

ICFA Applauds the 2023 Particle Physics Prioritization Panel (P5) Output

April 2024

At its recent meeting on 10-11 April 2024, ICFA – the International Committee for Future Accelerators – congratulated the 2023 Particle Physics Project Prioritization Panel (P5)¹ on their report “Exploring the Quantum Universe” released on 7 December 2023². The report is the P5 answer to the charge of developing a 10-year strategic plan for US particle physics, in the context of a 20-year global strategy and two budget scenarios.

The 2021 Snowmass Community Planning Exercise³, organized by the Division of Particles and Fields of the American Physical Society, represented a relevant source of inputs. Additional contributions came from town hall meetings, laboratory visits, and individual communications.

The P5 report describes three science themes that represent the core of investigations into nature driving the US community in the next two decades: Decipher the quantum realm, revealing the neutrino nature and the unknowns of the Higgs boson; Explore new paradigms in physics, searching for new matter states and/or new phenomena; Illuminate the hidden universe, questioning the nature of dark matter and cosmic evolution mechanisms.

Highest priority was given by P5 to ongoing projects and their maximal science exploitation, such as HL-LHC, DUNE and PIP-II first phase, and the Rubin Observatory. In parallel, the community is encouraged to prepare a list of major projects to study fundamental matter and the universe, comprising CMB-S4, which looks back at the history of the universe, a second phase of DUNE, an offshore Higgs factory in collaboration with international partners, an ultimate experiment for dark matter direct detection, and the IceCube-Gen2 detector. The proposed portfolio includes an intense effort to implement theoretical, computational and technological resources vital to the achievement of the vision.

P5 strongly supports accelerator R&D to chart a path towards a 10 TeV parton centre-of-mass collider based on pp, muon, or potentially wakefield technologies. It also recommends to develop a plan that could lead to the construction of a major HEP facility in the US, potentially in the form of a 10 TeV muon collider, to be hosted on the Fermilab premises.

ICFA is highly supportive of several important international activities recommended by P5, and it acknowledges the far-reaching impact of the report, not only for the US community, but particle physics worldwide. ICFA supports the collaborative platforms on the advanced technologies mentioned in the P5 document.

ICFA congratulates the US community for the P5 report, and reiterates its supports for strong international collaboration that continues to be an effective tool to achieve progress for the entire field of collider-based particle physics.

¹ <https://science.osti.gov/hep/hepap>

² https://science.osti.gov/-/media/hep/hepap/pdf/Reports/P5Report2023_120123-DRAFT-to-HEPAP.pdf

³ <https://atlaswww.hep.anl.gov/snowmass21/doku.php>