News from NSF

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Division Director
Division of Physics

With Input from Program Directors: Jim Shank; Brian Meadows; Jean Cottam; Jim Whitmore; Keith Dienes

HEPAP 6 April 2015

Physics Division Current Plan for FY 2015

Some good news

FY 2015 Budget Request	$263.70 M
FY 2015 Current Plan	$274.99 M

Proposal and Award Processing Underway –
No Further Details Available

FY 2016 Budget Request	$277.37 M

Particle Physics at NSF

Individual programs within Physics Division

Elementary Particle Physics – Experimental
Jim Shank, Brian Meadows, Saul Gonzalez (On detail)

Cosmic Phenomena – Jean Cottam
Studies of Ultra-High Energy Particles, CMB, Dark Energy

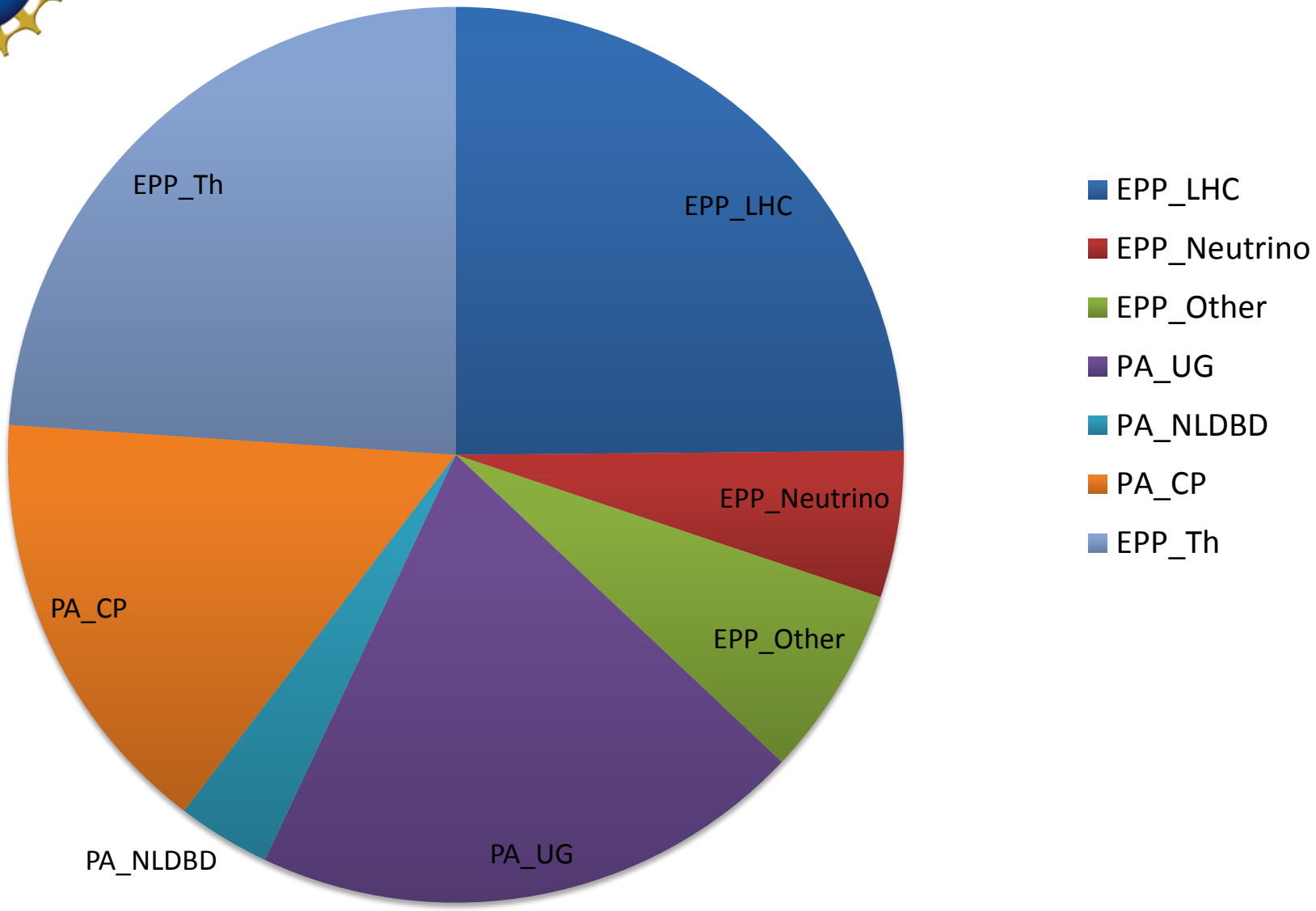
Underground Physics – Jim Whitmore
Experiments in environments requiring low background

Elementary Particle Physics and Astrophysics and Cosmology
Theory – Keith Dienes

Particle Physics – FY 2014 Budget

Base Program Funding	$ in millions	
EPP Research	18.7	
PA Research	11.2	
Underground Physics	8.9	
LHC Operations	17.4	
IceCube Operations	3.5	
Theory	12.1	
	71.8	27% of total PHY R&RA Available
Additional PHY Cross-Cutting Resources		
Midscale	8.4	LHC Phase-One Upgrades; XENON1T; SPT
CDS&E	3.4	OSG; Using GPUS in HEP (LHCb)
PFC	3.1	KICP at U of Chicago
	14.9	
Additional NSF-Wide Resources		
MRI	**1.9**	LAr1ND; DarkLight Phase 1; ATLAS Electronics; Mass Spectrometer (SURF)
Indirect Funding (Funding through Independent Programs into Awards that Impact Particle Physics)		
AMO	1.9	Electron Electric Dipole Moment
Accelerator Science	4.5	Possible Short-Term Impact
	6.4	
Total	**95**	

PHY 2014 Base Research Awards



Computing and Cyberinfrastructure at NSF

Priority area of CIF21 (Cyberinfrastructure Framework for 21st Century Science, Engineering and Education)

Close collaboration with Division of Advanced Cyberinfrastructure (ACI)

Projects: OSG, DASPOS

Funding opportunity within Division:
CDS&E (Computation and Data-Enabled Science and Engineering)

Funding opportunity led by ACI: SI2 (Software Infrastructure for Sustained Innovation)

Opportunities to address computing challenges facing the LHC

Contact Bogdan Mihaila with questions

Main Events of FY 2015

MPSAC Subcommittee Report on NSF Response to P5

Physics Division Committee of Visitors – Report Public Soon

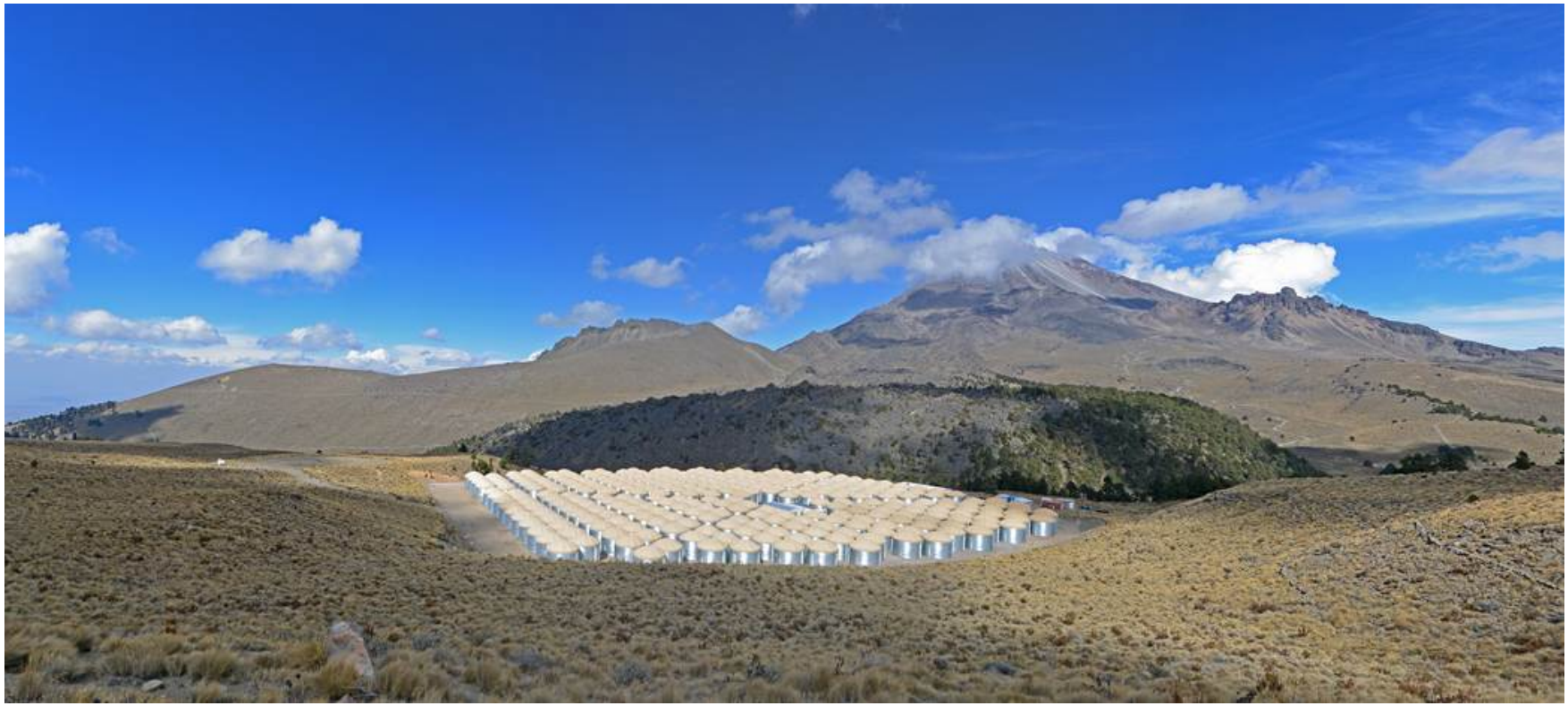
Accelerator Science Program in Second Year – Strong Response

MidScale Instrumentation Fund Extremely Active

New US-CERN Agreement Concluded

HAWC Inauguration – March 2015

HAWC Inauguration



Goodman, U. MD, Dingus: NSF, DOE

In collaboration with CONACYT

NSF Response to Particle Physics Prioritization Plan

MPSAC Subcommittee: Young-Kee Kim, U Chicago, Chair

Thanks to the subcommitte for delivering a report within the timeframe from September 2014 to January 2015

Commended actions already taken by NSF in support of LSST, in moving ahead on dark matter and accelerator science, phase-one LHC upgrades, etc.

Primary focus on balance of NSF investments in Particle Physics:

Taking P5 Report as given

Assuming constrained budget scenarios

Report accepted by MPSAC January 2015

Relationship between Broad Investment and Projects

Maintain total investment in R&D for future projects and operations for ongoing facilities to current level of about one-third the particle physics budget, distributed among projects of different scales

Contribute to areas of common interest with DOE when the NSF investment:

Significantly enhances scientific value
Enables NSF-supported groups to play distinctive and visible roles
Results in the training of the next generation of scientists
Results in significant broader impacts

Relationship between Broad Investment and Projects

NSF should invest broadly while also targeting a few specific resource-intensive projects.

Criteria for balancing support among projects of different scales:

- Scientific impact
- Flexibility of project execution within the proposed budget
- Training of the next generation of scientists
- Visibility and importance of the NSF investment
- Broader impacts
- Budgetary impact on PI-driven research awards

Investment in Large Facilities

From P5 report: "The LHC upgrades constitute our highest priority near-term large project."

Based on the criteria given, "the subcommittee strongly supports the NSF investment in the LHC phase-2 upgrades as a way to enable and participate in fundamental discoveries."

Funding at the MREFC level is required for NSF to play significant and visible leadership roles.

Potential MREFC Project

NSF is exploring this option

What is the current estimated total cost of the project?

What would be the unique NSF contribution?

Are NSF-supported PI's playing leading roles in the global collaboration?

Would support of the project planning significantly damage support for PI's?

Can the NSF meet the timeline proposed by CERN?

Back-Up Slides

Subcommittee Members

Young-Kee Kim (Chair)	The University of Chicago
Marina Artuso	Syracuse University
Frank Avignone	University of South Carolina
Patricia Burchat	Stanford University
Joel Butler	Fermilab
Marc Kamionkowski	Johns Hopkins University
Jay Marx	Caltech
Luis Orozco	University of Maryland
Bob Redwine	MIT
Hank Sobel	University of California, Irvine

Accelerator Science Program

- FY2014 Portfolio.
  - 60 proposals, 52 projects (some proposals were collaborative)
  - Request total
    - $70M
  - 12 awards
    - $9M

	Amount $	No. awards
Beam Dynamics	520,397	2
Plasma	1,469,900	3
Sources	1,006,910	2
SRF	4,522,786	2
Education	700,000	1
Other	720,000	2
Total	8,939,993	12

Mid-Scale Instrumentation

- Resources from the Mid-Scale Instrumentation Fund can be used for off-the-shelf purchases or for construction of specialized equipment.
- Mid-Scale Instrumentation Fund resources are intended to be one-time investments in the research project and require that the project have a well-defined beginning and end.
- Merit reviews proceed through the base programs or special reviews.
- Funding Levels begin at TPC of ~$4.0M and can go up to TPC of ~$20.0M.
- Prior year examples: formerly called the APPI Program
  - Has provided significant instrumentation and development for PA experiments. $25.9M over the period FY08 – FY13. Examples HAWC, XENON1T, SCDMS…
- Mid-Scale awards for FY14:
  - Phase-I Upgrades for ATLAS and CMS and the LHCb Upgrade.
  - $28.9M over the period FY14 – FY18.

ALTAS Phase I Upgrade (NSF)

- 5 Year Cooperative Agreement started FY2014
- $11.4 M Total. Current Funding Profile

FY14 ($M)	FY15 ($M)	FY16 ($M)	FY17 ($M)	FY17 ($M)	Total ($M)
3.3	1.95	3.2	2.75	0.2	11.4

- Lead Inst.: SUNY, StonyBrook
  - Sub-awards to
    - Columbia, Michigan State, Southern Methodist

CMS Phase I Upgrade (NSF)

- 5 Year Cooperative Agreement started FY2014
- $11.4 M Total. Current Funding Profile

FY14 ($M)	FY15 ($M)	FY16 ($M)	FY17 ($M)	FY17 ($M)	Total ($M)
3.75	1.8	2.7	2.18	1.09	11.5

- Lead Inst.: University of Nebraska, Lincoln
  - Sub-awards to
    - Cornell, Kansas, Northeastern, Purdue, Rutgers, SUNY Buffalo, U. of Illinois Chicago, Notre Dame

LHCb Tracker Upgrade (NSF)

- Collaborative award to Syracuse University (lead)
  - Cincinnati, MIT, Maryland

FY14 ($M)	FY15 ($M)	FY16 ($M)	FY17 ($M)	FY17 ($M)	Total ($M)
1.4	1.25	1.48	1.43	0.44	6.0

- Co-Funding with MPS Office of Multidisciplinary Activities (OMA) FY14 funds