HEP Community Outreach Materials

Rob Fine, Louise Suter (CEF06 co-conveners)
CSS Seattle - 23 July 2022

me page of https://www.usparticlephysics.org/

About Particle Physics

Particle Physics is Discovery Science

Particle Physics Progress and Priorities

Particle Physics Makes a Difference in Your Life

Particle Physics Builds STEM Leaders

Particle Physicists Deliver Discovery Science Through Collaboration

Particle Physicists Advance Artificial Intelligence

U.S. Particle Physics: Building

About Particle Physics | Resources for Physicists | Particle Physics in t

About Particle Physics

Particle Physics is Discovery Science

Particle Physics is Discovery Science

The challenge of particle physics is to discover what our world s made of and how it works at the smallest scales. Particle physics explores the undiscovered universe from the tiniest particles to the outer reaches of space. The quest to understand our world inspires and educates students across the country and drives innovation that improves the nation's health, wealth, and security.

PARTICLE PHYSICS *is Discovery Science*

Exploring the Universe

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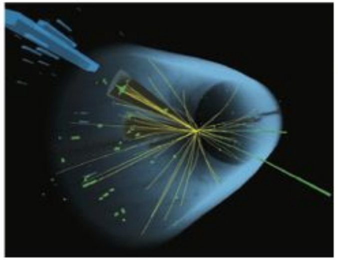

U.S. Particle Physics: Building

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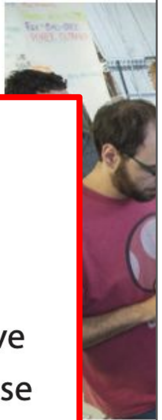
Building for Discovery

The United States has entered a new era of discovery. The U.S. particle physics community is implementing its vision for the future, based on five intertwined science drivers that show great promise for discovery:

- 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



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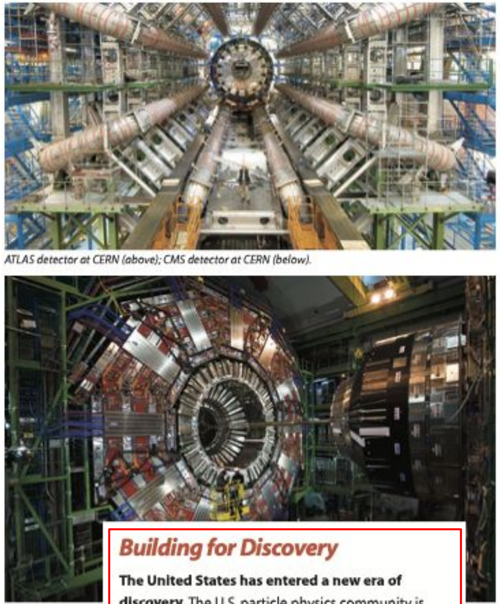

ATLAS detector at CERN (above); CMS detector at CERN (below).

NOvA neutrino experiment

Construction of the SuperCDMS-SNOLAB detector

The Muon g-2 experiment at Fermilab

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Images courtesy CERN, Fermilab, LSST, SLAC

The report of the Particle Physics Project Prioritization Panel (P5) provides the long-term strategy and identifies the priorities for U.S. investments in particle physics that will enable discovery and maintain the U.S. position as a global leader.

Find all the details at usparticlephysics.org

usparticlephysics.org

Prepared by:


Building for Discovery

Strategic Plan for U.S. Particle Physics in the Global Context

usparticlephysics.org

e P5 Report provides the strategy and priorities for U.S. estments in particle physics for the coming decade.

e top three priorities in 2022

gthen support for particle physics research at universities and national laboratories, which includes nalysis, R&D, design of new experiments, and a vibrant theory program. As emphasized in the P5 Report, activities are essential for the success of the field. They are crucial for extracting scientific knowledge ll the great new data, developing new methods and ideas, maintaining U.S. leadership, and training the eneration of scientists and innovators.

nce the High-Luminosity Large Hadron Collider (HL-LHC) accelerator and ATLAS and CMS detector de projects on schedule, continuing the highly successful LHC program and bilateral partnership with

nce the Long-Baseline Neutrino Facility (LBNF), Deep Underground Neutrino Experiment (DUNE), roton Improvement Plan-II (PIP-II), working with international partners on the design, prototypes, initial nstruction, and long-lead procurements.

e carefully chosen investments will enable a steady stream of exciting new results any years to come and will maintain U.S. leadership in key areas.

Particle physics is both global and local. Scientists, engineers, and technicians at more than 180 universities, institutes, and laboratories throughout the U.S. are working in partnership with their international colleagues to build high-tech tools and components, conduct scientific research, and train and educate the next generation of innovators. Valuing equity, diversity, and inclusion, the field is committed to increasing participation of underrepresented groups. Particle physics activities in the U.S. attract some of the best scientists from around the world.

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physicists are advancing providing solutions to ensors, and simulations.

will continue to play key experiments, motivating to the deepest questions.

nd guided by new results, nass community planning of the field are discussed so working with partners ts for facilities that could

dvanced technologies to and detectors with a wide e, and industry.

Strategic Plan for U.S. Particle Physics in the Global Context

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Particle Physics Progress and Priorities

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The U.S. particle physics community has a clear vision for the future. The P5 report provides the strategy and priorities for U.S. investments in particle physics for the coming decade. These carefully chosen investments will enable a steady stream of exciting new results for many years to come and will maintain U.S. leadership in key areas.

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The P5 strategy has been very successful. Even with extraordinary challenges due to COVID-19, there was great progress.

Recent results

The LHC experiments reported many important and precise results. The remarkably productive ATLAS and CMS experiments have each produced more than 1,000 refereed publications. The advances in precision are represented well by the new measurement of fundamental symmetry properties of **Higgs boson** decays that test the foundations of the underlying theory. The LHCb experiment also published many new results that are sensitive to **new physics**.

The **Muon g-2** fundamental parameter was measured to much greater precision, which represents another success in the program recommended in the P5 report. Remarkably, the value differs significantly from the theoretical prediction, pointing the way to more scientific progress.

Using the high-temperature superconductor, YBCO, researchers at **Fermilab set a new record for a fast-cycling accelerator magnet**.

The **Dark Energy Survey (DES)** announced many results using data from its first three years of operation.

Theoretical physicists have discovered new connections between particle production at **colliders** and fundamental concepts in **quantum field theory**, offering new, more incisive tests. They have also discovered new ways to search for candidate **dark matter** particles.

Intriguing first results from the **MicroBooNE** neutrino experiment, which is a proof-of-principle application of liquid argon for neutrino detectors, tested hypotheses about anomalies from previous neutrino experiments.

Program advances in 2021

Building upon the historic 2015 and 2017 bilateral U.S.-CERN agreements, U.S. and CERN scientists successfully continued their cooperative partnership at the LHC and the international neutrino program hosted by Fermilab. So far, government-to-government agreements with 10 countries have been signed for LBNF/DUNE, PIP-II, and the Short Baseline Neutrino program at Fermilab, with more in progress.

The **Vera C. Rubin/LSST Camera** successfully passed its CD-4 construction completion milestone. The **Dark Energy Spectroscopic Instrument (DESI)**, the world's premiere multi-object spectrometer, began its 5-year survey in May 2021, enabling major advances in the study of the nature of **dark energy** using methods complementary to those of Rubin Observatory's upcoming imaging survey.

The next-generation cosmic microwave background facility, CMB-S4, was ranked highly in the NAS Decadal Survey of Astronomy & Astrophysics, opening the path for a partnership in this interdisciplinary science that was also a priority in the P5 report. CMB measurements uniquely probe **physics of the inflationary era in the early Universe** at energies well beyond those of earth-bound accelerators and can also reveal **neutrino properties**.

Looking forward

All eyes are on the LHC, as its
continue to improve through vas
deep-learning data analysis meth
their discovery reach and probe
ever greater precision for many y
funding constraints, the HL-LHC

Eagerly anticipated new data
advance the understanding of
identified in the P5 Report. At th
to resume operations this spring
upgraded experiments.

Particle physicists are expandi
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accelerators and experiments,
opening new avenues for scienti

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Particle Physics Makes a Difference in Your Life

Particle physics is a global discovery science central to the modern innovation ecosystem. It drives national, regional, and local progress in science and industry. And it improves your quality of life. Here are just a few of the ways particle physics works for you.

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Makes a Difference in Your Life

Global science, local impact

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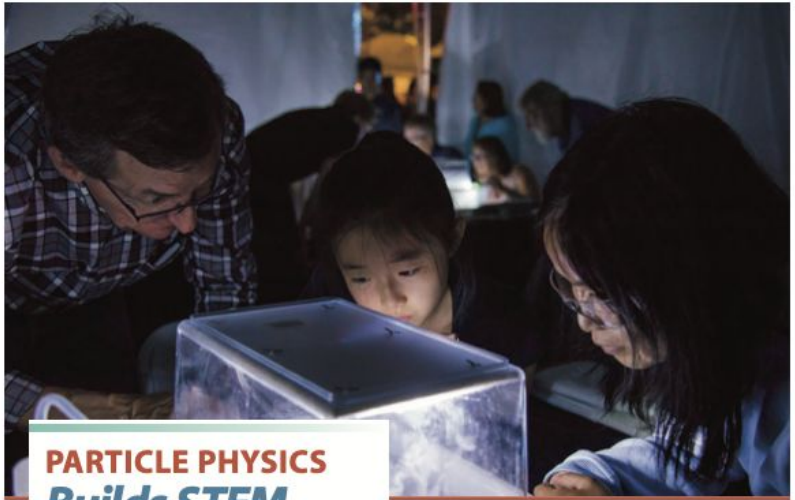
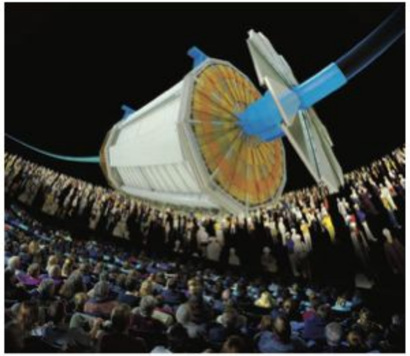


PARTICLE PHYSICS
Builds STEM Leaders

Particle physicists share the excitement of discovery, inspire young minds, and enhance public understanding of science. We partner with educators to prepare students to thrive in our high-tech global economy and develop the next generation of innovators.



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Muon g-2

SPT-3G

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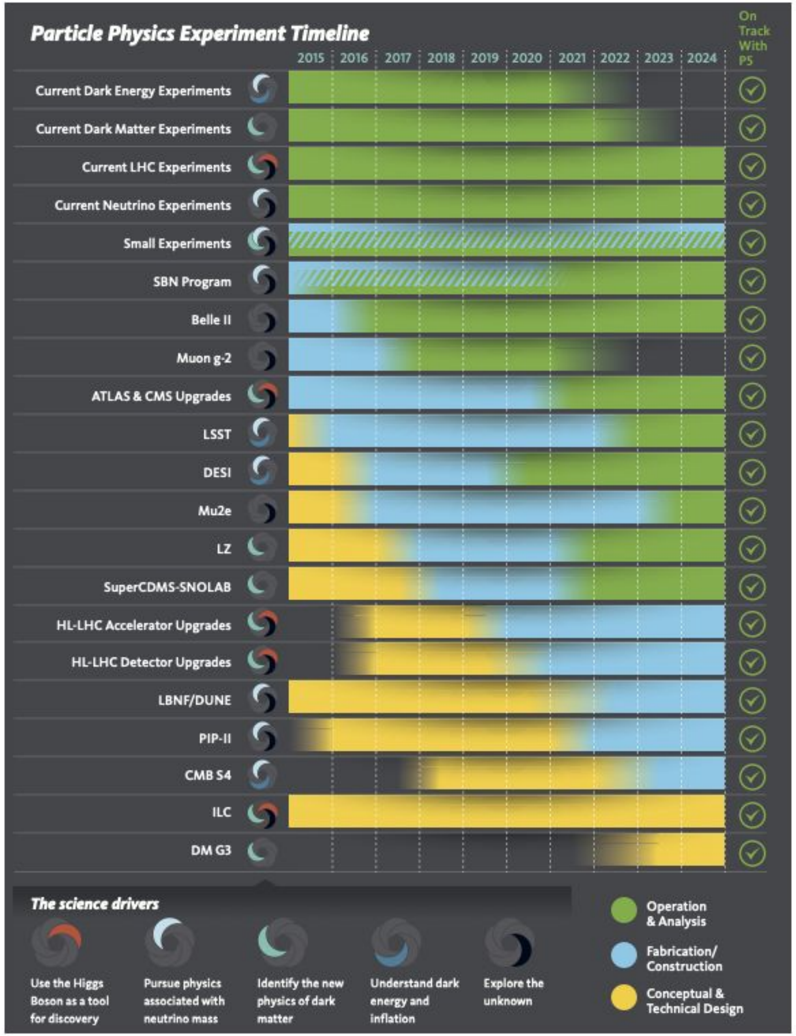

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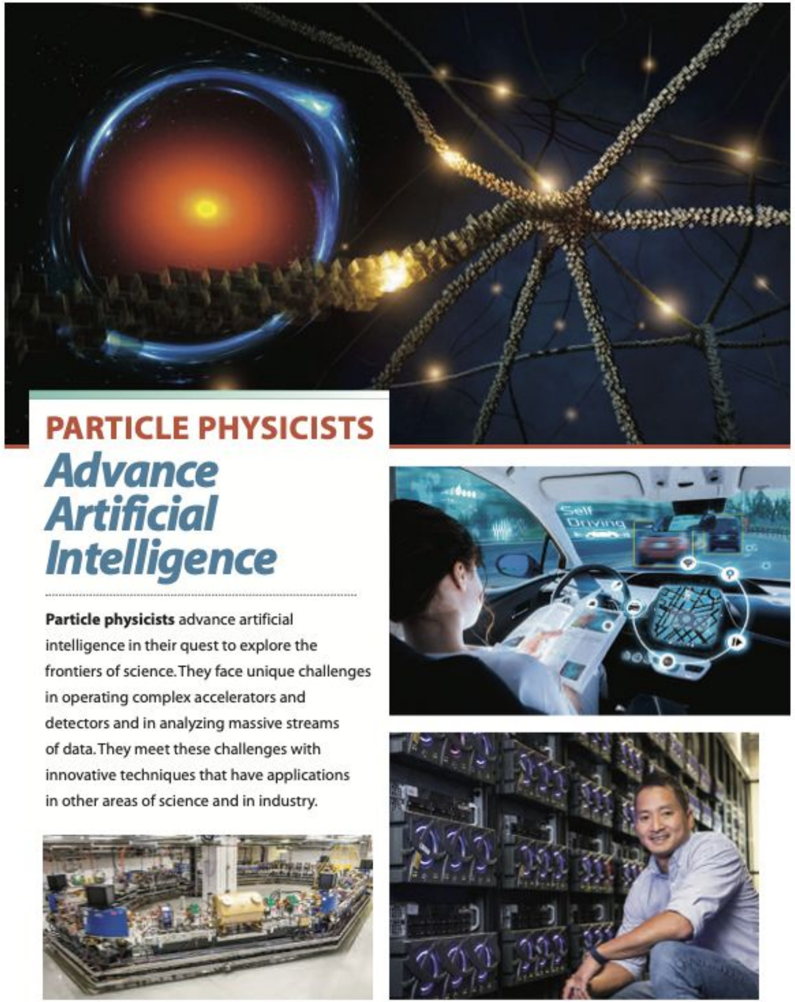
PARTICLE PHYSICISTS

Advance Artificial Intelligence

Particle physicists advance artificial intelligence in their quest to explore the frontiers of science. They face unique challenges in operating complex accelerators and detectors and in analyzing massive streams of data. They meet these challenges with innovative techniques that have applications in other areas of science and in industry.

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Particle Physicists Advance Artificial Intelligence

HEP community outreach materials timeline

- 2013 - Snowmass process concludes
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Planning the Future of U.S. Particle Physics

Report of the 2013 Community Summer Study

Conveners: M. Bardeen, W. Barletta, L. A. T. Bauerdick, R. Brock, D. Cronin-Hennessy, M. Demarteau, M. Dine, J. L. Feng, M. Gilchriese, S. Gottlieb, J. L. Hewett, R. Lipton, H. Nicholson, M. E. Peskin, S. Ritz, I. Shipsey, H. Weerts

Division of Particles and Fields Officers in 2013: J. L. Rosner (chair and corresponding author), I. Shipsey (chair-elect), N. Hadley (vice-chair), P. Ramond (past chair)

Editorial Committee: R. H. Bernstein, N. Graf, P. McBride, M. E. Peskin, J. L. Rosner, N. Varelas, K. Yurkewicz

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51

Communication with U.S. Policy Makers and Opinion Leaders

Conveners: M. Bardeen, D. Cronin-Hennessy, H. White, K. Yurkewicz

51.1 Introduction

The U.S. particle physics community has recognized as part of the 2013 Community Summer Study ("Snowmass") process that it must embark on a coordinated effort that mobilizes a greater fraction of scientists and students to translate the public excitement about and interest in particle physics research into greater support among the policy makers that make decisions about research funding and the opinion leaders whose views they trust to guide them in their decisions.

The particle physics community has engaged for decades in a variety of efforts to educate and inform the public, including policy makers and opinion leaders, about the excitement and importance of particle physics research and its benefits to society. These public outreach efforts have met with success, as demonstrated by the public attention to events in particle physics over the last six years. The saga of the Large Hadron Collider (LHC)—its startup, shutdown, restart and discovery of the Higgs boson—was followed by an unprecedented fraction of the worldwide public audience. Experimental hints of faster-than-light neutrinos made worldwide headlines in publications that rarely, if ever, cover physics news. The transit in 2013 of a large electromagnet from one Department of Energy (DOE) laboratory to another drew crowds of onlookers and live coverage on local television networks. Public lectures and other events on particle physics topics draw crowds that not all other fields of science can attract.

Yet while particle physics research fascinates and excites the American public, their continuing support for the funds required to build new facilities is not guaranteed. In the current climate of fiscal austerity, government-funded programs must make compelling cases for the societal benefit of their work. The bar is set high for scientific fields such as particle physics, which currently receives more than $750 million annually in the budget of the DOE Office of High Energy Physics and has proposed to build new projects with total costs of more than $1 billion.

A survey of more than 600 members of the particle physics community conducted in the first half of 2013 by the Snowmass Communication, Education and Outreach (CE&O) group revealed that only about 30% of respondents are engaged in outreach activities that reach policy makers and opinion leaders (see Appendix). Higher fractions of respondents were engaged in outreach to the general public (approximately 60%), activities that reach K-12 teachers or students (50%), and in activities that reach scientists in other fields (35%).

Translating the excitement and interest about particle physics into public support for funding of particle physics is critical not only to the long-term health of this field, but to the larger scientific enterprise in which particle physics plays an essential role. Maintaining and enhancing support will require a much larger fraction of the particle physics community to engage in activities targeted at policy makers and opinion

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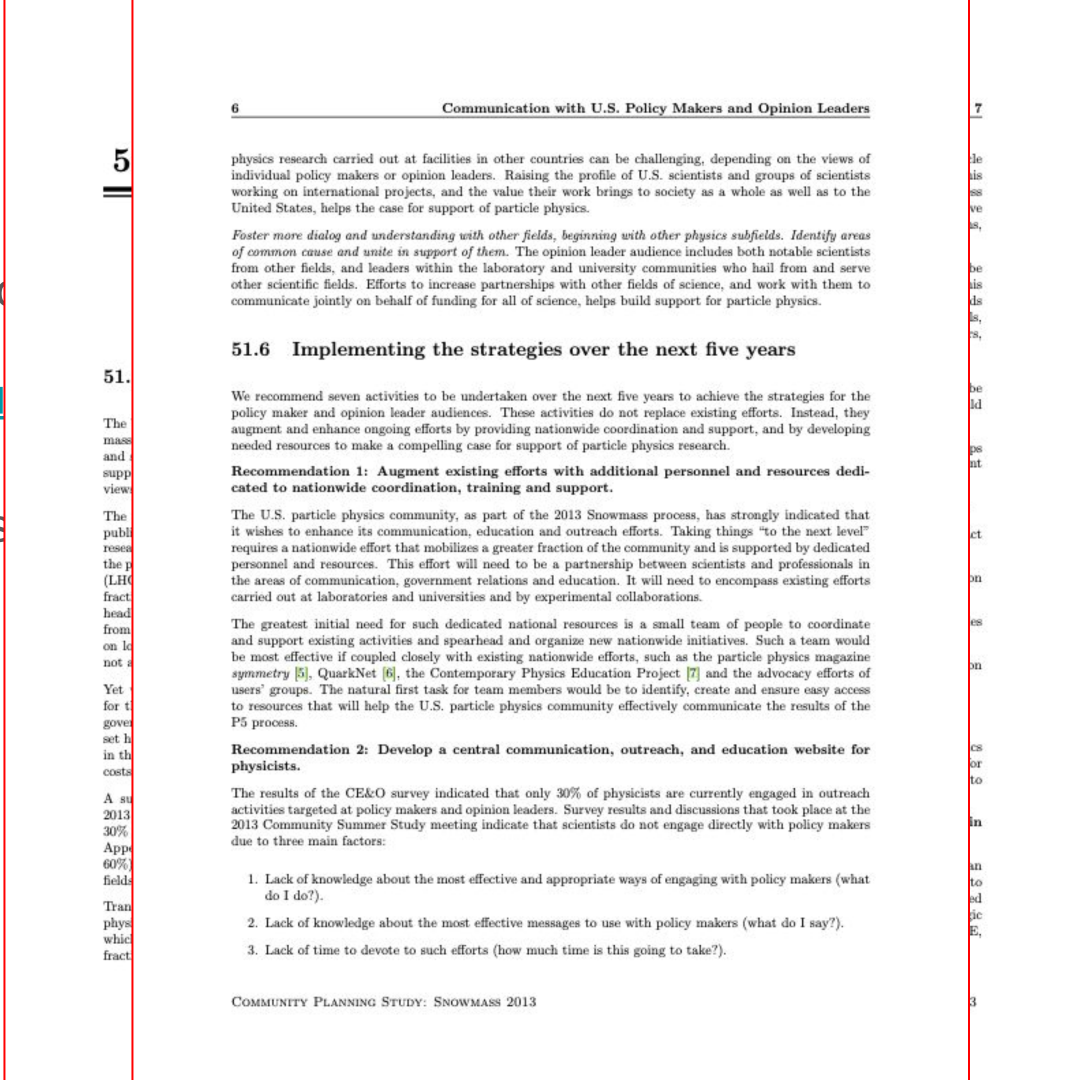

6 Communication with U.S. Policy Makers and Opinion Leaders

physics research carried out at facilities in other countries can be challenging, depending on the views of individual policy makers or opinion leaders. Raising the profile of U.S. scientists and groups of scientists working on international projects, and the value their work brings to society as a whole as well as to the United States, helps the case for support of particle physics.

Foster more dialog and understanding with other fields, beginning with other physics subfields. Identify areas of common cause and unite in support of them. The opinion leader audience includes both notable scientists from other fields, and leaders within the laboratory and university communities who hail from and serve other scientific fields. Efforts to increase partnerships with other fields of science, and work with them to communicate jointly on behalf of funding for all of science, helps build support for particle physics.

51.6 Implementing the strategies over the next five years

We recommend seven activities to be undertaken over the next five years to achieve the strategies for the policy maker and opinion leader audiences. These activities do not replace existing efforts. Instead, they augment and enhance ongoing efforts by providing nationwide coordination and support, and by developing needed resources to make a compelling case for support of particle physics research.

Recommendation 1: Augment existing efforts with additional personnel and resources dedicated to nationwide coordination, training and support.

The U.S. particle physics community, as part of the 2013 Snowmass process, has strongly indicated that it wishes to enhance its communication, education and outreach efforts. Taking things "to the next level" requires a nationwide effort that mobilizes a greater fraction of the community and is supported by dedicated personnel and resources. This effort will need to be a partnership between scientists and professionals in the areas of communication, government relations and education. It will need to encompass existing efforts carried out at laboratories and universities and by experimental collaborations.

The greatest initial need for such dedicated national resources is a small team of people to coordinate and support existing activities and spearhead and organize new nationwide initiatives. Such a team would be most effective if coupled closely with existing nationwide efforts, such as the particle physics magazine *symmetry* [5], QuarkNet [6], the Contemporary Physics Education Project [7] and the advocacy efforts of users' groups. The natural first task for team members would be to identify, create and ensure easy access to resources that will help the U.S. particle physics community effectively communicate the results of the P5 process.

Recommendation 2: Develop a central communication, outreach, and education website for physicists.

The results of the CE&O survey indicated that only 30% of physicists are currently engaged in outreach activities targeted at policy makers and opinion leaders. Survey results and discussions that took place at the 2013 Community Summer Study meeting indicate that scientists do not engage directly with policy makers due to three main factors:

1. Lack of knowledge about the most effective and appropriate ways of engaging with policy makers (what do I do?).
2. Lack of knowledge about the most effective messages to use with policy makers (what do I say?).
3. Lack of time to devote to such efforts (how much time is this going to take?).

Community Planning Study: Snowmass 2013

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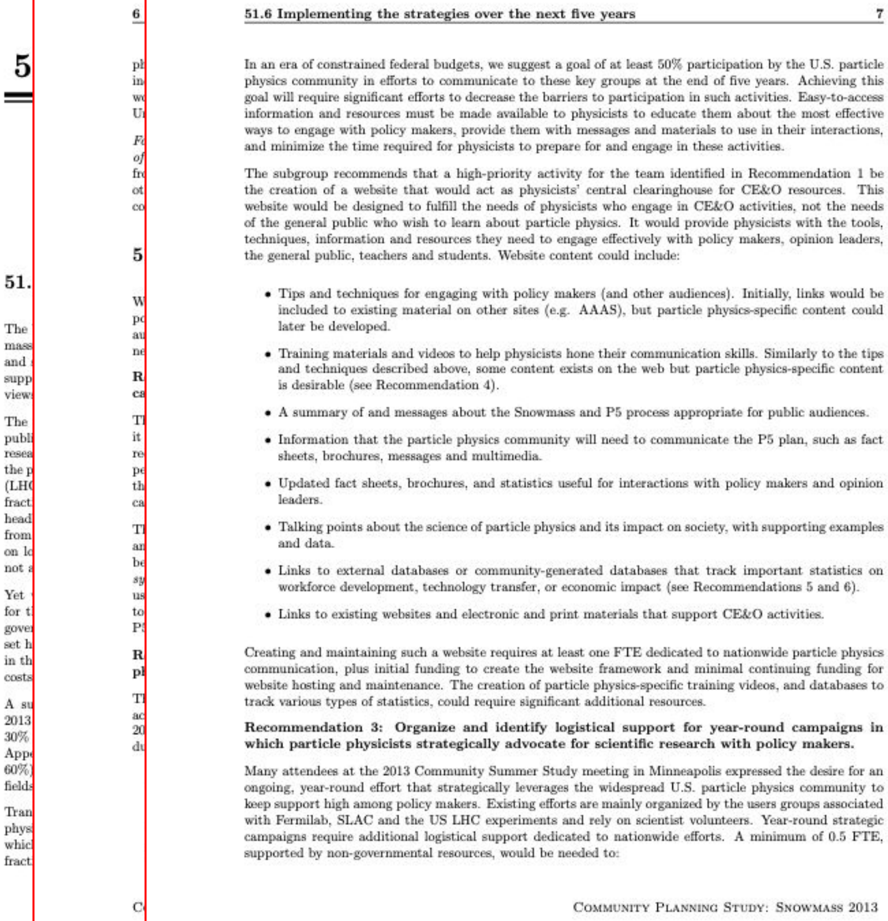

51.6 Implementing the strategies over the next five years 7

In an era of constrained federal budgets, we suggest a goal of at least 50% participation by the U.S. particle physics community in efforts to communicate to these key groups at the end of five years. Achieving this goal will require significant efforts to decrease the barriers to participation in such activities. Easy-to-access information and resources must be made available to physicists to educate them about the most effective ways to engage with policy makers, provide them with messages and materials to use in their interactions, and minimize the time required for physicists to prepare for and engage in these activities.

The subgroup recommends that a high-priority activity for the team identified in Recommendation 1 be the creation of a website that would act as physicists' central clearinghouse for CE&O resources. This website would be designed to fulfill the needs of physicists who engage in CE&O activities, not the needs of the general public who wish to learn about particle physics. It would provide physicists with the tools, techniques, information and resources they need to engage effectively with policy makers, opinion leaders, the general public, teachers and students. Website content could include:

- Tips and techniques for engaging with policy makers (and other audiences). Initially, links would be included to existing material on other sites (e.g. AAAS), but particle physics-specific content could later be developed.
- Training materials and videos to help physicists hone their communication skills. Similarly to the tips and techniques described above, some content exists on the web but particle physics-specific content is desirable (see Recommendation 4).
- A summary of and messages about the Snowmass and P5 process appropriate for public audiences.
- Information that the particle physics community will need to communicate the P5 plan, such as fact sheets, brochures, messages and multimedia.
- Updated fact sheets, brochures, and statistics useful for interactions with policy makers and opinion leaders.
- Talking points about the science of particle physics and its impact on society, with supporting examples and data.
- Links to external databases or community-generated databases that track important statistics on workforce development, technology transfer, or economic impact (see Recommendations 5 and 6).
- Links to existing websites and electronic and print materials that support CE&O activities.

Creating and maintaining such a website requires at least one FTE dedicated to nationwide particle physics communication, plus initial funding to create the website framework and minimal continuing funding for website hosting and maintenance. The creation of particle physics-specific training videos, and databases to track various types of statistics, could require significant additional resources.

Recommendation 3: Organize and identify logistical support for year-round campaigns in which particle physicists strategically advocate for scientific research with policy makers.

Many attendees at the 2013 Community Summer Study meeting in Minneapolis expressed the desire for an ongoing, year-round effort that strategically leverages the widespread U.S. particle physics community to keep support high among policy makers. Existing efforts are mainly organized by the users groups associated with Fermilab, SLAC and the US LHC experiments and rely on scientist volunteers. Year-round strategic campaigns require additional logistical support dedicated to nationwide efforts. A minimum of 0.5 FTE, supported by non-governmental resources, would be needed to:

Community Planning Study: Snowmass 2013

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- Talking points about the science of particle physics and its impact on society, with supporting examples and data.
- Links to external databases or community-generated databases that track important statistics on

The subgroup recommends that a high-priority activity for the team identified in Recommendation 1 be the creation of a website that would act as physicists' central clearinghouse for CE&O resources. This website would be designed to fulfill the needs of physicists who engage in CE&O activities, not the needs of the general public who wish to learn about particle physics. It would provide physicists with the tools, techniques, information and resources they need to engage effectively with policy makers, opinion leaders, the general public, teachers and students. Website content could include:

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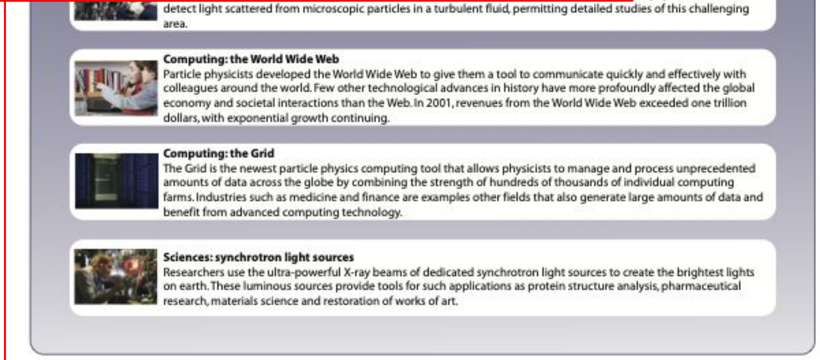

State of the outreach materials in 2014
(note explicit coupling of outreach materials to advocacy activities)

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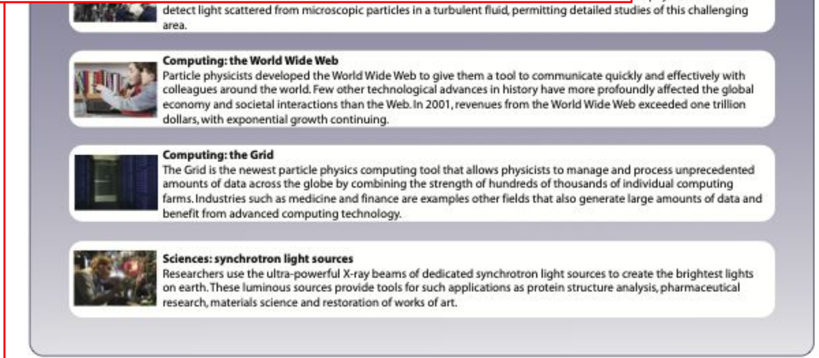

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OFFICE OF HIGH ENERGY PHYSICS

Office of Science

Particle Physics: Benefits to Society

From the earliest days of high energy physics in the 1930s to the latest 21st century initiatives, the innovative ideas and technologies of particle physics have entered the mainstream of society to transform the way we live. Selected examples illustrate a long and growing list of beneficial practical applications with contributions from particle physics.

Medicine: cancer therapy
Every major medical center in the nation uses accelerators producing x-rays, protons, neutrons or heavy ions for the diagnosis and treatment of disease. It is estimated that there are over 7,000 operating medical linacs around the world that have treated over 30,000,000 patients.

Medicine: diagnostic instrumentation
Particle detectors first developed for particle physics are now ubiquitous in medical imaging. Positron emission tomography, the technology of PET scans, came directly from detectors initially designed for particle physics experiments sensing individual photons of light.

Homeland security: monitoring nuclear waste nonproliferation
In nuclear reactors, the amount of plutonium builds up as the uranium fuel is used. Because plutonium and uranium emit different kinds of particles, a particle detector can be used to monitor and analyze the contents of the nuclear reactor core. A prototype detector, originally developed by physicists for experiments, has already demonstrated the potential use of this new monitoring technology.

Industry: power transmission
Cables made of superconducting material can carry far more electricity than conventional cables with minimal power losses. Further superconducting technology advances in particle physics will help advance this industry, offering an opportunity to meet continued power needs in densely populated areas where underground copper transmission lines are near their capacity.

Industry: biomedicine and drug development
Biomedical scientists use particle physics technologies to decipher the structure of proteins, information that is key to understanding biological processes and healing disease. A clearer understanding of protein structure allows for the development of more effective drugs, such as Kaletra, one of the world's most-prescribed drugs to fight AIDS.

Industry: understanding turbulence
From long distance oil pipelines to models for global weather prediction, turbulence determines the performance of virtually all fluid systems. Silicon strip detectors and low-noise amplifiers developed for particle physics are used to detect light scattered from microscopic particles in a turbulent fluid, permitting detailed studies of this challenging area.

Computing: the World Wide Web
Particle physicists developed the World Wide Web to give them a tool to communicate quickly and effectively with colleagues around the world. Few other technological advances in history have more profoundly affected the global economy and societal interactions than the Web. In 2001, revenues from the World Wide Web exceeded one trillion dollars, with exponential growth continuing.

Computing: the Grid
The Grid is the newest particle physics computing tool that allows physicists to manage and process unprecedented amounts of data across the globe by combining the strength of hundreds of thousands of individual computing farms. Industries such as medicine and finance are examples other fields that also generate large amounts of data and benefit from advanced computing technology.

Sciences: synchrotron light sources
Researchers use the ultra-powerful X-ray beams of dedicated synchrotron light sources to create the brightest lights on earth. These luminous sources provide tools for such applications as protein structure analysis, pharmaceutical research, materials science and restoration of works of art.

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Building for Discovery

Strategic Plan for U.S. Particle Physics in the Global Context

Report of the Particle Physics Project Prioritization Panel (P5)

The U.S. particle physics community has just updated its vision for the future. The P5 report presents a strategy for the next decade and beyond that enables discovery and maintains our position as a global leader through specific investments by the Department of Energy's Office of Science and the National Science Foundation Directorate for Mathematical and Physical Sciences.

Particle physics is a highly successful, discovery-driven science. It explores the fundamental constituents of matter and energy, and it reveals the profound connections underlying everything we see, including the smallest and the largest structures in the Universe. Earlier investments have been rewarded with recent fundamental discoveries, and upcoming opportunities will push into new territory. Particle physics inspires young people to engage with science.

Particle physics is global. To address the most pressing scientific questions and maintain its status as a global leader, the U.S. must both host a unique, world-class facility and be a partner on the highest priority facilities hosted elsewhere.

Choices were required. The updated strategy recommends investments in the best opportunities, chosen from a large number of excellent options, in order to have the biggest impact and make the most efficient use of resources over the coming decade.

Five intertwined scientific Drivers were distilled from the results of a yearlong community-wide study:

- 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

Higgs boson | Neutrino mass | Dark matter | Cosmic acceleration | Explore the unknown

The U.S. particle physics program is poised to move forward into the next era of discovery.

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The P5 report recommends a prioritized and time-ordered list of experiments to address the five science Drivers optimally. These opportunities are at the small, medium, and large investment scales that, together, produce a continuous flow of major scientific results throughout a twenty-year timeframe.

- Large projects, in time order, include the Muon g-2 and Muon-to-electron Conversion (Mu2e) experiments at Fermilab, strong collaboration in the high-luminosity upgrades to the Large Hadron Collider (HL-LHC), and a U.S.-hosted Long Baseline Neutrino Facility (LBNF) that receives the world's highest intensity neutrino beam from an improved accelerator complex (PIP-II) at Fermilab.
- U.S. involvement in a Japanese-hosted International Linear Collider (ILC), should it proceed, with stronger participation in more favorable budget scenarios.
- Areas with clear U.S. leadership in which investments in medium- and small-scale experiments have great promise for near-term discovery include dark matter direct detection, the Large Synoptic Survey Telescope (LSST), the Dark Energy Spectroscopic Instrument (DESI), cosmic microwave background (CMB) experiments, short-baseline neutrino experiments, and a portfolio of small projects.
- Specific investments in particle accelerator, instrumentation, and computing research and development are required to support the program and to ensure the long-term productivity of the field.

Several significant changes in direction are recommended:

- 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 specific activities and efforts at Fermilab to the PIP-II program of improvements to the accelerator complex, which 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.
- Re-align activities in accelerator R&D with the new strategic plan, and emphasize capabilities that will enable creating future-generation accelerators at dramatically lower cost.

Small changes in yearly budgets have large impacts on the timeline and capability of the U.S. particle physics program. A very large return on investment is ensured by the relatively small increment in funding between the constrained budget scenarios given in the P5 charge:

- A small limited-time funding increment to ensure support of the Dark Energy Spectroscopic Instrument (DESI) would yield scientific returns with high impact.
- World-leading accelerator and instrumentation development research would be retained.
- U.S. research capability would be maintained, including a thriving theory program.
- The Muon-to-electron Experiment (Mu2e) at Fermilab would be completed on time.
- The long-baseline neutrino program would proceed without delays.
- The third-generation dark matter direct detection capabilities would be fully developed on time.

The lowest budget scenario given in the P5 charge is precarious. It is close to the point beyond which the U.S. would not be capable of hosting a large project while maintaining the other core program components that ensure mission success. Without this capability, the U.S. would lose its position as a global leader in this field, and highly productive international relationships would be fundamentally altered.

High-priority options for additional investments beyond our constrained scenarios are identified:

- Expand accelerator R&D to enable very high-energy future machines at lower cost, and likely provide benefits beyond particle physics.
- Play world-leading roles in the ILC detector program and provide critical accelerator components, should the ILC proceed in Japan.
- Host a large water-based neutrino detector to complement the LBNF liquid-argon detector and unify the global long-baseline neutrino community around the world's highest intensity neutrino beam provided by Fermilab.

For more information on P5 or to download a PDF copy of the report, visit usparticlephysics.org/p5

Report of the Particle Physics Project Prioritization Panel (P5)

U.S. DEPARTMENT OF ENERGY | Office of Science

NSF

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Outreach materials as we currently know them are developed and first used
(at this point the outreach materials become decoupled from explicit advocacy activities)

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Outreach materials serve as key element of highly successful HEP community advocacy activities

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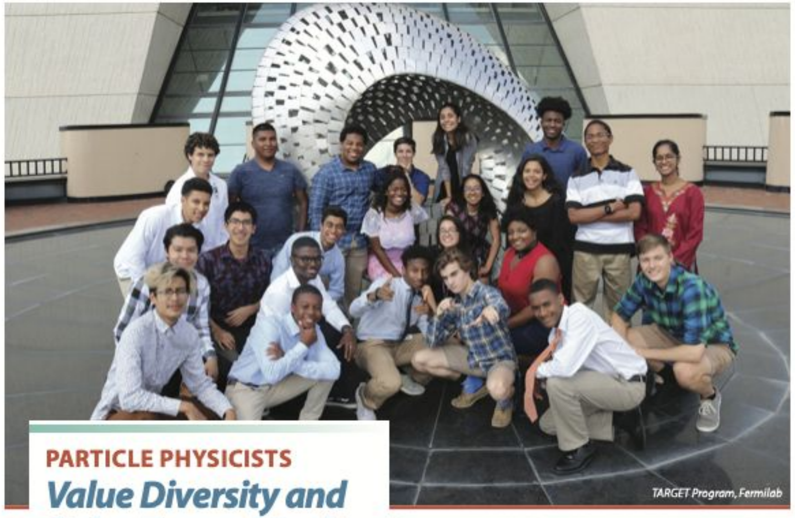

TARGET Program, Fermilab

PARTICLE PHYSICISTS Value Diversity and Strive Toward Equity

Particle physicists understand the importance of having a diverse research community and fostering a sense of belonging among its current and future members. We are actively working to improve the climate for groups historically underrepresented in physics. These long needed ... re ... and ... ratory

SAGE-S Summer Camp, SLAC

...unity strategy to enable a diverse future

"...es significant intellectual progress and breakthroughs is having a diverse ...nts who bring in distinctive skills and perspectives. Through the Snowmass ...nning process, the U.S. Particle Physics community is strategizing ways to ...al access to education and career opportunities for historically ...ed communities."

—*Mu-Chun Chen* (she/her/hers)
University of California, Irvine

Building a sense of belonging and a pathway to success

"The Suarez group at Boston University established a mentoring program for women and other underrepresented students to facilitate participation in LHC research starting early in their undergraduate career. We're invested in **promoting the mentoring, teaching, and training of students and creating a pipeline for their success** through involvement in research. This ensures that we create a STEM workforce that is diverse in experiences, knowledge, and skills."

—*Indara Suarez and Daniel Spitzbart*
Boston University

Building inclusive environments

"The increased **awareness of diversity and equity issues is translating into action** in particle physics collaborations and university physics departments. Large collaborations have Codes of Conduct and strive for diversity when assigning management positions. University physics departments increasingly consider diversity and inclusion a core value in teaching and research. Target of opportunity programs and improvements in candidate evaluation are making hiring and admissions more equitable, **leading to increased diversity** in faculty and students."

—*Meenakshi Narain*, Brown University

...uate education opportunities

"...ent, I had to balance a full-time job and class, which left little time to ...perience. I was accepted at Cal State Long Beach through the APS Bridge ... **outstanding mentorship and guidance both in academics and** ...**nt.** After earning a masters degree and a PhD, I am now a postdoctoral ... at the frontier of high energy physics research and computing."

—*Daniel Diaz*, UC San Diego

APS · Fermilab UEC · SLUO SLAC Users Organization · US LUA

New outreach materials are generated when a need is identified, and can be driven by motivated individual community members.

(DEI document new as of 2022, see here)

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What will our community outreach materials look like post-Snowmass (2021); post-P5 (2023)?

Future of HEP community outreach materials

- These materials are a critical resource for HEP community advocacy activities, **and also serve as a guide for promoting the message of unity within our field**
  - They can and should be utilized more broadly by the community in all types of communications with non-physicists
  - We should advertise their existence more extensively within the community
- **Updating these materials and our messaging should be a priority post-P5**

For more details see the CEF06 contributed paper Congressional Advocacy for HEP Funding (The "DC Trip") and our topical group report draft, which you can view here.