

U.S. National Accelerator R&D on Future Colliders Initiative

Pushpa Bhat,
Andrew Lankford, Sergei Nagaitsev
(Lead Contacts)

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U.S. National Accelerator R&D Program on Future Colliders

P.C. BHAT^{1,†}, S. BELOMESTNYKH^{1,5}, A. BROSS¹, S. DASU⁶, D. DENISOV⁴, S. GOURLAY⁷,
S. JINDARIANI¹, A.J. LANKFORD^{8,†}, S. NAGAITSEV^{1,2,†}, E.A. NANNI³, M.A. PALMER⁴,
T. RAUBENHEIMER³, V. SHILTSEV¹, A. VALISHEV¹, C. VERNIERI³, F. ZIMMERMANN⁹

¹Fermi National Accelerator Laboratory

²University of Chicago

³SLAC National Accelerator Laboratory

⁴Brookhaven National Laboratory

⁵Stony Brook University

⁶ University of Wisconsin, Madison

⁷Lawrence Berkeley National Laboratory, Retired

⁸ University of California, Irvine

⁹CERN

† Lead Contacts; Email: pushpa@fnal.gov, andrew.lankford@uci.edu, nsergei@fnal.gov

Motivation

- Future Colliders are an essential component of strategic vision for particle physics
- Energy Frontier vision calls for development of future collider concepts for the intermediate and longer-term future facilities
 - HL-LHC being the near-term future
- Development of collider options and feasibility studies are underway in Europe (CERN), Japan and China
- **But, the U.S. HEP accelerator R&D program has no support for development of collider concepts for strategic planning**
 - Compromises U.S. leadership role in collider design and development
 - Severely limits U.S. leadership in particle physics
- This R&D initiative is proposed to address this shortcoming in the U.S. accelerator R&D.

Objective of the Proposed Program

- **The overarching objective: Address in an integrated fashion the technical challenges of promising future collider concepts, particularly those aspects of accelerator design, technology, and beam physics that are not covered by the existing General Accelerator R&D (GARD) program.**
- The goal is to inform decisions in down-selecting among the collider concepts by the next European strategy update and the next US community planning cycle
 - **help move towards realization of the next collider as soon as possible (e+e- Higgs Factory)**
 - **help to subsequently advance towards a collider at a higher energy scale (to probe Multi-TeV scale)**

Scope of the Proposed Program

- Scope:
 - Sharply focused on future colliders
 - Address challenges for next colliders (e.g., Higgs factories) and for collider concepts for ~ 10 TeV-scale machines
 - Spans accelerator design, technology and full concept development
 - Complements the existing HEP GARD program
 - Multifaceted but selective, and synergistic
 - Support multiple approaches but be selective among R&D topics in a way that leads to converging on viable option(s)
 - Cost-effective, opportunity for technical benefits, innovation
 - Integrates all critical R&D for a concept
 - Enable full development of collider concepts
 - Priorities guided by P5

Organization and Coordination

- Organization:
 - Coherent national program
 - Key: Advance developments and preparedness for future colliders
 - Program's portfolio of activities centrally selected, coordinated
 - Guided by P5 and an Advisory Committee/Board
 - Collaborative effort of U.S. national labs and universities
 - Funding allocations through proposals/review process
- Coordination:
 - Centrally coordinated and funded
 - Management hosted at a national lab
 - Coordinated with global design studies and R&D
 - Avoid duplication of efforts, engage in complementary R&D
 - Periodic assessment
 - Of coherence of activities, specifications

Summary

- In order to position the U.S. as a key player in future HEP facilities, whether hosted abroad or in the U.S., the proposed U.S. national accelerator R&D program focused on future colliders is essential.
- The potential scope of the program, and how it could be organized and coordinated are outlined.

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