What to expect from Snowmass 2013

DOE has divided particle physics into three “frontiers”:

– Energy Frontier

- Higgs
- precision EW
- top
- BSM (new particles, forces, dimensions)
- QCD
- flavor mixing / CPV (at high-energy machines)

– Cosmic Frontier

- includes dark matter

– Intensity Frontier

- includes neutrino program
- includes next-gen B-factories

“Snowmass” planning process initiated by DPF in anticipation of need for community input to funding agencies.

Webpage: `www.snowmass2013.org`

Charge of the Energy Frontier group:

- Investigate major areas of particle physics relevant to possible high-energy accelerators: current state, opportunities for future discoveries

- Explore motivations for possible energy frontier accelerators that may complement LHC

Conveners: Chip Brock (Michigan State), Michael Peskin (SLAC)

Charge of the Higgs subgroup:

- summarize current Higgs knowledge (incl. extra Higgs states)

- determine the theory motivations to explore Higgs properties to high precision — what do we learn?

- organize a series of simulations to evaluate Higgs measurement capabilities of the range of possible future accelerators

Conveners: Sally Dawson (BNL), Andrei Gritsan (Johns Hopkins), Heather Logan (Carleton), Jianming Qian (Michigan), Chris Tully (Princeton), Rick Van Kooten (Indiana)

Meetings 2013

- Jan 14–15 at Princeton: Higgs working group

- April 3–6 at Brookhaven: Energy Frontier meeting

- May 29–31 at KITP: Theory meeting together with Cosmic and Intensity Frontiers

- June 30–July 3 on west coast (location TBD): Energy Frontier meeting

- Final "Snowmass" meeting: July 29–Aug 6, Minneapolis

Mailing list: `snowmass-higgs@slac.stanford.edu`

To subscribe: send email to `listserv@slac.stanford.edu` with `subscribe snowmass-higgs` in msg body

January 14–15 workshop at Princeton

Agenda: `http://physics.princeton.edu/snowmass`

– Summarize current status, report on studies in progress/planned
- for LHC, future accelerators (including HL-LHC), theory

– Lots of time for discussion to identify gaps in theoretical and experimental studies
- what else should be done to understand physics capabilities
- what should be computed from theory side / what do we learn

– We plan to have remote access available (flavor TBD)

Some questions we've thought of:

* What are the ultimate precision "floors" for each machine?
- systematics, backgrounds

* What precision is needed to draw useful conclusions in various theoretical contexts?

* What luminosities/machines do we need to make a convincing discovery of new physics in the Higgs sector in various theoretical scenarios?
- want 5σ! 5% deviation $\rightarrow$ need 1% measurement
- want to measure correlations $\rightarrow$ identify NP
- answering this requires a lot of theory/model input

* Are there interesting Higgs observables that have not yet been studied?