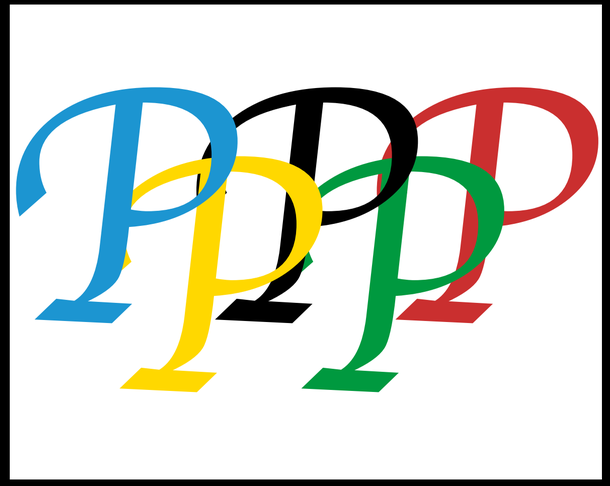


P5 Introduction

Hitoshi Murayama

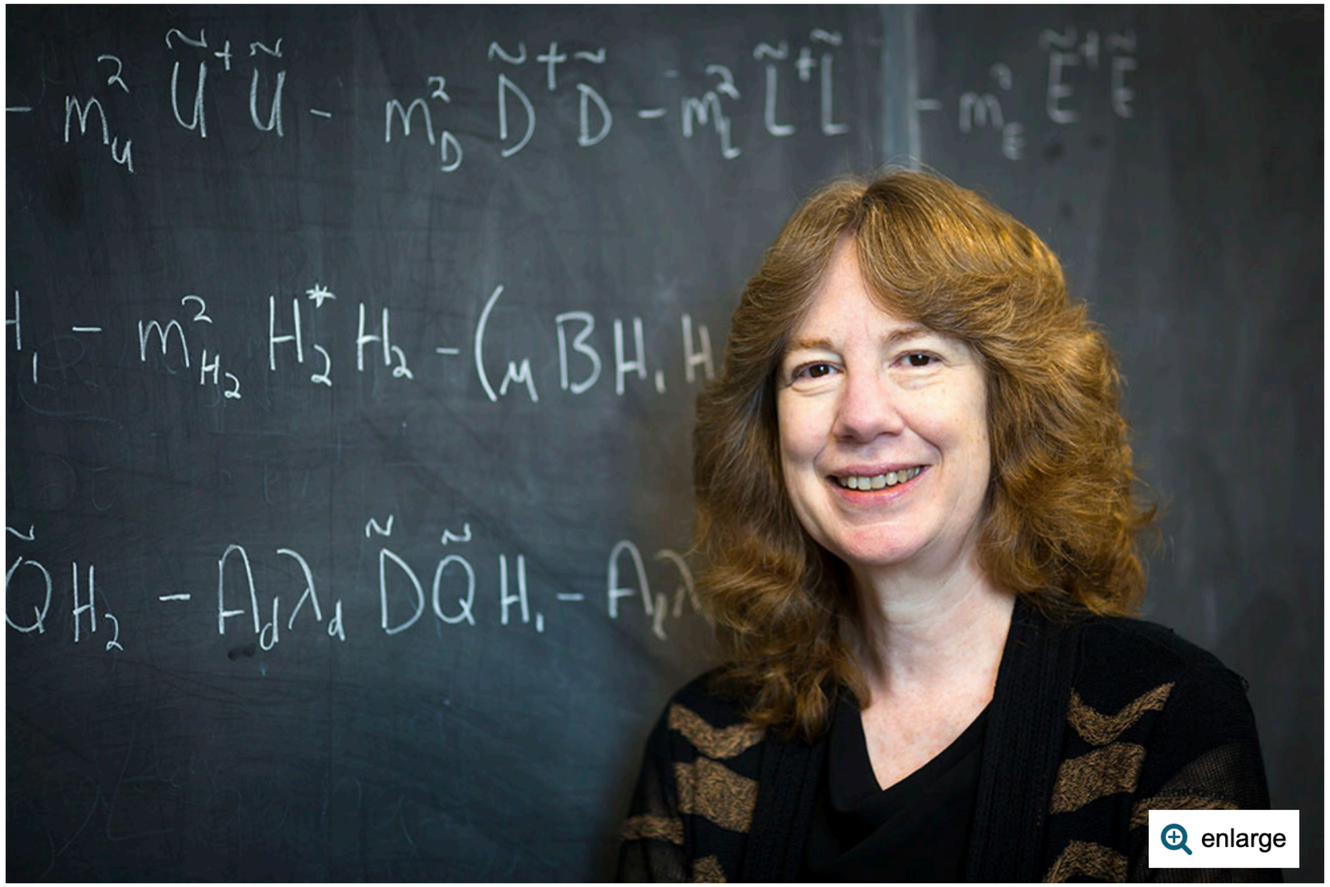
Town Hall at BNL, Apr 12, 2023

Congratulations!

Contact: Peter Genzer, (631) 344-3174

JoAnne Hewett Named Director of Brookhaven National Laboratory

April 10, 2023



JoAnne Hewett *(Photo courtesy of SLAC National Accelerator Laboratory)*

- Centered around
  - Energy frontier
  - Computing frontier
  - Instrumentation frontier
  - Also gravitational wave
- 666 registrants
  - 253 in person attendees
- Webinar
  - Questions on google docs (look at the side menu)
  - Read by the chair
- Recorded only for the panel
  - Encourage free discussions

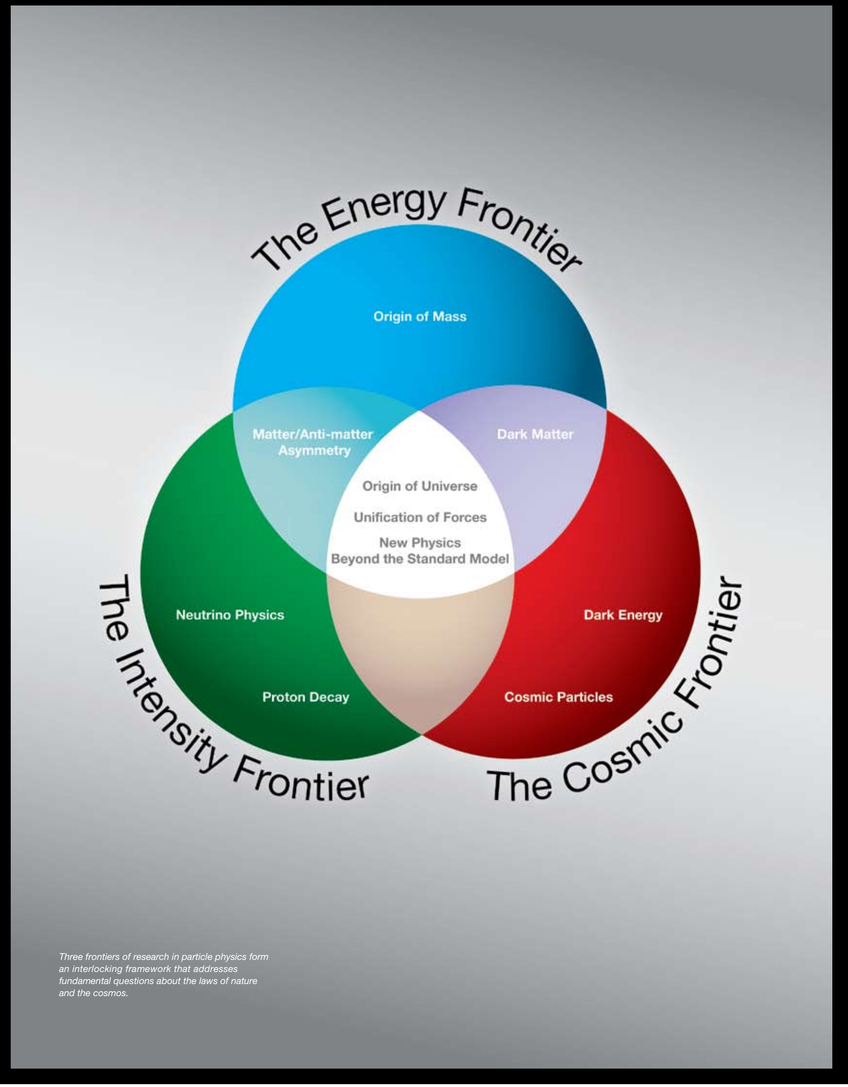
Key Elements of a Successful P5

- Well informed by the science community
- Set a grand long-range vision for U.S. particle physics
- Faced budget constraints realistically
  - "Community made tough choices."
- Balanced portfolio
  - Domestic and international
  - Small, mid-scale, and large projects
- Community engagement critical to success
  - "Bickering scientists get nothing."

Harriet Kung, Snowmass in Seattle

2008 P5

- 2008 P5 (Charlie Baltay)
  - First “modern” P5 with budget scenarios and long-term vision
  - Energy, Intensity, Cosmic Frontiers
  - Tevatron for one to two more years
  - World-class neutrino program
  - Dark matter & dark energy, LSST
- *US Particle Physics: Scientific Opportunities A Strategic Plan for the Next Ten Years*



Three frontiers of research in particle physics form an interlocking framework that addresses fundamental questions about the laws of nature and the cosmos.

2014 P5

- 2014 P5 (Steve Ritz)
  - 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.
- Finally “got it right”
  - Well received in Washington
  - Embraced CMB (inflation)
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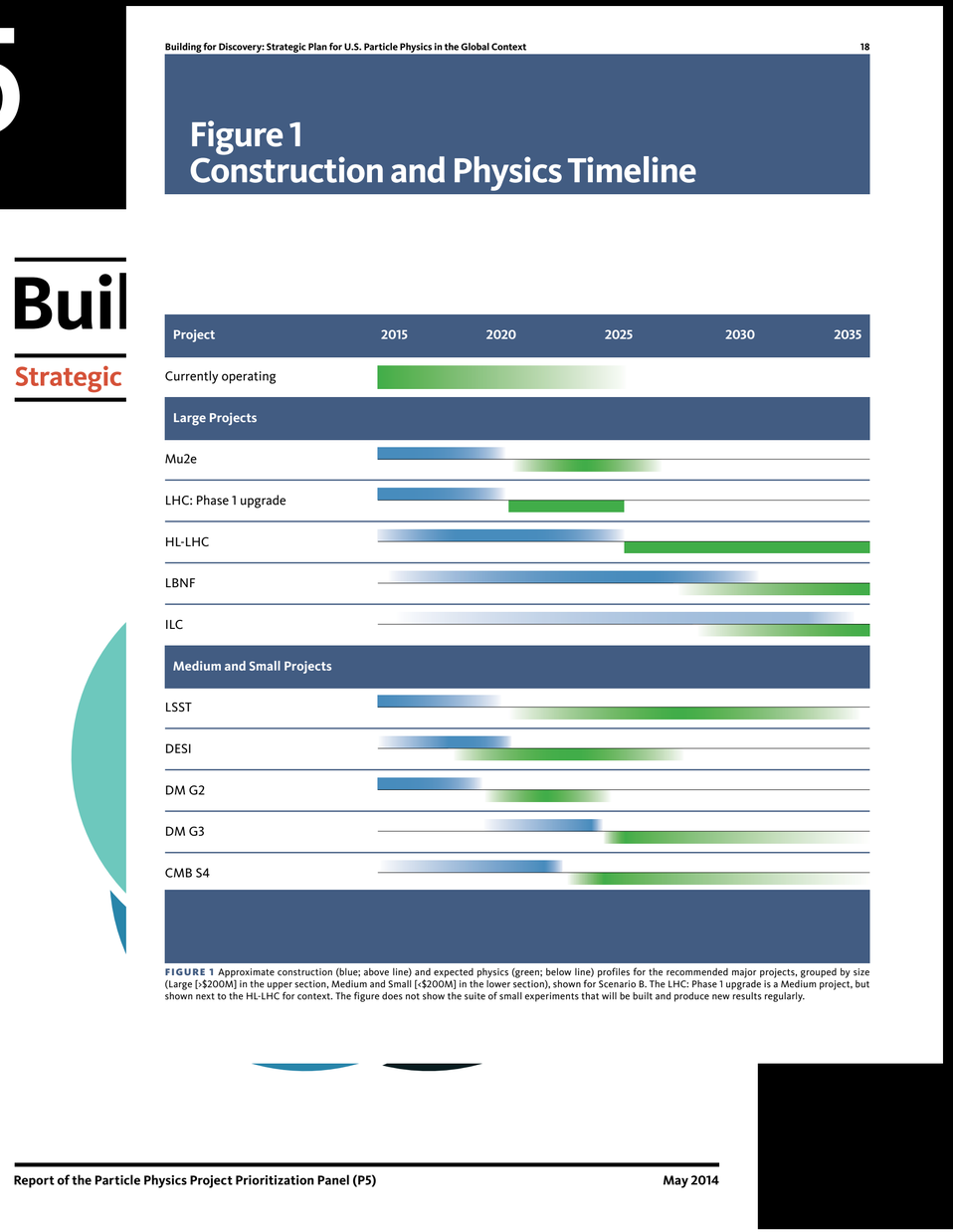


Building for Discovery: Strategic Plan for U.S. Particle Physics in the Global Context 18

Figure 1
Construction and Physics Timeline

Buil

Strategic

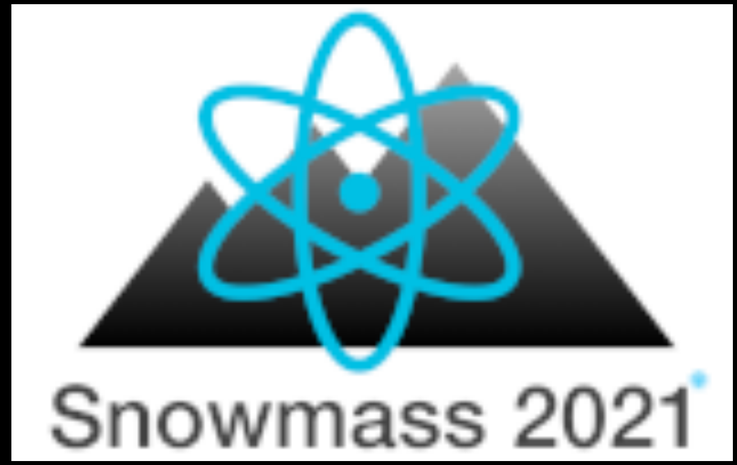
Project	2015	2020	2025	2030	2035
Currently operating					
Large Projects					
Mu2e					
LHC: Phase 1 upgrade					
HL-LHC					
LBNF					
ILC					
Medium and Small Projects					
LSST					
DESI					
DM G2					
DM G3					
CMB S4					

FIGURE 1 Approximate construction (blue; above line) and expected physics (green; below line) profiles for the recommended major projects, grouped by size (Large [>$200M] in the upper section, Medium and Small [<$200M] in the lower section), shown for Scenario B. The LHC: Phase 1 upgrade is a Medium project, but shown next to the HL-LHC for context. The figure does not show the suite of small experiments that will be built and produce new results regularly.

Report of the Particle Physics Project Prioritization Panel (P5) May 2014

Changing landscape

- 125 GeV Higgs does look like standard model
  - Previous P5: “Higgs as a new tool for discovery”



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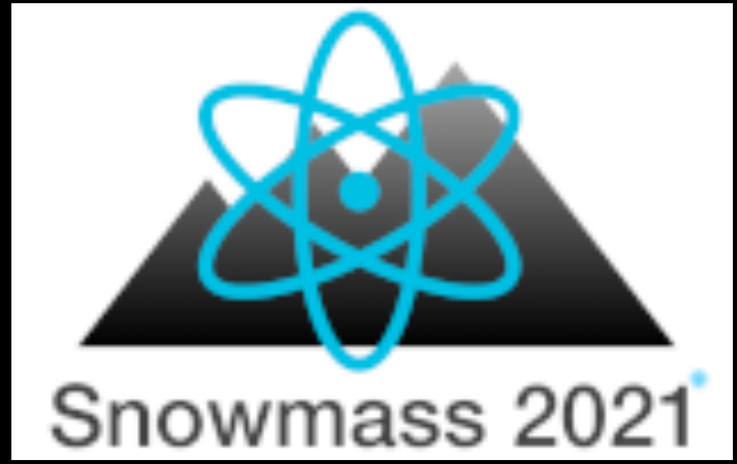

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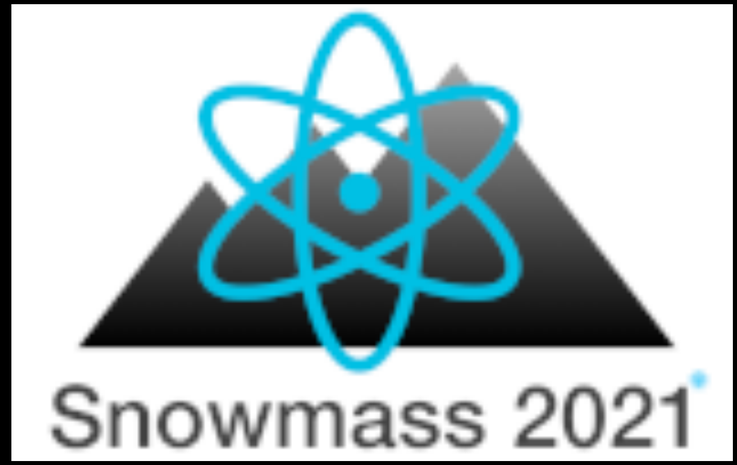

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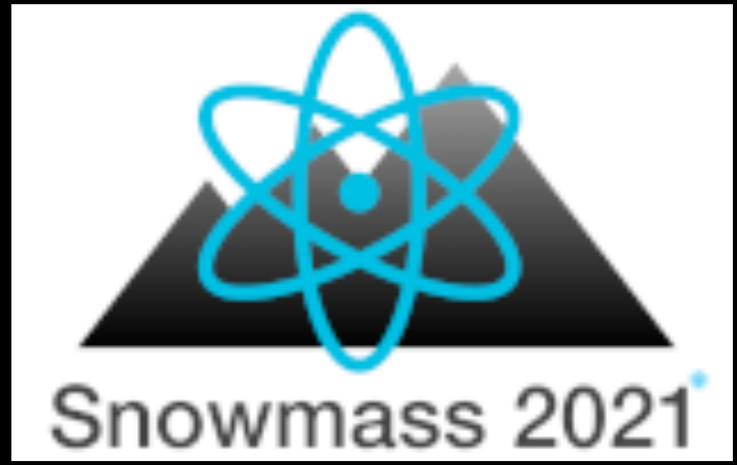
  - Now Hyper-Kamiokande is also happening



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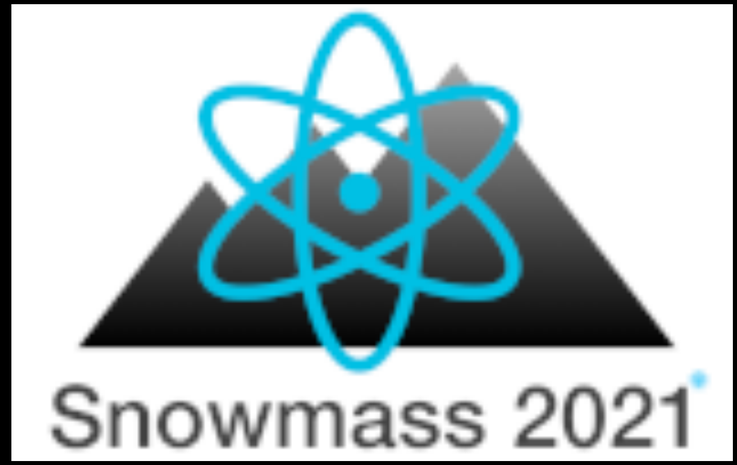

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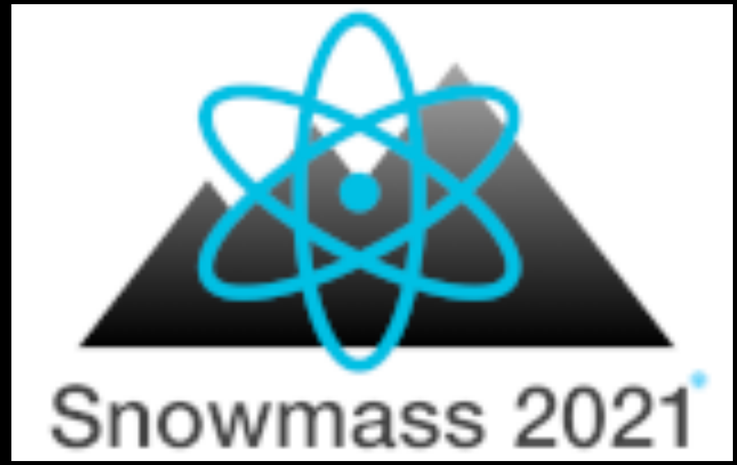

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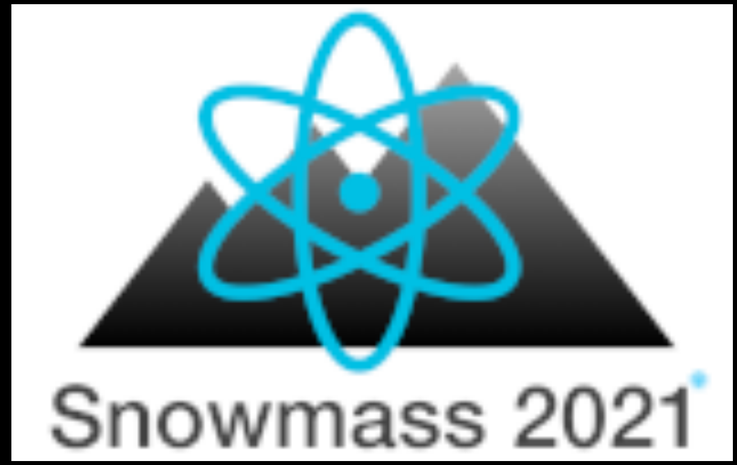

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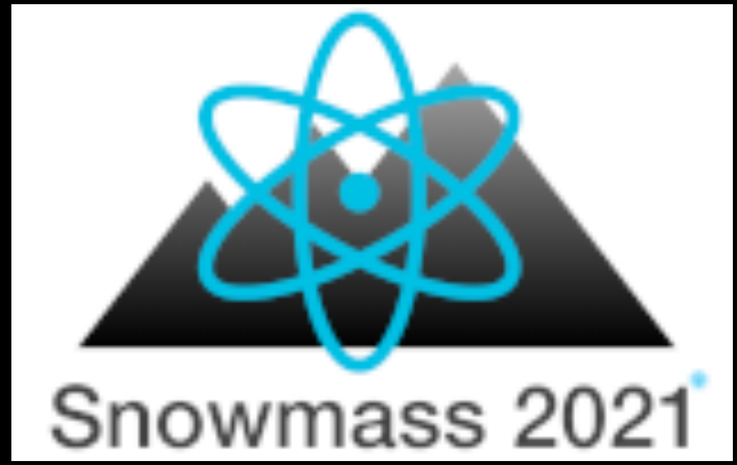

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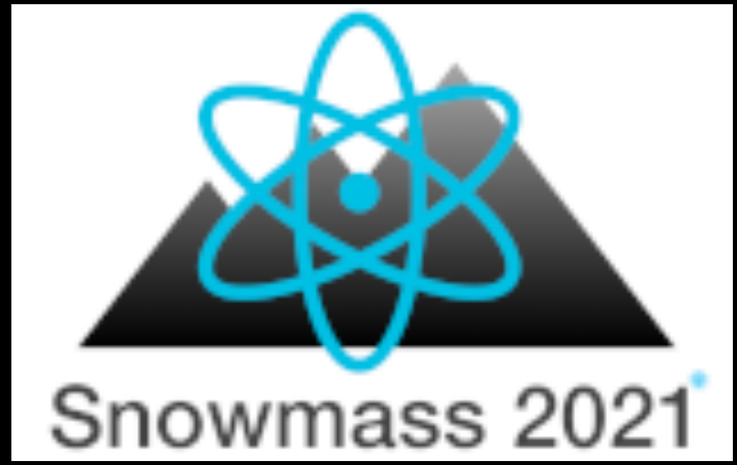

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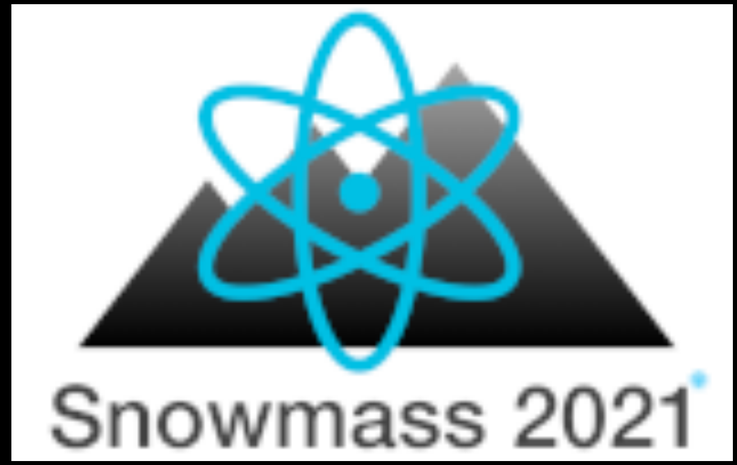

My take away from Snowmass

- We have an exciting program lined up
  - Thanks to Steve Ritz, previous P5, agencies!
- We are broader than the current program energy, intensity, cosmic
  - Where is the boundary of our field?
- We are a forward-looking community
  - We need program beyond what the previous P5 outlined
  - We also need more freedom
  - better balance big, medium, small; projects vs research
- We deeply care about our community
  - Diversity, equity, inclusion, outreach, engagement
- Visited both DOE & NSF in early September
  - I’m still scared of the tasks ahead.
  - Reading Snowmass reports!

<table>
<tr><th colspan="3">Decadal Overview of Future Large-Scale Projects</th></tr>
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Balance

- Project vs research
- Large (>$200M), medium ($50-200M), small (<$50M) (previous P5)
  - Collection of small may be medium
- Science vs R&D
  - Instrumentation, computing, theory
- National initiatives
  - AI/ML, microelectronics, QIS
  - How do we capitalize on it? How do we contribute to justify it?
- DEI
  - What can agencies do?
  - Mentoring statement in grant proposals (done!)

Interface to EPP2024

- EPP2024 looks into long-term vision, dreams

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- What we recommend should smoothly connect to their longer-term vision

Costs/Risks/Schedule Committee

- One lesson from the previous P5 was some of the costs were off by a factor of ~π
- Need to understand maturity of cost estimates better
- Jay Marx started working as of April 10
- Now membership is getting assembled
- Gil Gilchriese & Matthaeus Leitner (LBNL)
- Giorgio Apollinari & ? (Fermilab)
- Mark Reichanandter & Nadine Kurita (SLAC)
- Jon Kotcher & Srini Rajagopalan (BNL)
- Allison Lung (JLab)
- Harry Weerts (Argonne)

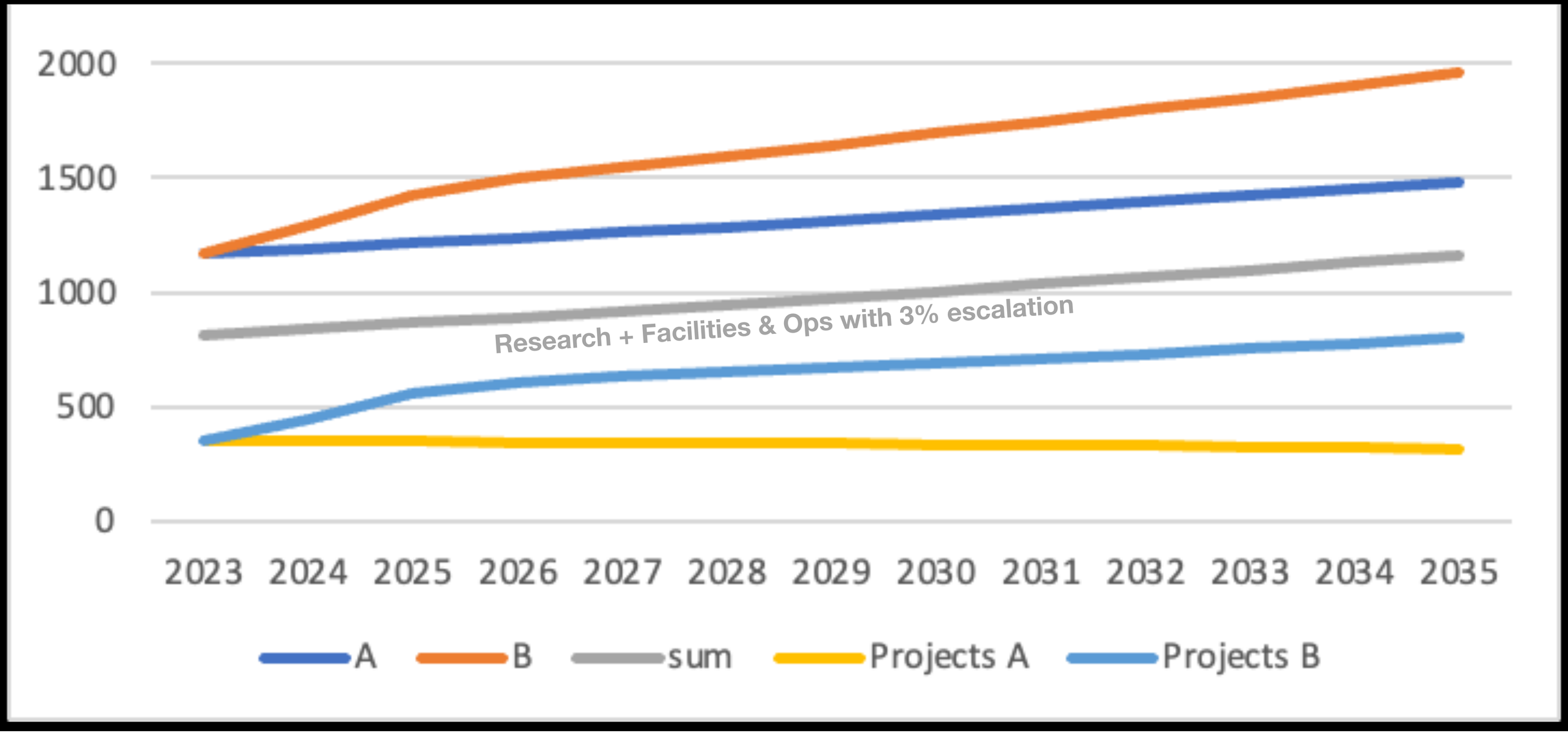
Jay Marx

Charge to P5 cost committee (Draft - 3/1/2023)

The cost/schedule/risk subcommittee to P5 is asked to obtain and clarify the cost/schedule/risk information from the proponents of high cost (>250M FY23$) HEP projects funded or being considered for funding by the DOE and/or NSF. The subcommittee will not prepare its own estimates. The committee should assess this information at a high level, noting key assumptions, risks and cost and schedule uncertainties including the risk from non-DOE/NSF funding sources, international partners making in-kind contributions and collaborations and missing costly items, if any. The committee is also asked to comment on the operation costs for projects for during commissioning and when the resulting facilities are in steady-state operation. This committee will provide P5 with the expert opinions on the uncertainty ranges for the projects that P5 needs to develop a strategy for the field within assumed budgetary constraints. The subcommittee will submit their preliminary report to P5 in early summer.

Requests to “big” projects soon
Will also ask for information from medium and small

Budget Scenarios



P5

This web site was only tentative. Go to the official site instead.

P5 (Particle Physics Project Prioritization Panel) reports to HEPAP (High-Energy Physics Advisory Panel) that advises High-Energy Physics of DOE Office of Science and Division of Physics of NSF. We will build on the "Snowmass" community study to hash out priorities for the next 10 years within 20-year context.

This is a tentative bare-bones web site for information and annnouncements. More professional web site is in the works.

There is some misinformation out there about P5. We are now just entering the information gathering mode and no discussions or decisions took place. Please be careful!

Charge

The charge to P5 was issued by Dr. Asmeret Asefaw Berhe, Director of Office of Science, Department of Energy, and Dr. Sean L. Jones, Assistant Director, Directorate for Mathematical and Physical Sciences, National Science Foundation, to the HEPAP chair JoAnne Hewett on November 2, 2022

Town Halls

We will have four town hall meetings with people in the community to give short presentations on issues, visions, science, projects of interest to the field, including an open-mic session. If people want to speak privately with the panel, we will try to accommodate the request as much as we can, especially for early career scientists. They are not tied to any specific Snowmass frontiers.

In addition, we will have a set of invited talks at the meetings cenetered around some of the Snowmass frontiers, on the visions of the communities and specific set of projects. This is an important part of the information gathering mode for the panel.

We plan for additional virtual town halls to receive more input from the community. Details are still subject to change. I'm sorry that registration pages are slow to open. There are forces beyond our control.

- Lawrence Berkeley National Laboratory, Cosmic Frontier (except for High-Energy Astrophysics and Gravitational Wave), open sessions on February 22 and 23, followed by a closed session for the panel in the morning on 24 (confirmed)
- Fermilab/Argonne, Neutrino, Rare Processes and Precision Frontier, High-Energy Astrophysics, Mar 21, 22, 24 (Fermilab), 23 (Argonne) (confirmed)
- Brookhaven, Energy, Instrumentation, Computational Frontiers, Gravitational Wave, Apr 12, 13, 14 (confirmed)
- SLAC, Underground, Accelerator, Theory Frontiers, Community Engagement, May 3 to 5 (confirmed)

Virtual Town Halls

We make some of them specific to early career scientists in closed settings. Details TBD.

- week of May 15
- week of June 5
- week of June 26

2023 P5

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https://www.usparticlephysics.org/p5/

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2023 P5

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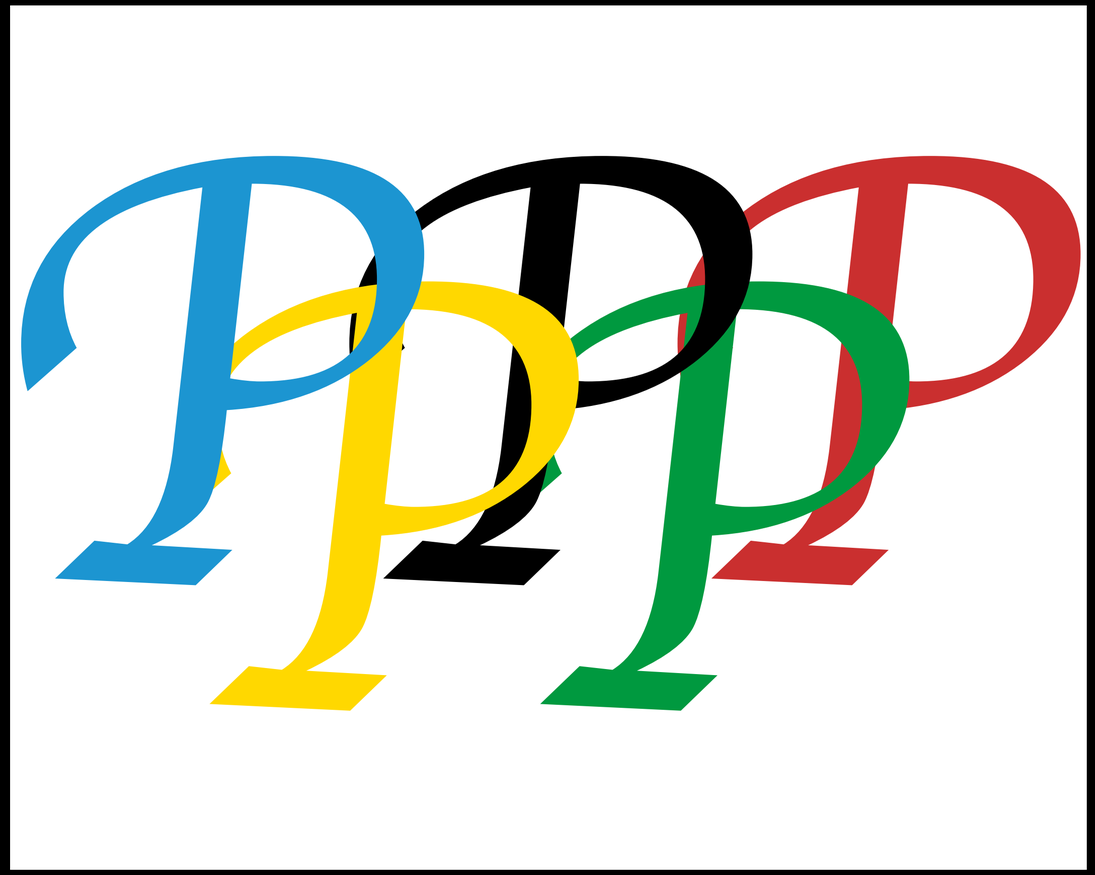
P5 tentative logo



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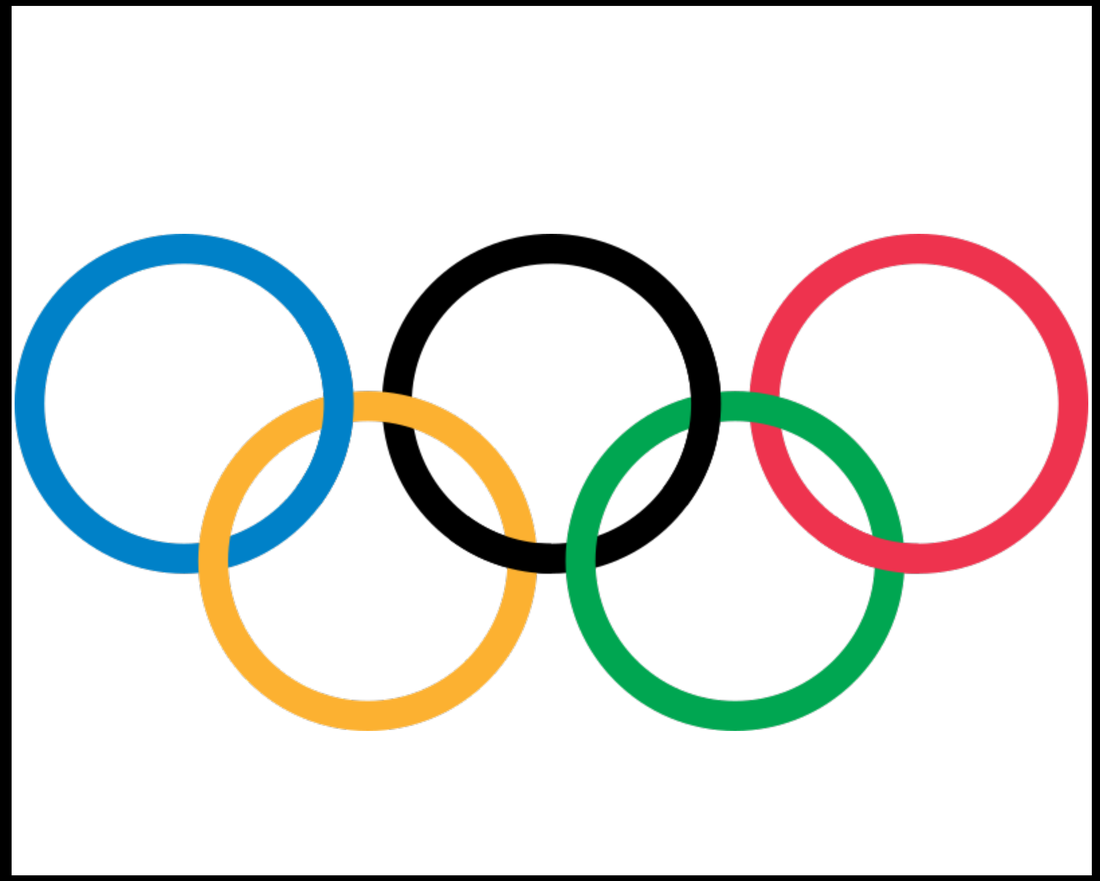

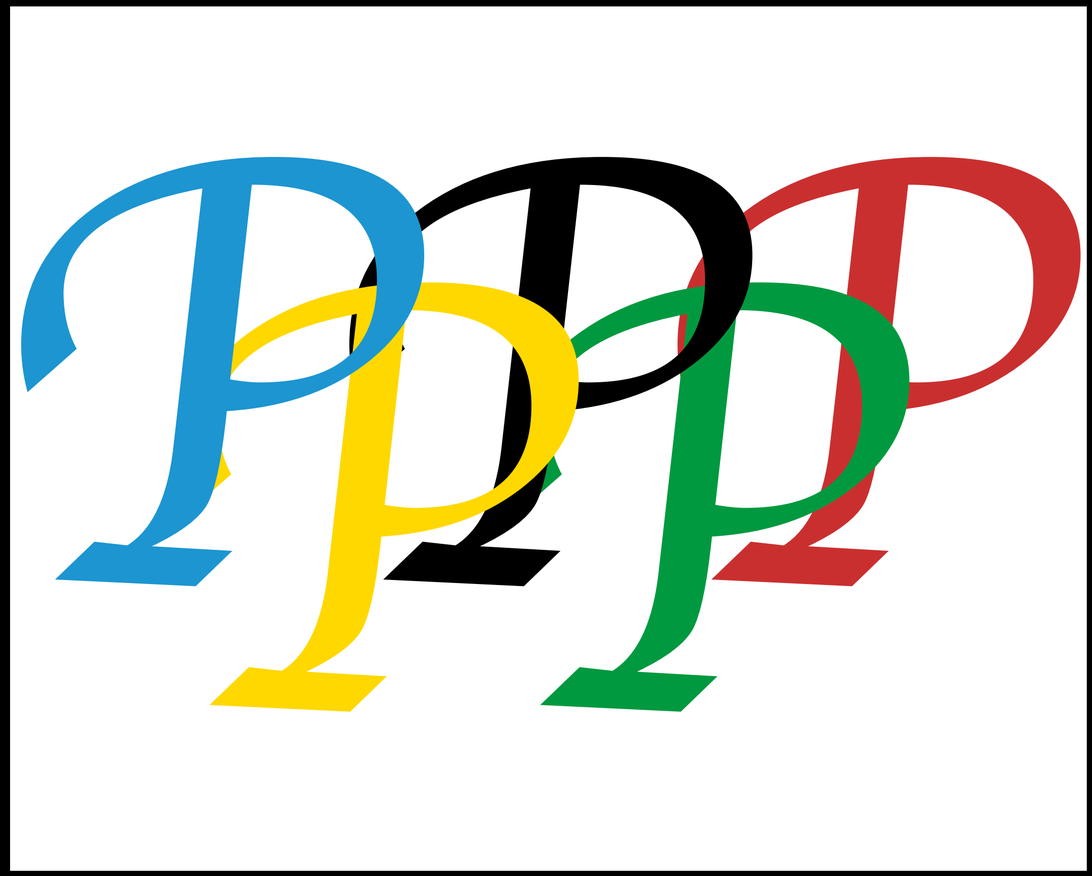

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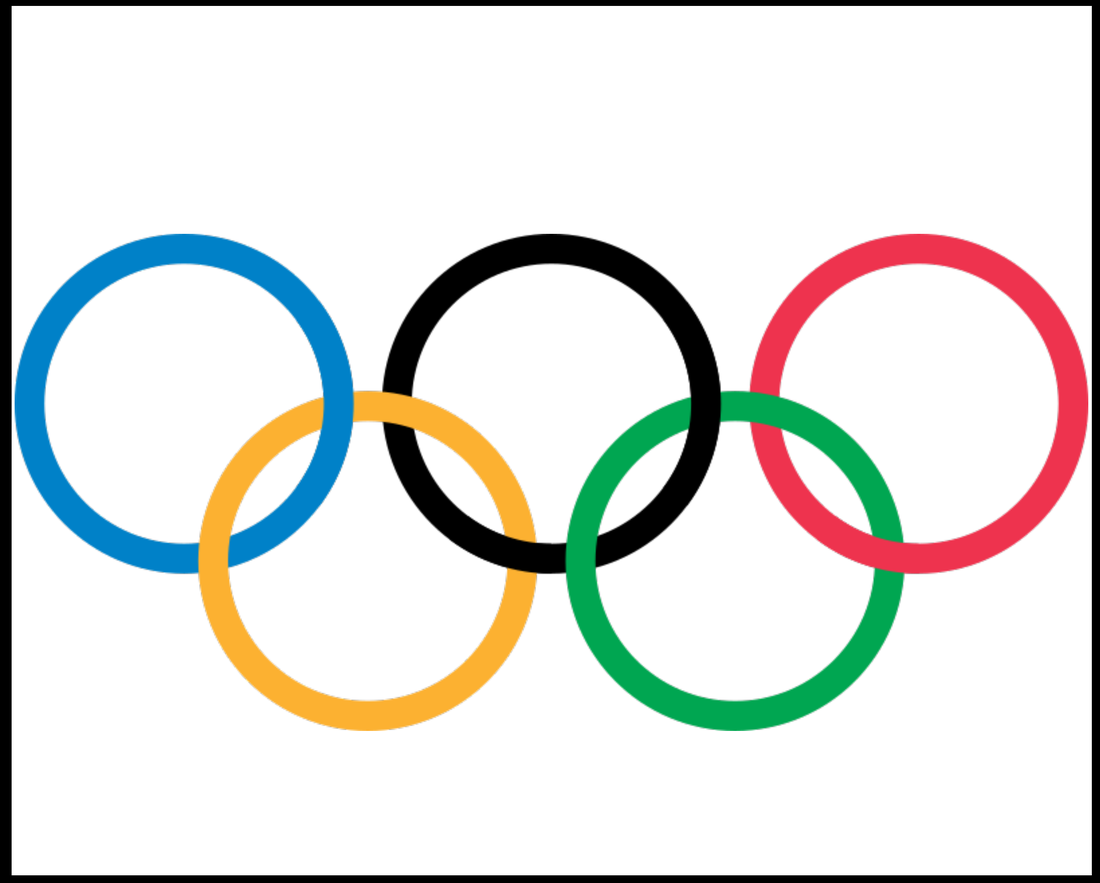

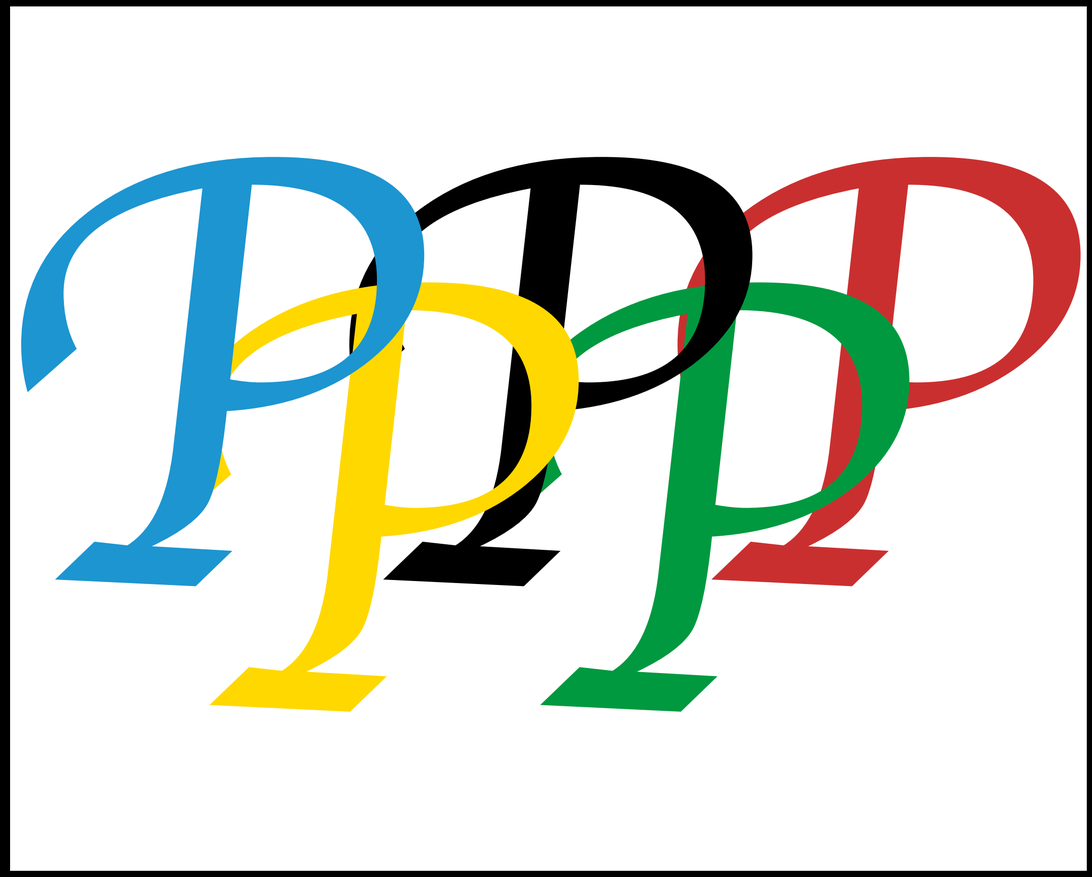

Apologies to Antarctica! CMB and IceCube

Coming meetings

- Open Town Halls
  - LBNL: Feb 22, 23
  - Fermilab/Argonne: March 21, 22, 23
  - Brookhaven: April 12, 13 (just before DPF in Minnesota)
  - SLAC: May 3, 4
  - Sign up for making short remarks! (x3 oversubscription)
- DPF session on P5 (April 15)
- Virtual Town Halls: weeks of May 15, June 5, June 26 (at least one for early career only)
- Closed meetings from May to July
- Preliminary recommendations to agencies August
- Final report due October

P5 Town Hall at SLAC

2-5 May 2023
SLAC
America/Los_Angeles timezone

https://indico.slac.stanford.edu/event/7992/overview

P5 Town Hall hosted by SLAC National Accelerator Laboratory

with a focus on

Underground, Accelerator, Theory Frontiers, Community Engagement

P5 (Particle Physics Project Prioritization Panel) makes recommendations on the next 10 years of the US particle physics program within the 20 year context to HEPAP, which advises DOE and NSF. It builds on the extensive community involvement in the Snowmass study. This meeting is part of a series of town halls for information gathering for the panel to learn the aspiration of the community and basic ideas on costs and schedule of proposed projects.

Town Halls have a set of invited talks on overview of scientific opportunities as well as concrete projects, including their costs and schedules. They also have sessions for the community members to make short (~5min) remarks about their vision for the field, exciting science, projects, and issues of the

Maximize science!