Beyond the ALCPG

David B. MacFarlane
Associate Laboratory Director for PPA

SLAC NATIONAL ACCELERATOR LABORATORY

New landscape

- GDE and evolution to LCO
  - » TDR and DBD on track for delivery and review by year's end
  - » ICFA has taken steps to stand up LCO & LCB by end of 2012
  - » Aim to capitalize on momentum created by LHC discovery
- Discovery of 125 GeV boson at LHC
  - » More data and information by end of year, but 14 TeV data may be important also
  - » Examining physics case for Higgs Factory being factored into regional planning exercises including US CSS2013
  - » Various machine options, but ILC most mature & ready to build
    - Linear colliders, circular colliders, & muon colliders
  - » Convergence on plan and priority over the next year in all three regions will be crucial

New landscape

- Lepton collider prospects in the US
  - HEP funding remains fragile, with priority given to LBNE
  - Near-term funding will be very limited for accelerator & detector R&D
  - Best to continue positioning LC accelerator & detector effort more generically by broadening ILC efforts
  - Focus on developing Higgs Factory case should be a central part of this broadened agenda

American Linear Collider Physics Group

- ALCPG was formed in 2002 to advance preparation for an experimental program at an electron-positron linear collider
- ALCPG leadership has spurred:
  - Studies of critical physics processes with full simulation
  - Understanding of detector requirements, including the machine-detector interface
  - Development of integrated detector concepts with international collaboration, essential to assessment of physics performance
  - Promotion of prioritized detector R&D program funded by government agencies
  - Organization of periodic workshops with international participation, coordinated with accelerator community
- The ALCPG is the North American part of a global effort working closely with Europe and Asia colleagues

Ongoing organizational needs for LC

- Need an ALCPG-like organization to advance a broader agenda for energy frontier Lepton-Collider physics
  - » Reconstitute ALCPG to assume the same functions for a broader set of energy frontier options
  - » Would like to see it recognized in this broader role by LCSGA, DPF, and DOE
  - » Coordinate development of physics studies aimed at CSS2013 community meeting
- Need a common simulation tool to underpin physics studies
  - » DOE has partially funded a joint Fermilab/SLAC proposal to enhance LCSim capabilities and provide community support
- Detector R&D needs will emerge from these studies
  - » Group could coordinate detector R&D proposals as part of national generic R&D program

US Lepton Collider Physics Framework (LCPF)

- Goal:
  - Coordinate a research program to prepare the US HEP community for a forefront experimental program at a high-energy Lepton Collider
- LCPF would coordinate studies needed to reach this goal
  - Define and compare the physics potential for Lepton Colliders with a common benchmarks and simulation tools
  - Evaluate machine backgrounds & impacts on physics capabilities
  - Support developing detector concepts for Lepton Colliders
  - Establish a list of critical R&D required and coordinate LC related detector R&D as part of a national generic R&D program

LCPF roles

- Develop the essential elements of the LC physics program for future colliders in the context of LHC results
  - » LCPF should identify critical physics measurements for detailed study and full simulation
  - » Standard benchmarks, studied quantitatively, & documented, will enable a systematic comparison of the LC options
  - » Focus near-term on case for Higgs Factory
- Coordinate a program that is responsive to changing needs and opportunities such as LHC discoveries
  - » Physics discoveries, accelerator technology advances, or developing global project plans
- Facilitate close collaboration between the groups focusing on physics issues, detector design & development, and the machine/detector interface

LCPF roles

- Organize workshops, including participation in the established global linear collider workshops & CSS2013
- Coordinate evaluation of detector concepts for each LC using a set of well documented, common simulation tools
- Formulate a process by which the R&D needs are identified and prioritized, and seek funding
- Support regional and global bodies, including the LCSGA, LCO and LCB
  - » Serve the LCSGA as it principal physics and detector subgroup

Possible LCPF structure

- The LCPF should be administered by a Steering Committee, consisting of:
  - Director and members from key institutions with lepton collider interests
  - Membership should represent all constituents of the lepton collider physics and detector community within the Americas
- Options for establishing LCPF and agreeing on charter
  - Approached DPF Executive in March, but DPF was worried about precedent for sponsoring community organization
  - Plan now to coordinate among the HEP Labs on developing a charge letter to current ALCPG leadership
    - Relevant other parties to be consulated include LCSGA, DPF, DOE, & NSF
  - Framework is envisioned to function for the next 3 years

LCPF and CSS2013

- LCPF in the context of CSS2013
  - Leadership for Energy Frontier & Facilities Frontier working groups being established
  - Some number of subgroups being established, several involving future lepton collider opportunities
- LCPF could provide:
  - Advice on subgroup leadership & organization
  - Be a point of contact with the national & international Lepton Collider efforts and the CSS2013 organizers
  - Support simulations and community engagement in preparation for Snowmass

Summary

- LHC discovery offers an exciting physics opportunity
  - » Converging on a plan and priority across all regions a crucial ingredient to capitalizing on this opportunity
  - » ILC design most mature and ready to execute
- In the US, the best strategy remains a plan to evolve the ALCPG towards a broader lepton collider agenda
  - » Higgs Factory a key near-term part of this broadened agenda
  - » Interfaces to broadened agenda internationally for LCO
  - » CSS2013 a crucial regional part of the planning and prioritization process