Snowmass
Rare and Precision Frontier

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on behalf of RPF Conveners
Frontier Focus

- We’re the “Intensity Frontier” with neutrinos in their own Frontier
- Rare Processes, precision measurements
- Lots of overlaps with other frontiers
- I’ll focus on ideas tightly coupled to Fermilab
- I will leave things out to minimize my talking time
Topical Groups

- Weak Decays of $b$ and $c$
  - LHCb/BELLE-II and CMS measurements
- Weak Decays of Strange and Light Quarks
  - kaon experiments; REDTOP; universality
- Hadron Spectroscopy
  - tetraquarks, glueballs….
- Baryon and Lepton Number Violation
  - $n\bar{n}$ oscillations, proton decays (of course coupled to neutrinos)
Topical Groups II

• Fundamental Physics in Small Experiments
  • g-2 goes here! also EDMs, possible collaboration with AMO world

• Dark Sector at High Intensities
  • accelerator-based DM: LDMX, CODEX-b, FASER, etc

  • this is a rapidly growing field and (personal opinion) we as a community will have to think about this as part of Snowmass/P5: implications for both FNAL and US program as a whole
Topical Groups III

• Charged Lepton Flavor Violation
  • Mu2e-II, $\mu \rightarrow e\gamma, \mu \rightarrow 3e$
  • and $\tau$ processes as well
  • universality measurements split across frontiers; some here, others in other TGs
  • disclaimer: this is what I do, so I’m biased
Big Issues We See for our Community

• **do we want to build a new muon program using PIP-II?**

• definite interest in CLFV from PSI for next-gen experiments in $\mu \rightarrow e\gamma$, $\mu \rightarrow 3e$ after current round, combined with whole new type of Mu2e experiment

• couples to wide variety of other muon experiments (e.g. muonium-antimuonium)

• coupling to muon collider and neutrino factories

  • problem of targeting high-intensity proton beams in solenoids
Fermilab Community Has Done a Lot Already

- Workshop on Potential Fermilab Muon Campus and Storage Ring Experiments
  - [https://indico.fnal.gov/event/48469/program](https://indico.fnal.gov/event/48469/program)

- Booster Replacement Studies
  - [https://indico.fnal.gov/event/23352/](https://indico.fnal.gov/event/23352/)

- All of these fit in our Snowmass Rare and Precision Frontier

- **Snowmass is a chance for you to make a difference**
  - [https://snowmass21.org/rare/start](https://snowmass21.org/rare/start)