



U.S. Department of Energy Office of Science

The Future of U.S. High Energy Physics and the ILC

Joint Meeting of the American Linear Collider Physics Group ILC Global Design Effort

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View from the Office of Science

- Today, particle physics boasts an unprecedented number of fundamental questions and opportunities for transformative discoveries.
- The sense that the answers to these questions are within our grasp provides a new vibrancy and excitement to this field.
- The particle physics community has a vision and ambitious goals that require the development of a path forward that is adaptable and robust.
- The community's recent long-range plans all include the International Linear Collider (ILC) as an important element of that plan.
- It is critical that planning for the ILC takes into account the realities of the funding situation, the need to formalize the ILC arrangements between governments, the changing scientific landscape, the scientific capabilities at other facilities, and the health of our national scientific structure.



Global Planning for the ILC

- When I spoke to the High Energy Physics Advisory Panel (HEPAP) in February I discussed the need for a realistic cost and schedule for the ILC.
- The ILC must be conceived, planned, developed, constructed and operated as a truly international project, from beginning to end.
- The participating governments (funding agencies) must take responsibilities for oversight and budgeting.
- The Global Design Effort (GDE) has accomplished the remarkable and essential task of a reference design.
- It is now time to integrate the associated R&D into a global, government structure, encompassing Asia, North America, and Europe.



The U.S. Government Role

- The Department of Energy's (DOE) Project Management Order, DOE O 413.3, sets the ground rules for the U.S. participation in the development and construction of the ILC. This order is used for all of DOE's major facility construction planning and execution, including the US participation in international projects such as ITER.
- The U.S. ILC effort must follow the 413.3 process towards a cost and schedule that is achievable within U.S. and international budgetary constraints.



DOE Order 413.3

DOE Order 413.3 lays out the following “Critical Decisions” for project management (Projects above \$750M need to be approved by the Deputy Secretary):

- (1) CD-0, Approve Mission Need
- (2) CD-1, Approve Alternative Selection and Cost Range
- (3) CD-2, Approve Performance Baseline
- (4) CD-3, Approve Start of Construction
- (5) CD-4, Approve Start of Operations or Project Completion

From the U.S. House Energy and Water Development Appropriations Committee Report for 2008 (Report 110-185, July 7, 2007):

“The Committee repeats its prior guidance on the importance of improving the project management culture within the Department and on faithful compliance with Project Management Order 413.3. It is important for the Department to maintain its focus on project management for all aspects of its work, but most especially for major capital projects.”



Elements feeding into CD-0: Mission Need

- We need to have results from the LHC before we can proceed to CD-0 (Mission Need) for ILC. The results from LHC may point to other, more promising energies to explore.
- We need to be aware of the status of other planned international projects, so as not to duplicate their capabilities.
- Guidance will be obtained from the community (HEPAP) on what the options are with various projected funding levels for a sustainable U.S. HEP program.
- I ask your continued help to develop our understanding of the Mission Need (CD-0) for the ILC through this R&D period.



Need to Formalize the ILC process

- The U.S. must work both bilaterally and multilaterally with interested governments to formalize the ILC partnership. We must move beyond informal collaborations initiated for the Engineering Design Report (EDR).
- These discussions will include ways to optimize international research efforts during this R&D phase and reduce duplication and reduce the potential for misunderstandings between government funding agencies.



Need to Bring the National and GDE Efforts into Phase

- The Global Design Effort (GDE) should be commended for the Reference Design Report (RDR) which represents a significant international achievement.
- However, the GDE has now initiated efforts to generate an Engineering Design Report (EDR), while at least one of the nations interested in the possibilities of an ILC (e.g.; the U.S.) is at the R&D and pre-conceptual design phase.
- The international effort (GDE) needs to take into account in its planned schedule the constraints faced by the interested nations and funding agencies and the obstacles that will have to be overcome.
- This is absolutely needed to assure continued funding and coordination of research efforts for the ILC.
- The success of the ILC depends on the implementation of the formal arrangements. I judge that these arrangements will require more time than the current proposed schedule of the GDE.



The Road Ahead

- The U.S. remains committed to pursuing the scientific promise of the energy frontier. This includes continued support for the LHC program and R&D for a next-generation Terascale facility. However, this will be done in the context of a scientifically productive and sustainable U.S. HEP research program.
- DOE project management embodied in Order 413.3 establishes a clear roadmap for DOE's involvement in the ILC project.
- The ILC and all projects of similar scope will require the Nations of the world to cooperate to advance science. To maintain the current levels of R&D we need to move towards more formal international arrangements.
- The future of High Energy Physics in the U.S. depends on the decisions we make over the coming years.
- I remain optimistic about the long-term prospects for the field – we are at the threshold of an era of tremendous discovery.