Introduction to the Alliance Accelerator Research and Perspectives

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3rd Annual Workshop of the Helmholtz Alliance Physics at the Terascale, Hamburg Nov 2009

Accelerator Research in Germany



Research Topics for HEP

- High Energy
 - Linacs
 - High Gradients
 - Circular machines
 - High magnetic fields
- High Luminosity
 - Low emittance





Fabrication of Accelerator Structures



Accelerator Gradient in SRF Structures



Beyond acceleration

- Source
 - low emittance e
 - high intensity e⁺
 - Polarization

Polarimeter tests in Bonn

- Damping ring
- Main linac
 - FLASH 9 mA



- Beam delivery
 - ILC & CLIC
- Feedback
 - Multibunch feedback
 - ILC & CLIC



Opportunities at CERN LHC Commissioning and Upgrade

- The start of the LHC is happening expert action
- LHC injector complex will be upgraded;
 - Opportunities for Diploma/Master theses

• Linac 4

SPS

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Beyond current technologies

- Future Terascale accelerators have to achieve gradients of 1GV/m
 - Plasma Wakefield is one candidate



- YIG (Hamburg, currently being filled) to explore the options for high-gradient
 - collaboration with DESY/ infrastructure
- consistent approach in Terascale has to be developed



Verbundforschung

- Initiative to establish a research field accelerator physics
- join forces on common topics
- Workshop tried to identify interests, establish contacts
- possibly form a wider network (Verbund) – as in particle physics for HEP experiments
 - A S Müller and W Hillert

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Beschleunigerentwicklung Thursday 17 September 2009
                                                                                      (12:00)
              an deutschen
                                                                  to Friday 18 September 2009
                                                                        (16:00) (Europe/Berlin
              Hochschulen für die
                                                                      at Universität Hamburg 8
              Grundlagenforschung an
                                                                                        DES
                                                                 chaired by: Jörg Roßbach (Un
                                                                                   Hamburg
              Großgeräten
                                                                            support: pt@desv.de
                                                   Thursday 17 September 2009 | Friday 18 September 2009
Thursday 17 September 2009
                                                                                          top+
   12:00
                                      Business Lunch (Sem. 4, Geb. 1)
         Ankunft, meet&greet
13:00->13:20 Begrüßung (Location: Sem. 4, Geb. 1)
   13:00 Begrüßung durch die Tagungsleitung (10) (ဲ Slides 🛀
                                                                           Jörg Roßbach (DESY)
   13:10 Begrüßung durch DESY (05)
                                                                       Reinhard Brinkmann (DESY)
13:20->16:30 Überblick: Stand der Beschleuniger-R&D in
Deutschland (Location: Sem. 4, Geb. 1)
                                                                           Monica Pantea (BMBF)
   13:20 Förderziele des BMBF (20) (Slides 🗐
   13:40 Hochenergiephysik (40) (ဲ Slides 🔁 )
                                                                           Eckhard Elsen (DESY)
   14:20 Hadronen- und Kernphysik (40) (Slides 🚺 )
                                                                     Ulrich Ratzinger (Uni Frankfurt)
   15:00
   15:30 Erforschung kondensierter Materie (40) (ဲ Slides 🚺
                                                                     Shaukat Khan (TU Dortmund)
   16:10 Förderinstrumente (20) (Sides 🔁
                                                                         Hanna Mahlke (PT-DESY)
   16:30
                                                Pause
17:00->19:00 Schwerpunktthemen (Location: Sem. 4, Geb. 1)
   17:00 Strahldynamik (30) (َ Slides 🚺
                                                                        Wolfgang Hillert (Uni Bonn)
   17:30 Strahldiagnostik (30) (🔊 Slides 🛄 )
                                                                      Jörg Roßbach (Uni Hamburg)
   18:00 Beschleunigertechnologie (30) (ဲ Slides 🛄 )
                                                                          Malte Kaluza (Uni Jena)
   19:30
                                                Dinne
Friday 18 September 2009
                                                                                         top↑
08:30->12:30 Konkrete Vernetzungsmaßnahmen
         Arbeitsgruppe "Strahldiagnostik/Strahldynamik" (1h45')
                                                                           Atoosa Meseck (HZB)
   08:30
                                                                    Wolfgang Müller (TU Darmstadt)
         (ဲ Paper 🖳; ဲ Slides ) (Location: Sem 4, Geb. 1 )
         Arbeitsgruppe "Beschleunigertechnologie" (1h30)
                                                               Anke-Susanne Müller (Uni Karlsruhe)
   08:30
          (Slides) (Location: Sem 3a, Geb. 1)
                                                                          Malte Kaluza (Uni Jena)
   10.15
                                             Kaffeepause
         Berichte aus den Arbeitsgruppen (45)
                                                   Atoosa Meseck (HZB), Wolfgang Müller (TU Darmstadt)
   10.45
                                                                Anke-Susanne Müller (Uni Karlsruhe)
            Slides 🔼 ) (Location: Sem. 4, Geb. 1 )
   11:30 Round Table (1h00') (Location: Sem. 4, Geb. 1 )
          Vernetzung der Beschleunigerphysik in Deutschland und internationale Zusammenarbeit im Rahmen der
          BMBF-Förderung
  12:30
                                                Lunch
13:30->15:00 Ausbildung von Beschleunigerphysikern (Location: Sem. 4
Geb. 1)
   13:30 Beruf: Beschleunigerphysiker (30') (Slides 🚺 )
                                                                             Hans Weise (DESY)
         Ausbildungsangebote der Universitäten (Bachelor/Master) (30)
                                                                              Jörg Roßbach (Uni
   14:00
                                                                                     Hamburg
         (Slides 🛄 )
                                                                        Hanna Mahlke (PT-DESY)
   14:30 Outreach (30) (Slides 🔼
   15:00
                                           PETRA III-Führung
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nach Absprache: bei Interesse bitte anmelden

Programme for Today

		Thursday 12 November 2009
Thursday 12 November 2009		
12:30	Lunch break	
14:00->17:30 Accelerator Project (Convener: Eckhard Elsen (<i>DESY</i>), Wolfgang Hillert (<i>University of Bonn, Physics Institute</i>)) (Location: Sem. R. 4 b)		
14:00	Introduction to the Alliance Accelerator Research and Perspectives (15')	Eckhard Elsen (<i>DESY</i>)
14:15	Optical inspection of SRF cavities at DESY (20')	Sebastian Aderhold (DESY)
14:35	Second Sound as diagnostic tool for SCRF cavities (40') (Slides 1)	Felix Schlander (<i>DESY</i>) , Hannes Vennekate
15:15	A digitally controlled test stand for SCRF cavities (20') (Slides 1)	Marc Wenskat (<i>University</i> <i>Goettingen</i>)
15:35	break	
15:50	Construction of an electronBenjamin Born departmentspectrometer for photo-enhanced fielddepartmentemission studies (20')	nann (Uni Wuppertal, physics ent, group of Prof. G. Mueller, accelerator physics)
16:10	Surface roughness and correlated field emission investigations of electropolished Nb samples (20')	Aliaksandr Navitski
16:30	A single bunch injector for ELSA (20') (ဲ Slides 粒)	Fabian Klarner
16:50	Multi bunch feedback systems for ELSA (20)	Andre Roth
17:10	Contributions to advanced accelerator Shaukat K concepts (20')	han (Technische Universitaet Dortmund)

Summary – Project Accelerator

- Terascale comprises only a fraction of the accelerator activities in Germany given by the focus on HEP (β =1 accelerators)
- Education is an emphasis
 - Lectures
 - Schools
- Research mainly directed towards ILC
- Developing plans for engagement for Future Accelerating Technologies

