



# The Fermilab accelerator physics program in the next decade

Introduction to presentations for the  
BNL P5 Meeting by

Steve Holmes  
Andreas Kronfeld

## Planning Process

- Our community has identified many exciting, well-motivated, new or upgraded experiments to pursue
- The Snowmass Outcome
  - Hundreds of pages of white papers and reports
  - General support and enthusiasm from all frontiers for all frontiers
- Funding is not available to do everything
- There are three regions internationally which host major facilities : Europe, Asia and the Americas
  - Large programs are expensive and will require global planning and collaboration

**Need to plan with a global view of the future**

# Summary Presented to P5 in November

- **We recommend the following elements as priorities for the U.S. Particle Physics Program**

- U.S. High Energy Physics community continues to play a leading role in LHC operations and upgrades
- **Fermilab hosts a world-class accelerator-based neutrino program**
  - **Full scope LBNE, deep underground with >1MW beam power**
  - **Active program in short baseline LArTPC experiments**
- The next generation rare process experiments will take place within this decade
- Continue to explore new particles and forces with a community selected set of experiments in the cosmic frontier
- Participation in the ILC as an international partner when the concept matures to the appropriate level
- Plans for an upgrade of the accelerator complex to deliver multi-megawatt beam power are developed
- Work with the world community on longer term accelerator technology options

**Requires major investments by non-DOE and international partners**

## In the interim....

- **We recommend the following elements as priorities for the U.S. Particle Physics Program**

- U.S. High Energy Physics community continues to play a leading role in LHC operations and upgrades
- Fermilab hosts a world-class **accelerator-based neutrino program**
  - Full scope LBNE, deep underground with >1MW beam power
  - Active program in short baseline LArTPC experiments
- **The next generation rare process experiments will take place within this decade -> g-2 and mu2e at FNAL**
- Continue to explore new particles and forces with a community selected set of experiments in the cosmic frontier
- Participation in the ILC as an international partner when the concept matures to the appropriate level
- Plans for an upgrade of the accelerator complex to deliver multi-megawatt beam power are developed
- Work with the world community on longer term accelerator technology options

Requires major investments by non-DOE and international partners

## Elements for Ensuring Success

- The U.S. particle physics community has a strong commitment for global programs
- Fermilab and the U.S. neutrino community commit to focus their efforts on this program
- Demonstrate that we are reliable partners by delivering beam to running experiments and remaining committed to projects that are already underway
- Attract international project partners to our neutrino program within two years
- **Develop a coherent, affordable plan for increasing beam power to neutrino targets**

# The path forward ....

- **We recommend the following elements as priorities for the U.S. Particle Physics Program**

- U.S. High Energy Physics community continues to play a leading role in LHC operations and upgrades
- Fermilab hosts a world-class **accelerator-based neutrino program**
  - Full scope LBNE, deep underground with >1MW beam power
  - Active program in short baseline LArTPC experiments
- The next generation rare process experiments will take place within this decade -> **g-2 and mu2e at FNAL**
- Continue to explore new particles and forces with a community selected set of experiments in the cosmic frontier
- Participation in the ILC as an international partner when the concept matures to the appropriate level
- **Plans for an upgrade of the accelerator complex to deliver multi-megawatt beam power are developed**
- Work with the world community on longer term accelerator technology options

Requires major investments by non-DOE and international partners

## Protons for Neutrinos

- We are reorienting the Project X program to have a goal of delivering  $>1\text{MW}$  on day one of LBNE operations
- To achieve  $>1\text{MW}$  an upgrade to the proton complex is required
  - Start by upgrading the linac
  - Develop high power target capability
  - Build a platform for multi-megawatt future

Details under development

To be presented at the BNL P5 Meeting

## Today's Presentations

- Steve Holmes
  - Fermilab Proton Accelerator Complex and Opportunities
- Andreas Kronfeld
  - Overview of Physics with High-intensity Proton Beams