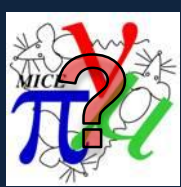


# Report from MAP and P5

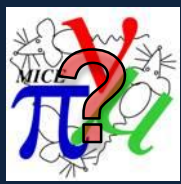


# 5's report

## Pick up your copy – its Free!



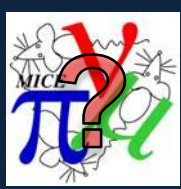
<http://www.usparticlephysics.org/p5/>



# Particle Physics Project Prioritization Panel (P5)



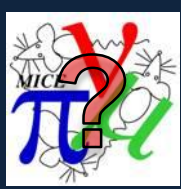
- Year long process to reformulate the future of HEP in the US.
- Final report delivered May 22<sup>nd</sup>. Science drivers:
  - Use the Higgs boson as a new tool for discovery
  - Pursue the physics associated with neutrino mass
  - Identify the new physics of dark matter
  - Understand cosmic acceleration: dark energy and inflation
  - Explore the unknown: new particles, interactions, and physical principles.



# 5's Charge and Scenarios



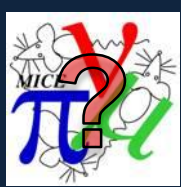
- Scenario A
  - a constant level of funding for three years, followed by increases of 2.0% per year with respect to the appropriated FY 2013 budget for HEP
- Scenario B
  - a constant level of funding for three years, followed by increases of 3.0% per year with respect to the FY 2014 President's Budget Request for HEP
- Scenario C
  - unconstrained budget. For this scenario, please list, in priority order, specific activities, beyond those mentioned in the previous budget scenario, that are needed to mount a leadership program addressing the scientific opportunities identified by the research community.



# Quotations from 5



- Significant changes in direction:
  - Increase the fraction of the budget devoted to construction of new facilities.
  - Reformulate the long-baseline neutrino program as an internationally designed, coordinated, and funded program with Fermilab as host.
  - Redirect former Project-X activities and some existing accelerator R&D to improvements of the Fermilab accelerator complex that will provide proton beams with power greater than one megawatt by the time of first operation of the new long-baseline neutrino facility.
  - Increase the planned investment in second-generation dark matter direct detection experiments.
  - Increase particle physics funding of CMB research and projects in the context of continued multiagency partnerships.
  - **Realign activities in accelerator R&D with the P5 strategic plan. Redirect muon collider R&D and consult with international partners on the early termination of the MICE muon cooling R&D facility**

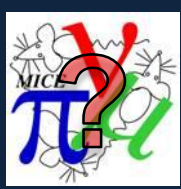


# Summary of recommendations



## Summary of Scenarios

Project/Activity	Scenarios			Science Drivers					Technique (Frontier)
	Scenario A	Scenario B	Scenario C	Higgs	Neutrinos	Dark Matter	Cosm. Accel.	The Unknown	
<b>Large Projects</b>									
Muon program: Mu2e, Muon g-2	Y, <small>Mu2e small reprofile needed</small>	Y	Y					✓	I
HL-LHC	Y	Y	Y	✓		✓		✓	E
LBNF + PIP-II	Y, <small>LBNF components delayed relative to Scenario B.</small>	Y	Y, enhanced		✓			✓	I,C
ILC	R&D only	R&D, <small>possibly small hardware contributions. See text.</small>	Y	✓		✓		✓	E
NuSTORM	N	N	N		✓				I
RADAR	N	N	N		✓				I
<b>Medium Projects</b>									
LSST	Y	Y	Y		✓		✓		C
DM G2	Y	Y	Y			✓			C
Small Projects Portfolio	Y	Y	Y		✓	✓	✓	✓	All
Accelerator R&D and Test Facilities	Y, reduced	Y, <small>some reductions with redirection to PIP-II development</small>	Y, enhanced	✓	✓	✓		✓	E,I
CMB-S4	Y	Y	Y		✓		✓		C
DM G3	Y, reduced	Y	Y			✓			C
PINGU	Further development of concept encouraged				✓	✓			C
ORKA	N	N	N					✓	I
MAP	N	N	N	✓	✓	✓		✓	E,I
CHIPS	N	N	N		✓				I
LAr1	N	N	N		✓				I
<b>Additional Small Projects (beyond the Small Projects Portfolio above)</b>									
DESI	N	Y	Y		✓		✓		C
Short Baseline Neutrino Portfolio	Y	Y	Y		✓				I



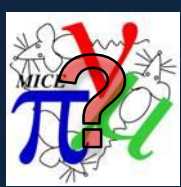
# Cut to the Chase



- 5's recommendation:





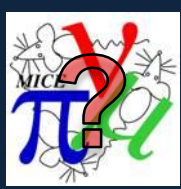


# Moving forward – Next 3 years



- MAP not likely to exist beyond September.
  - There will be a significant reduction in overall MAP funding
  - Try to preserve design effort by transferring an Accelerator Concepts activity to GARD
  - Try to preserve critical “RF-in-magnetic-field” program in the MTA as a GARD activity
- Ramp down MICE by deploying all US hardware (through Step V) by 2017
  - This requires a significant increase in MICE spending in FY15. Have received “guidance” from DOE to this effect.

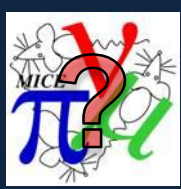




# Charting the path



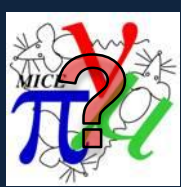
- DOE review of MAP (with emphasis on MICE) in August.
  - Crucial for setting the future for MICE and muon accelerator R&D
- HEPAP Accelerator R&D sub-panel
  - Preliminary report in November
    - Could impact the “devolution” of MAP



# DOE Review of MAP



- Review:
  - Dates: August 12-14 (Tue-Thu; 2.5 days)
    - ~1.75 days for presentations
  - Location: BNL
- Preliminary Committee List (not all answers are in):
  - Klaus Rode (JLAB)
  - Mike Syphers (MSU)
  - Ritchie Patterson (Cornell)
  - Ian Robson (STFC) [not yet responded]
  - Mark Thompson (STFC/RAL)
  - Richard York (MSU)
  - Dave McGinnis (ESS)
  - Jim Kerby (ANL/APSU)
  - Peter McIntyre (TAMU) [not yet responded]
  - Tom Taylor (CERN – ret.) [not yet responded]



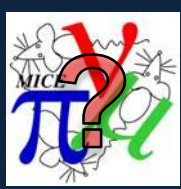
## Subpanel membership

- **Co-chairs:** **Marty Breidenbach & Don Hartill**
- **Members from:**
  - **HEPAP**

<b>Ilan Ben-Zvi</b>	<b>Robert Tschirhart</b>
<b>Georg Hoffstaetter</b>	<b>Bruce Carlsten</b>
  - **Particle physics accelerator and experiment communities**

<b>William Barletta</b>	<b>Young-Kee Kim</b>
<b>Roger Dixon</b>	<b>James Rosenzweig</b>
<b>Steve Gourlay</b>	<b>Michael Syphers</b>
	<b>Rik Yoshida</b>
  - **International accelerator community**

<b>Oliver Bruning (CERN)</b>	<b>Lia Meringa (TRIUMF)</b>
<b>Tadashi Koseki (KEK/J-PARC)</b>	

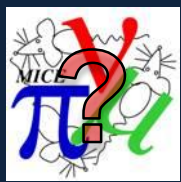


## Elements of Charge - 1

### Summary of charge:

- examine the research in the current HEP accelerator R&D program and identify the most promising research areas to support the advancement of particle physics.

**National Goals:** Describe medium- and long-term U.S. accelerator R&D required for a world-leading future program in accelerator-based particle physics consistent with the scientific priorities described in the HEPAP-P5 report for Scenarios A and B.



## Elements of Charge - 2

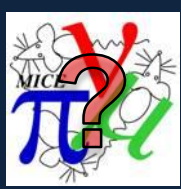
### *Balance:*

- healthy and appropriately balanced program for medium- and long-term R&D, including test facilities, in light of the budget envelope considered by P5.
- further guidance for a plan based on the science and technology case for increased investment in the HEP Accelerator R&D program called for in P5's Scenario C.
- particularly interest in how partnerships between universities, national laboratories and international collaborators could be most effective in achieving the goals.

From 5's report:

**High-priority options for additional investments beyond our constrained scenarios (Scenario C):**

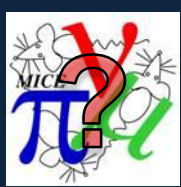
**Expand accelerator R&D to enable very high-energy future machines at lower cost, and likely provide benefits beyond particle physics.**



# Conclusions



- 5's report was not supportive of MAP or MICE
- MAP in its current form will most likely cease at the end of this US fiscal year (October 1).
  - MC work to be seriously curtailed
- MICE's future (at least the US participation) will be determined primarily by the DOE review scheduled for August.
  - The committee is fair and a good showing by the collaboration, will likely lead to a recommendation to terminate MICE after Step V
    - An expedited schedule would also likely be the outcome, completing the experiment in 2018
- MICE's underlying reason to exist is seriously compromised by 5's tepid comments regarding the NF and its very negative statements regarding a future MC.

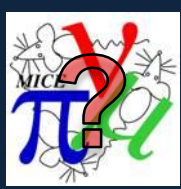


# Conclusions II



- What becomes of MAP will depend on both the DOE review and the recommendations of the HEPAP Accelerator R&D sub-panel
  - Given the members of the panel and 5's own recommendation, there is some possibility this sub-panel could make recommendations in conflict with 5's.
    - 5's own words are inconsistent w/r to MC R&D!
  - This could help, but the sub-panel's report will come too late to affect FY 2015 funding.
- Surviving the next 3 years as a coherent program will be very difficult. Moving beyond will depend on
  - Success of MICE
  - Modest progress in what is left of the MAP program
  - The physics landscape





# Final Thought



It wouldn't hurt to have our own Terminator