



The P5 Report provides a strategy and the priorities for U.S. investments in particle physics for the coming decade.

The top four priorities this year

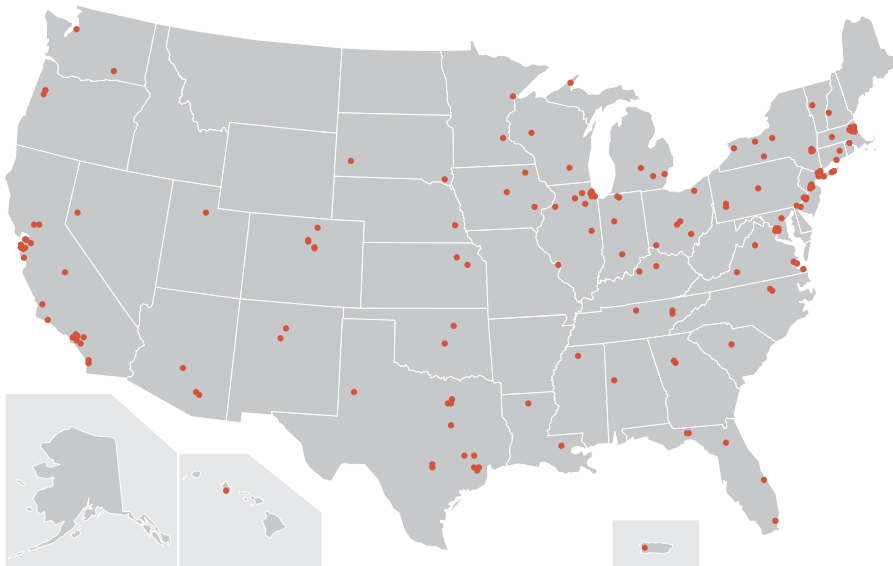
Start the High-Luminosity LHC (HL-LHC) accelerator and detector upgrade projects so the U.S. can deliver its critical contributions on time. This is P5's highest priority near-term large project.

Solidify international partnerships to establish the Long-Baseline Neutrino Facility (LBNF) and Deep Underground Neutrino Experiment (DUNE), and move forward with the engineering design, construction site preparation, and long-lead procurements. This is the highest priority large project in its time frame.

Complete the existing construction projects that will enable the next major discoveries in particle physics, including the ATLAS and CMS upgrades, LSST, DESI, Mu2e, Muong-2, LZ, ADMX-G2, and SuperCDMS-SNOLAB.

Balance scientific research with facility operations and the carefully selected portfolio of small, medium, and large projects that together facilitate the success of the community's strategic vision.

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.



Particle Physics is both Global and Local. Scientists, engineers, and technicians at more than 160 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. Particle physics activities in the U.S. attract some of the best scientists from around the world.

Recent results

Higgs boson exploration. The Large Hadron Collider (LHC) experiments measured the Higgs boson mass to amazing precision (0.19%), along with many other results. The LHC is further expanding its great potential for discovery with higher-energy (13 TeV) operations.

Hints of neutrino mass ordering. Early results from the NOVA long-baseline neutrino experiment give intriguing hints about the arrangement of neutrino masses, a key question in neutrino science.

Program advances in 2015

The historic bilateral U.S.-CERN agreement was signed in May 2015, ensuring smooth continuation of this highly successful collaboration and, for the first time, enabling CERN to invest in facilities in the U.S.

The community moved rapidly toward a new era of neutrino physics. Development of the Long-Baseline Neutrino Facility (LBNF) and the Deep Underground Neutrino Experiment (DUNE) became truly international, providing a worldwide focus of scientific research at Fermilab. A coordinated set of short-baseline neutrino experiments designed to answer perplexing questions raised by earlier experiments is proceeding.

Looking forward

All eyes are on the LHC as it begins the second year of higher-energy searches for new physics.

Eagerly anticipated new data from operating experiments will advance the understanding of the intertwined Science Drivers.

Cosmic dark matter opportunities. The Dark Energy Survey discovered 17 dwarf galaxy candidates that provide valuable new venues to search for clues about the nature of dark matter using ground- and space-based instruments.

New configurations of matter. The LHCb experiment found evidence for exotic pentaquark states, postulated but never before observed.

Next-generation direct-detection dark matter experiments were selected and are moving toward construction.

Next-generation dark energy experiments began construction. The Large Synoptic Survey Telescope (LSST), led by the NSF, with a massive 3.2 gigapixel camera provided by DOE and international partners, was given final approval for start of construction. The Dark Energy Spectroscopic Instrument (DESI) is moving forward on final design and into fabrication.

Accelerator R&D program priorities were identified for the coming decade in a new High Energy Physics Advisory Panel report, following the P5 strategic plan.

Japan is considering hosting the International Linear Collider (ILC), which would provide new opportunities for discovery beyond the LHC.

The vibrant U.S. particle theory community will continue to play key roles interpreting results from current experiments, motivating future experiments, and pursuing the deepest questions about the foundations of particle physics.



Building for Discovery

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

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