Sciences, Leipzig
- Dr. Herbert Festl,
  Max Planck Society, central administration

International Max Planck Research School on Elementary Particle Physics (IMPRS EPP)

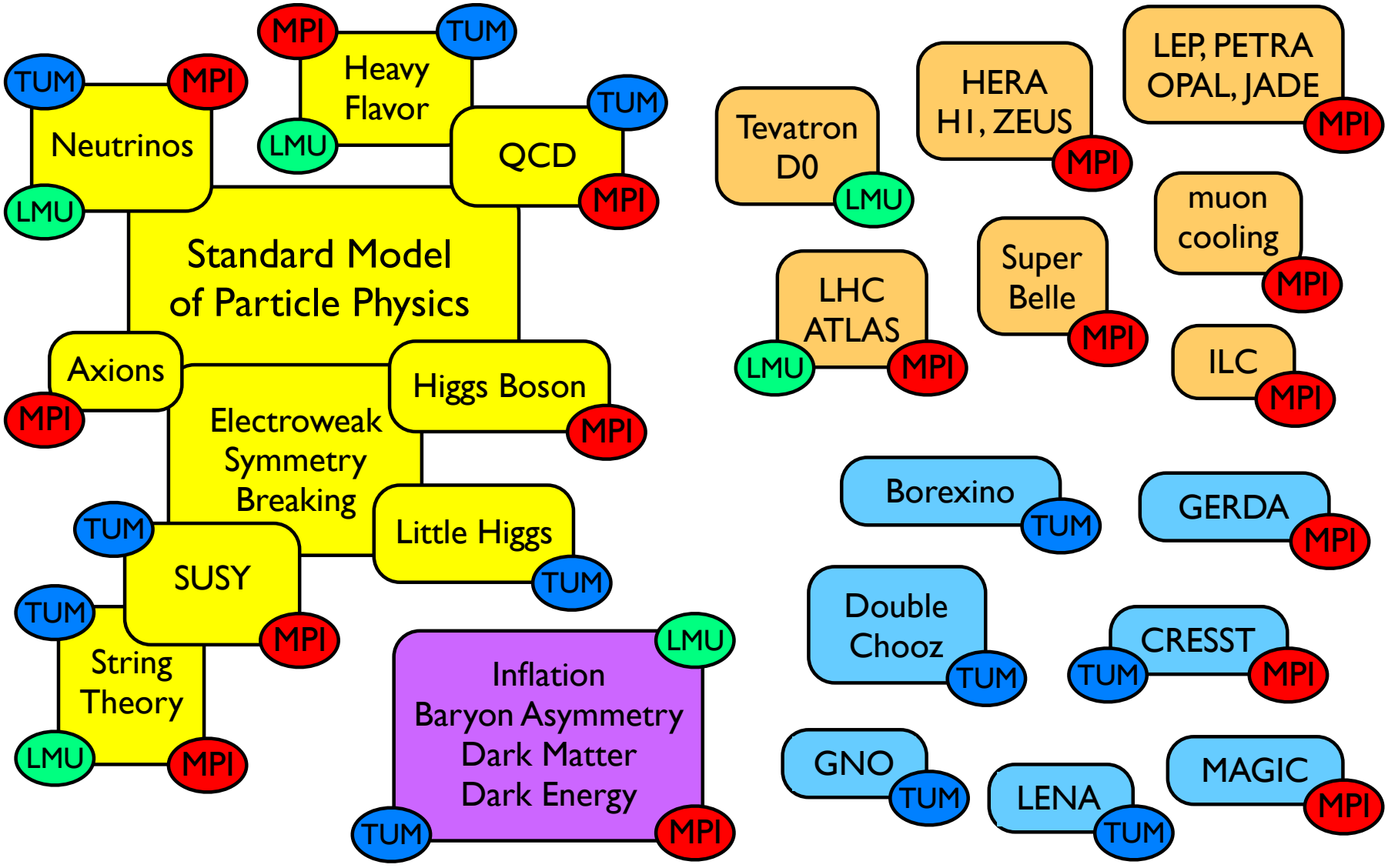
Theoretical, experimental, and cosmological frontiers

Host Institutions:	MAX PLANCK INSTITUT FÜR PHYSIK	MPP
	LUDWIG MAXIMILIANS UNIVERSITÄT MÜNCHEN	LMU
	TECHNISCHE UNIVERSITÄT MÜNCHEN	TUM

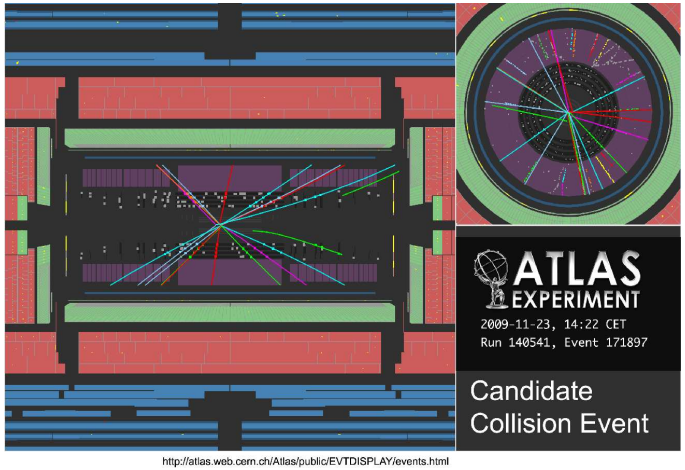
Scientific Subject: FUNDAMENTAL RESEARCH ON PARTICLE PHYSICS AND ASTROPARTICLE PHYSICS FROM BOTH THEORETICAL AND EXPERIMENTAL PERSPECTIVES

Period:	October 2005 – September 2011
Spokesperson:	Wolfgang Hollik, MPP
Coordinator:	Frank Steffen, MPP, since dec 2006
	Jochen Schieck, MPP, until nov 2006
Executive Committee:	Otmar Biebel, LMU (exp)
	Gerhard Buchalla, LMU (theo)
	Bela Majorovits, MPP (exp)
	Iris Abt, MPP (exp), until nov 2008
	Johanna Erdmenger, MPP (theo)
	Georg Raffelt, MPP (theo)
	Andrzej Buras, TUM (theo), until dec 2008
	Alejandro Ibarra, TUM (theo)
	Lothar Oberauer, TUM (exp)

Research topics within IMPRS EPP



ATLAS, CERN
detector at LHC



http://atlas.web.cern.ch/Atlas/public/EVTDISPLAY/events.html

CRESST, Gran Sasso
dark matter search

GERDA, Gran Sasso
ν-less double-β decay

MAGIC, La Palma
high-energy γ-ray telescopes (I+II)

	DEPT.	PROJECT
MPP	S. BETHKE	ATLAS
MPP	A. CALDWELL	GERDA, μ COOLING, BELLE II [ILC]
MPP	W. HOLLIK	PARTICLE THEORY, PHENOMENOLOGY
MPP / LMU	D. LÜST	STRING THEORY
MPP	G. RAFFELT	ASTROPARTICLE THEORY
MPP	M. TESHIMA	MAGIC I+II, CRESST
LMU	D. SCHAILE	ATLAS, DO
LMU	[H. FRITZSCH] G. BUCHALLA	PARTICLE THEORY, PHENOMENOLOGY
LMU	D. V. MUKHANOV	COSMOLOGY
TUM	A. BURAS	PARTICLE THEORY, PHENOMENOLOGY
TUM	[V. FEILITZSCH] L. OBERAUER	CRESST, BOREXINO, DOUBLE CHOOZ

INDEPENDENT YOUNG RESEARCHER GROUPS

MPP	S. ANTUSCH	PARTICLE THEORY, NEUTRINOS+NEW PHYSICS
MPP	F. SIMON	DETECTOR DEVELOPMENT, BELLE II, ILC

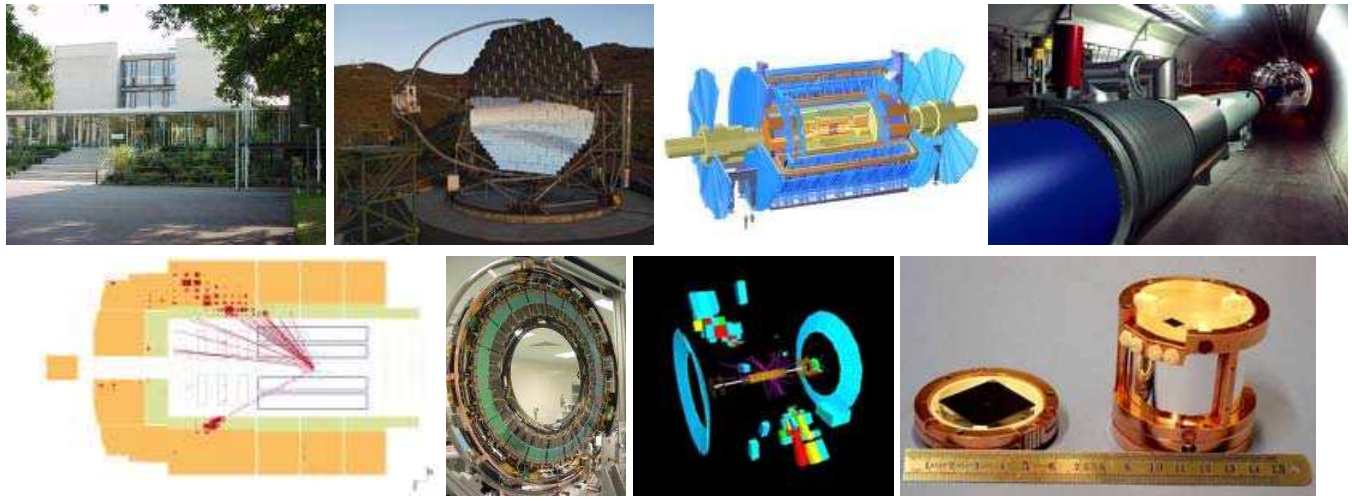
OTHER SUPPORTING PROGRAMS

EXCELLENCE CLUSTER TUM/LMU/MPP	ORIGIN AND STRUCTURE OF THE UNIVERSE
GRADUIERTENKOLLEG LMU/TUM [MPP]	PARTICLE PHYSICS AT THE ENERGY FRONTIER OF NEW PHENOMENA
SFB/TR27, TUM/MPP	NEUTRINOS AND BEYOND
EMMY NOETHER, MPP	MATTER-ANTIMATTER ASYMMETRY | SUGRA AND STRINGS
EU MC NETWORKS	ARTEMIS, HEPTOOLS, FLAVIANET

Realization

- Lecturers from all host institutions LMU, MPP, TUM
- Curriculum $\longrightarrow$ *talk by F. Steffen*
- Committees:
  - *Executive Committee*
  - *PhD Committee: students' representatives*
    C. Kiessig (spokesperson), M. Ammon, Y. Bao,
    D. Borla Tridon, J. Germer, P. Giovannini
  - *Thesis Committees (individually) from LMU/MPP/TUM*
- Particle Physics School Munich Colloquium
  (common with Graduiertenkolleg)
  FIRST FRIDAY EACH MONTH
- Young Scientists Workshop *(common with Graduiertenkolleg)*
  RINGBERG CASTLE, ONE WEEK IN SUMMER EACH YEAR
- IMPRS Workshop *(recruitment of PhD students)*
  ONCE EVERY 3 MONTHS

Inauguration: 17th October 2005



Homepage of the

International Max Planck Research School (IMPRS) on Elementary Particle Physics in Munich, Germany

The IMPRS on Elementary Particle Physics (IMPRS EPP) offers outstanding research and training opportunities to highly qualified doctoral students. The excellent theoretical and experimental research opportunities cover a wide range of topics in high energy particle physics, astroparticle physics, and cosmology. The IMPRS EPP is open for students from all countries and offers 3-year fellowships available for both international and national students.

IMPRS Workshop

Date/Time: from Tuesday 28 June 2005 (19:00) to Thursday 30 June 2005 (18:00) (Europe/Berlin)
Location: MPI (Main Auditorium)
Chairperson: Schieck, J

Tuesday 28 June 2005 19:00->23:00 BBQ
Wednesday 29 June 2005 10:00->12:30 Presentations
Wednesday 29 June 2005 14:00->15:00 guided MPI tour
Thursday 30 June 2005 10:00->12:20 Presentations
Thursday 30 June 2005 15:00->18:00 closed session (Room 313)

Tuesday 28 June 2005

BBQ (19:00 ->23:00)

Chairperson: Schieck,J
Material: pictures

Wednesday 29 June 2005

Presentations (10:00 ->12:30)

Chairperson: Schieck,J

10:00	**Welcome** (10')	J. Schieck, W. Hollik
10:10	**Explicit formulas for the scalar modes in Seiberg-Witten theory** (20')	Nikolas Akerblom
10:30	**Perturbations of selfgravitating fluid cylinders** (20')	Philipp Höffer v. Loewenfeld
10:50	**The Backreaction in Models of Acoustic Black Holes** (20')	Michele Maio
11:10	**Coffee Break** (20')	All
11:30	**The Worldline Approach to two-loop Yang-Mills Theory** (20')	Jianhui Zhang
11:50	**Local couplings in quantum field theory** (20')	Stephan Hoehne
12:10	**On twist-two operators in N=4 SYM** (20')	Johannes Henn

guided MPI tour (14:00 ->15:00)

Chairperson: Schieck, J

Thursday 30 June 2005

Presentations (10:00 ->12:20)

Chairperson: Schieck,J

10:00	**Radio waves and Ionization Trails of Cosmic Rays Air Showers in the Earth's Atmosphere** (20')	Gina Isar
10:20	**Robust approach for Alignment of ATLAS SCT detector** (20')	Roland Haertel
10:40	**Analysis on Longitudinal Spin Transfer of Lambda Hyperon in HERMES** (20')	Chen Xun
11:00	**Coffee Break** (20')	All
11:20	**Taking a picture of the Earth's interior with geoneutrinos** (20')	Kathrin Hochmuth
11:40	**The nu MSM, dark matter and neutrino masses** (20')	Steve Blanchet
12:00	**Renormalization in vNRQCD** (20')	Maximilian Stahlhofen

closed session (15:00 ->18:00)

Chairperson: Schieck, J.
Location: Room 313

Achievements

Characteristics	Total	Completed PhDs	Completion in 3 months	Ongoing PhDs	Starters
Total	89	30	8	40	11
Gender					
Women	20 (22%)	6 (20%)	2 (25%)	9 (23%)	3 (27%)
Men	69 (78%)	24 (80%)	6 (75%)	31 (77%)	8 (73%)
Nationality					
German	58 (65%)	17 (57%)	7 (87%)	26 (65%)	8 (63%)
Non-German	31 (35%)	13 (43%)	1 (13%)	14 (35%)	3 (27%)
Austria	2	1		1	
China	3	3			
Denmark	1			1	
Georgia	1		1		
Italy	7	2		3	2
Japan	1			1	
Poland	1	1			
Macedonia	1				1
Russia	1			1	
Slovakia	2	2			
Spain	1	1			
Sweden	1	1			
Switzerland	2	1		1	
Turkey	1			1	
Ukraine	1			1	
USA	3	1		2	
Vietnam	2			2	
Discipline					
Experim. Phys.	37 (42%)	8 (27%)	6 (75%)	18 (45%)	5 (45%)
Theoret. Phys.	52 (58%)	22 (73%)	2 (25%)	22 (55%)	6 (55%)

	Total	Completed PhDs	Completion in 3 months	Ongoing PhDs
Number of persons	78	30	8	40
Publications				
Papers	320 (4.1)	202 (6.7)	26 (3.3)	92 (2.3)
Proceedings	88 (1.1)	55 (1.8)	11 (1.3)	22 (0.5)
Grades				
summa cum laude		17		
magna cum laude		13		

average duration of PhD thesis work: 34.6 months

time from start of project to thesis submission

Awards

Name	Institute	Award
Martin Ammon	MPP	Fritz and Maria Hoffmann Award 2007
Michael Beimforde	MPP	Lise Meitner Award 2007
Dr. Steve Blanchet*	MPP	Universe PhD Award 'Theory' 2008
Dr. Monika Blanke*	TUM	Universe PhD Award 'Theory' 2009
Dr. Matthias Kaminsky*	MPP	Arnold Sommerfeld Center PhD Prize 2008
Dr. Kevin Kröninger*	MPP	Otto Hahn Medal 2007
Dr. Enrico Pajer*	LMU	Arnold Sommerfeld Center PhD Prize 2008
Dr. Josef Pradler	MPP	Helmholtz Young Researcher Prize 2006
Karoline Schäffner	MPP	Georg-Simon-Ohm Award 2008
Hai Ngo Thanh	MPP	DAAD Prize 2007

Indicators for progress and success

- IMPRS EPP is attractive for students
  - large number of application within the first 4 years (839)
  - PhD projects address fundamental questions in natural sciences,
    often in exciting experiments with highly international collaborations
  - supervisors/lecturers are world experts
  - Munich area offers a very active scientific environment and a wide range of cultural events
  - social integration proceeds well

Indicators for progress and success *(cont.)*

- wide ranging spectrum of thesis work
  - cosmological questions – particle physics
  - string theory – detector development
  - data analysis – hardware tools
- high rate of successful thesis accomplishments
- thesis awards
- international visibility of students
  publications, talks at conferences, proceedings contributions
- attractive positions after accomplished PhD
  – postdoc positions worldwide
  – or with companies
- contacts with alumni

Future perspectives

- IMPRS EPP succesfully installed and shows very good performance
- scientific and training program well received and appreciated by the young scientists
- increasing number of PhD students
- big interest in continuation beyond 2011
- from January 2010 on: Georgi Dvali as new chair at LMU and director at MPP (*Particle Cosmology*)
- most exciting time for particle physics yet to come