Report to HEPAP on P5 Activities and Plans

C. Baltay

February 15, 2008

P5 Membership

Charles Baltay (Yale University), Chair

Hiroaki Aihara (University of Tokyo)

James Alexander (Cornell University)

Daniela Bortoletto (Purdue University)

James Brau (University of Oregon)

Peter Fisher (Massachusetts Institute of Technology)

Josh Frieman (Fermi National Accelerator Laboratory)

Fabiola Gianotti (CERN)

Donald Hartill (Cornell University)

JoAnne Hewett (Stanford Linear Accelerator Center)

Andrew Lankford (University of California, Irvine)

Joseph Lykken (Fermi National Accelerator Laboratory)

William Marciano (Brookhaven National Laboratory)

Jay Marx (California Institute of Technology)

Steve Ritz (NASA GSFC)

Marjorie Shapiro (Lawrence Berkeley National Laboratory)

Henry Sobel (University of California, Irvine)

Robert Tshirhart (Fermi National Accelerator Laboratory)

Carlos Wagner (Argonne National Laboratory)

Stanley Wojcicki (Stanford University)

Mel Shochet (University of Chicago) (Ex-Officio)

DOE Budget Guidelines

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
2008 Base Then Yr	752	688	712	737	763	789	817	846	875	906	938
2007 Base Then Yr	752	688	806	834	863	893	924	957	990	1025	1061
2007 DoublThen Yr	752	688	853	908	967	1030	1097	1169	1245	1325	1412
2008 Base 2008$	752	688	688	688	688	688	688	688	688	688	688
2007 Base 2008$	752	688	752	752	752	752	752	752	752	752	752
2007 Doubl 2008$	752	688	798	822	846	872	898	925	953	981	1011

P5 Subgroups and Writing Assignements

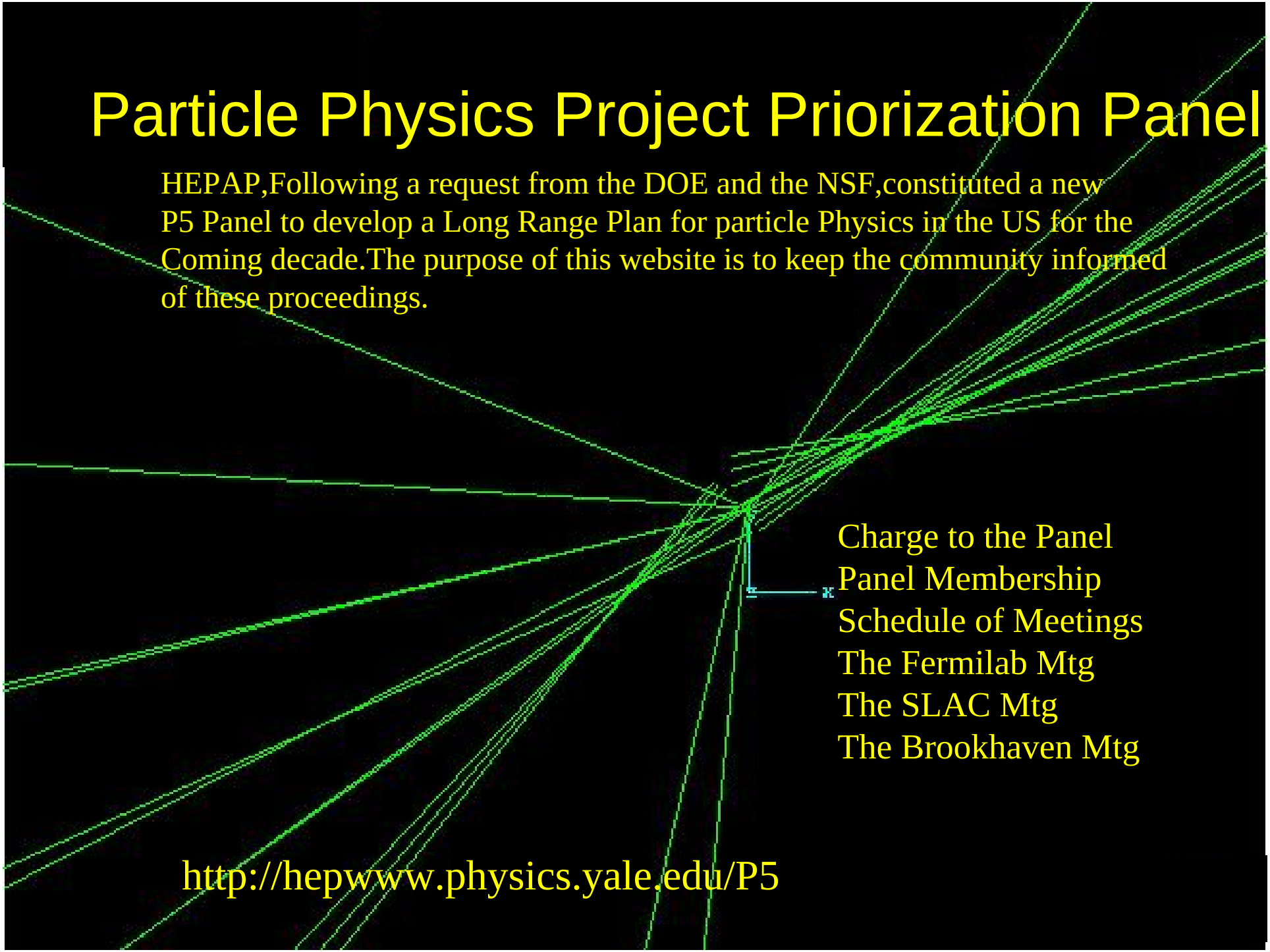
1.Tevatron	Bortoletto,Wagner, Wojcicki
2.LHC&SuperLHC	Shapiro,Gianotti, Frieman
3.ILC	Brau,Hewett,Hartill
4.Project X	Marx,Lykken,Aihara
5.DUSEL	Fisher,Sobel, Bortoletto
6.Neutrino Physics	Marciano,Wojcicki,Fisher
7.Dark Matter	Sobel,Alexander, Lykken
8.Dark Energy and ParticleAstrophysics	Frieman,Ritz, Hewett
9.Precision Measurements&Other Expts	Tschirrhart,Marciano, Shapiro
10.Generic Accelerator and Detector R&D	Hartill,Lankford, Marx
11.Executive Summary,Introduction, Summary of Recommendations	Baltay,Shochet, Ritz
12.Budget Considerations	Baltay, Hartill, Brau

Each Subgroup has the following chores:

a. Help CB arrange the speakers for the appropriate Agendas
b. Pay particular attention and phrase questions if any at meetings
c. Help gather budget information for that area
d. Write the relevant section of the Report

Particle Physics Project Priorization Panel

HEPAP,Following a request from the DOE and the NSF,constituted a new P5 Panel to develop a Long Range Plan for particle Physics in the US for the Coming decade.The purpose of this website is to keep the community informed of these proceedings.



Charge to the Panel
Panel Membership
Schedule of Meetings
The Fermilab Mtg
The SLAC Mtg
The Brookhaven Mtg

http://hepwww.physics.yale.edu/P5

Fermilab P5 Meeting Agenda

Thursday Jan 31

9:00-12:00 Panel Organizational Session(Closed)

Introduction	Mel Shochet
Charge from DOE	Dennis Kovar
Charge from NSF	Joe Dehmer
DOE Budget Guidance	Dennis Kovar
NSF Budget Guidance	Jim Reidy
Panel Organization	Charlie Baltay
Discussion of procedures,issues,schedules etc	

12;00- 1:00 Lunch

1:00- 3:00 Long Range Plans

Fermilab Plans	Pier Oddone
Asian Plans	Atsuto Suzuki

3:00- 3:30 Coffee Break

3:30- 6:30 Program with a High Intensity Proton Source

Introduction	Young-Kee Kim
Physics Overview	Andre deGouvea
Neutrino Oscillations	Bonnie Fleming
Mu-e-gamma,G-2	Bill Molzon
Rare K Decays	Doug Bryman
Accelerator and R&D	Steve Holmes
Summary Remarks	Young-Kee Kim

7:00 Dinner Hosted by FRA

Friday Feb 1

9:00-12:00	Linear Collider	
	Overview	Barry Barish
	Physics and Detectors	John Jaros
	The US ILC Effort	Mike Harrison
	Global ILC Design	Marc Ross
	CLIC and Other Options	Tor Raubenheimer
12:00- 1:00	Lunch	
1:00- 3:00	Tevatron Run Extension	
	Machine Prospects	Roger Dixon
	The CDF Experiment	Rob Roser
	The D0 Experiment	Darien Woo
3:00-4:30	Town Meeting	
4:30-6:00	Panel Executive Session	

Saturday Feb 2

9:00-12:00	Panel Executive Session

SLAC P5 Meeting Agenda

Thursday Feb 21

9:00-10:00	Executive Session	
10:00-11:00	Super B Factories	
	Theoretical Motivation(20 min)	Zoltan Ligeti
	US Participation at Frascati(10 min)	David Hitlin
	US Participation at KEK(10 min)	Tom Browder
11:00-12:00	DUSEL	
	View from the NSF(20 min)	Jonathan Kotcher
	Facility,Experiments,Detectors(20 min)	Kevin Lesko
12:00- 1:00	Lunch	
1:00- 5:00	Neutrino Physics	
	Overview(30 min)	Peter Myers
	The NOvA Experiment(20 min)	Gary Feldman
	The Fermilab Program(20 min)	Gina Rameika
	Other Fixed Target Expts(15 min)	Heidi Shellman
	Coffee Break	
	Water C Det at DUSEL(20 min)	Milind Diwan
	Liquid Argon Detectors(20 min)	Bonnie Fleming
	Advanced Neutrino Sources(20 min)	Steve Geer
	Reactor Experiments(15 min)	Robert McKeown
	Double Beta Decay(15 min)	Giorgio Gratta
5:00- 6:00	Executive Session	

SLAC P5 Meeting Agenda

Friday Feb 22

8:00-10:00	Dark Energy Experiments	
	Overview(40 min)	Josh Frieman
	Supernovae (20 min)	Alex Kim
	Weak Lensing(20 min)	Bhuvnesh Jain
	Baryon Oscillations(20 min)	Martin White
10:00-10:30	Coffee Break	
10:30-12:00	Particle Astrophysics	
	High Energy Gamma Rays(25 min)	Roger Blandford
	H E Cosmics and Neutrinos(25 min)	Angela Olinto
	CMB Experiments(25 min)	Scott Dodelson
12:00- 1:00	Lunch	
1:00- 2:00	Executive Session	
2:00- 3:00	European Plans and Views	Rolf Heuer
3:00- 4:00	SLAC Plans and Views	Steve Kahn,Persis Drell
4:00- 4:30	LBL Plans and Views	Jim Siegrist
4:30- 6:00	Town Meeting	

Saturday Feb 23

9:00-12:00	Executive Session

Brookhaven P5 Meeting Agenda

Thursday March 6

9:00-11:00	Executive Session	
11:00-12:00	Dark Matter Experiments	Hank Sobel
12:00- 1:00	Lunch	
1:00- 3:00	LHC and SuperLHC	
	Physics Motivation(30 min)	Ian Hinchcliffe
	ATLAS(20 min)	TBD
	CMS(20 min)	TBD
	Machine Components(20 Min)	Steve Peggs
3:00- 3:30	Coffee Break	
3:30- 5:00	Generic Accelerator R&D	
	Generic R&D(20 min)	Maury Tigner
	Muon Colliders(20 min)	Bob Palmer
	Longer Term Technologies(20 min)	TBD
5:00- 6:00	Executive Session	

Brookhaven P5 Meeting Agenda

Friday March 7		
8:30- 9:00	University Program Concerns	TBD
9:00- 9:30	Brookhaven Plans&Views	Steve Vigdor
9:30-10:00	Cornell Plans&Views	Maury Tigner
10:00-10:30	Argonne Plans&Views	TBD
10:30-12:00	Executive Session	
12:00- 1:00	Lunch	
1:00- 4:30	Executive Session	
4:30- 6:00	Town Meeting	
Saturday March 8		
9:00-12:00	Executive Session	

Progress so far…

- We had our first meeting at Fermilab
  - Panel Organization
  - Developed agendas for SLAC and Brookhaven meetings
  - Heard well organized, informative talks about the Fermilab plans and the ILC situation
  - No attempt at decision making at this stage
  - Had long discussion about what issues the Panel should focus on
- In the next few slides I will give my personal impressions of this discussion of the broad issues we should address

Issues and Questions the Panel Started to Consider

- It is crucial for this Panel to articulate a Vision for our field that will make people want to open their wallets to us.

- Can we think of our field as having three Frontier Areas with similar high priority:
  - The Energy Frontier: The Origin of Matter
  - The Luminosity Frontier: Neutrinos and Leptonic CP Violation
  - The Cosmic Frontier: Dark Matter and Dark Energy

  Each of these three frontiers seek answers to fundamental questions that we should be able to articulate and everyone should be able to apreciate, and they require different approaches and facilities to pursue

Our field is richer in exciting intellectual questions then ever before, and we are at the threshold of incredible discoveries!!

What might follow from this

- The Energy Frontier
  - Should we consider the LHC program as an integral part of the US Program and as such deserving our high priority
  - Even though the ILC has taken considerable hits recently, should we continue to support the goal of regaining the Energy Frontier in the US via future Lepton Colliders as a high priority

What might follow from this

- The Luminosity Frontier:Neutrinos and Leptonic CP Viol
  - Should our Long Range Vision include having a world-leading Neutrino program in the US
  - Is it clear that such a program has to work towards
    - A megadetector at the DUSEL site with the neutrino source at Fermilab
    - Will we eventually need neutrino sources more advanced then Protons->pions->neutrinos (i.e.Neutrino Factory or Beta Beams)
  - If so, it is clear that we can not get there in one step but have to follow a program with a series of steps
    - It might be important to realize that each step in isolation by itself may not be spectacular but is justified as a step necessary to get to our goal
    - Care should be taken that these steps not be detours or sidetracks but are the most direct and rapid steps that lead to our goal

What might follow from this

- The Cosmic Frontier: Dark Matter and Dark Energy
  - Do we believe that the Cosmic Frontier is an integral part of our Field and as such deserves similar priority with the other Frontier Areas?
  - Do we believe that in the areas of Dark Matter and Dark Energy the US has a world-leading program, assuming that the plans we are proposing are realized?

Some other thoughts….

- It will be important to develop a vision that is coherent with the International nature of our field
  - The Energy Frontier Facilities have to dovetail with what might be in the future be planned in Europe and Asia.We should consider scenarios with both onshore and offshore facilities
  - The Luminosity Frontier plans have to be coordinated with Europe and Japan
  - The Dark Matter, Dark Energy and Neutrino programs will inherently be international collaborations and should be coordinated with programs abroad

Some other thoughts….

- How important is it to have an onshore running accelerator program in the US
  - To maintain accelerator expertise and train the next generation of accelerator physicists
  - Is this important in our hopes to recapture the Energy Frontier
  - To maintain a level of funding for our field anywhere near what it is now
  - If there were no accelerator facilities in the US, what would be our fair share of the operating costs at CERN?

Some other thoughts….

- Our crystal Ball can not see too far ahead. A ten year roadmap will have to have some branchpoints four or five years from now as more information becomes available:
  - What we find at the LHC will influence the nature of future lepton colliders
  - The value of Theta(13) will affect the nature of the optimum neutrino program
  - Will DUSEL be approved to proceed
- How do you balance
  - a bird in the hand- programs within reach that might be slightly less exciting
  - versus two in the bush- more exciting science with less certainty of realization
- The first four or five years will have to include an R&D program sufficiently well balanced to allow us to follow the best forks in the road as rapidly as possible when we get there