

Snowmass and P5

SAC Meeting, December 17, 2018

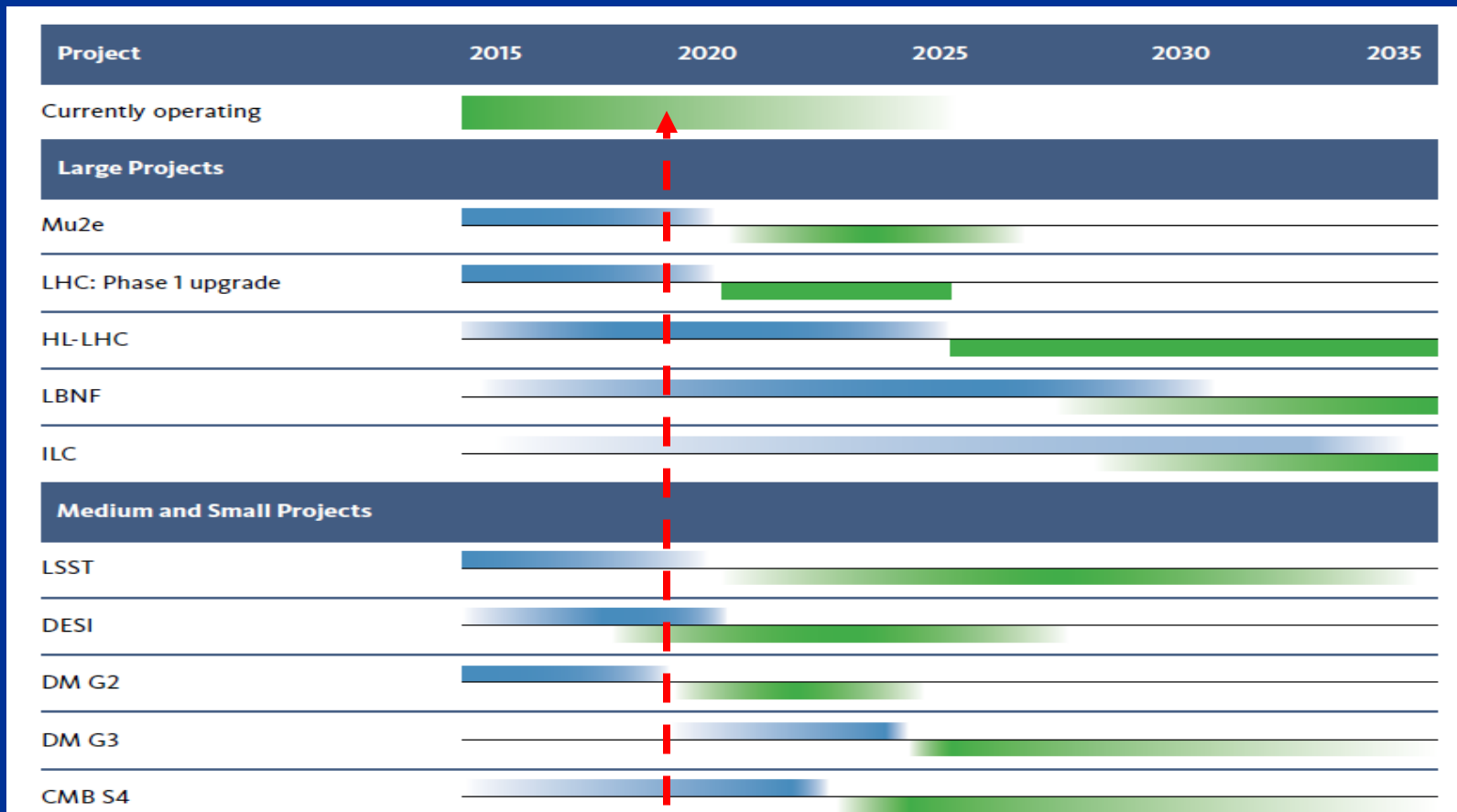
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Snowmass Tradition

- Snowmass planning events started in 1980's
 - Main ~3 weeks event happened in Snowmass Village near Aspen in Colorado
 - Plan longer term future options for the field
- Many ideas/developments happened at Snowmass
 - First 2-3 days plenary to define overall directions and working groups
 - Then ~2 weeks of actual work by various working groups
 - Then summaries of the results/developments at the end of the meeting
- Many options discussed/firmed at Snowmass which happened every 3-5 years
 - SSC, Tevatron upgrades, LHC, ILC and others
 - Working groups organized based on interest/experience
 - Less on affiliation/current activities
- Organized by APS/DPF
 - With active participation from various laboratories/universities
- Starting with latest 2013 Snowmass format of "Snowmass" changed
 - Longer process of about a year of short meetings
 - Final meeting of about a week long
 - No active working groups activities during main meeting
 - Not physically at Snowmass village

Snowmass and P5

- Since 2003 Snowmass is followed by P5 project prioritization panel
 - To provide specific recommendation to funding agencies
- 2014 P5 provided such list of future projects
 - With ~10 years time horizon
 - Pretty well implemented by community and funding agencies



Looking Forward

- Current construction program is expected to be completed by ~2026
 - Taking into account substantial R&D needed for future projects planning well ahead is critical
- Other regions are actively developing their programs
 - European Strategy 2019-2020
 - Japan – ILC and Hyper-K – 2019
 - China – CEPC – 2019-2021
- Important to have input on both science and technology for productive discussions
 - Timing of Snowmass/P5 is important
 - Can't wait for too long – risk lack of new facilities critical for the field
- Current plan for next Snowmass
 - Start in ~2020
 - This brings next P5 in ~2022

Big Picture

- Energy frontier
 - Higgs factory
 - ~100 TeV pp collider
 - Particles with masses ~50 TeV, distances up to 10^{-19} cm
- Accelerators and magnets
 - Critical to develop innovative, less expensive technologies
- Intensity frontier
 - Neutrinos program has excellent chances for discoveries
 - Results from NOvA, JUNO, DUNE and other experiments for future directions
 - Rare decays and other experiments are important
- Computing frontier
 - Larger and larger data sets – well beyond “flat” budget
 - New ideas (limits of technology been reached) are critical
- Cosmic frontier
 - More accurate, wide spectrum range surveys
 - Multi-messenger developments - gravitational waves/optical/neutrinos
- Instrumentation frontier
 - New detectors for all frontiers are important
 - Modern facilities for detectors production and training of personnel

Preparations for Next Snowmass

- In the “new” Snowmass format
 - **Proposals have to be developed in advance**
 - And not at the meeting itself
- Good proposal includes
 - **Physics goals**
 - **Technical implementation description**
 - **Cost estimate and schedule**
- To develop a proposal at least a year of concentrated efforts are required
- With Snowmass coming in ~2020 preparations for new proposals have to start soon
 - **Projects already listed in previous P5 plan and under execution are not expected to be part of the discussion**
 - **While substantial upgrades, such as Mu2e-II, are to be discussed**
 - **Potentially projects with substantially updated scope**
 - **Specifics about some projects, such as ILC, should be clarified**
- Examples
 - **ATLAS/CMS upgrades beyond HL-LHC**
 - **FCC at CERN**
 - **Various cosmic frontier experiments**
 - **Participation in colliders in China**

Preparing for Snowmass

- Active planning stage for Snowmass has to start soon
 - In 2019
 - Some activities are already in progress
- Close collaboration between all US labs/universities with input from international community is important
- Will require planning and dedicated resources
 - Having proposals developed requires efforts and time
- We should start efforts on planning and participating in preparations
 - Organization and resources
 - While leaving freedom for each scientist to define areas of participation