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, $\mu \to e\gamma, \mu \to 3e$
  - and τ 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
- Booster Replacement Studies
  - 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