US ‘Snowmass’ Study – CSS 2013

M. Ross

‘bottoms-up’ process managed by APS-DPF

CSS 2013 Update given to HEPAP yesterday

J. Rosner

http://science.energy.gov/~/media/hep/hepap/pdf/march-2013/Full_PresentationCFworkshopRosner.pdf

SNOWMASS PROCESS

J. Rosner – HEPAP – Mar. 11, 2013

Higgs signal, $\theta_{13} \neq 0 \Rightarrow$ Update long-range aspirations

Goals: (1) Help get our (HEP's) house in order regarding our long-range (10-20 Year) plans. (2) Communicate the opportunities for discovery in high-energy physics to the broader scientific community and to the government.

Last general Snowmass meeting was in 2001

Web page: `http://www.snowmass2013.org/`

- **Relevant Groups:**
  - Energy Frontier
  - Frontier Capabilities ←
- **Relevant Working Groups within 'Capabilities':**

  WG2: Energy Frontier Lepton and Gamma Colliders

  WG6: Accelerator Technology Test-beds and Test Beams (NS)

2: Energy Frontier Lepton and Gamma Colliders

Conveners:

- Markus Klute (MIT) / Marco Battaglia (UCSC), Kaoru Yokoya, Mark Palmer.
- Workshop: April 10, 11 at MIT
- https://indico.cern.ch/conferenceTimeTable.py?confId=233944#20130410.detailed

- **WG2 Charge:**

WG2 Questions to address (1):

1. What the required parameters and key characteristics of lepton / gamma colliders in the Higg's factory range? with physics capabilities far beyond the LHC? at what cost? What are the possible configurations of a lepton / gamma collider Higgs factory that would use existing accelerator infrastructures? How might such a facility be upgraded in energy and / or luminosity? ***How does a Higgs factory scale cost-wise to a TeV scale linear collider?*** Can the luminosity of the collider scale with E^2?
2. What are parameters of ~ TeV scale lepton / gamma colliders? Which technical approaches are naturally linked and how can they be used in conjunction with each other? How does performance scale with energy? What are the most important luminosity limitations? ***What is the cost scaling with cm energy?***

WG2 Questions to address (2):

3. Can muons colliders have a role as a Higgs factory on a 10 to 15 year horizon? What are the limitations due to site-boundary radiation control and collider background for a TeV-scale muon collider?
4. For colliders from the Higgs to TeV scale, what is the characteristic power consumption and how does it scale with energy and luminosity? What is the characteristic footprint?
5. What are the critical technical challenges for lepton / gamma / muon colliders as a function of collider energy? What R&D must be done to address them and what are key demonstrations and milestones? What is the timescale and what are the pacing factors? What infrastructure is required?
6. What accelerator R&D is required to realized the physics opportunities in these areas? What are the anticipated cost drivers in the research program?
7. Are there special opportunities that could be provided by the beam characteristics of wakefield accelerators? On what time scale? What is R&D path? Is there a US leadership scenario? (This will be handled in detail in group 6.

WG2 Questions to address (3):

8. Are there technology applications beyond energy frontier science that motivate development?

Schedule and Process:

- General call for reports, opinions, white papers was issued 02.20. (posted to today's TB indico)
- Deadline 04.01. 2 to 3 pages summarizing R & D and plans (all Capabilities WG's)

- (WG2 conveners will produce a 30 page summary of the April MIT workshop.)
- There will be a writers workshop in late June to combine input from all 6 Capabilities WG into a 30 top-level summary to be submitted at 'Snowmass'

LCC ILC-TB Issues (suggested)

- **Cost information has been requested and will be discussed**
  - What should we show and how?
- **WG6 (Accelerator Technology Test-beds and Test Beams) met 2 weeks ago**
  - See Rubin and Geng
  - https://indico.fnal.gov/conferenceDisplay.py?confId=6326
- **What documentation should we submit to WG2 and WG6?**
  - schedule needed; B. Foster has agreed to help

Interaction with Energy Frontier

- **M. Peskin and C. Brock are the conveners of the Energy Frontier group**
- **They have enlisted key international contributors who will attend pre-meetings:**
  - 04.03-04.06 BNL and 06.30-07.03 UW Seattle

→***the Groups are quite strongly separated*** ←

- **(Minneapolis meeting is intended for cross-communication)**
- **ILC – accelerator side international attendance may be helpful**
  - 07.29 to 08.06