



**Physics and Phenomenology:  
What's next?  
General discussion**

# Questions

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- Do we want a single integrated physics story for FCC-ee, pp, and ep?
  - Seems natural for some physics targets, e.g. Higgs
  - To what extent is the ep physics case “in service of” the pp?
  - To what extent does ee “foreshadow” new states available at pp, versus covering differing parts of the BSM parameter spaces?
  - Should we think about an ee, ep, pp staging plan with physics milestones?

# Questions for FCC-pp

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- What are the main detector issues/trade-offs for FCC-pp?
  - Do we optimize for detection of very heavy particles?
  - What about boosted objects? (granularity etc)
  - Lower mass exotics? (triggers, scouting etc)
  - Higgs precision measurements? Which ones?

# Questions for FCC-pp (and FCC-ee)

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- What are the top  $\sim 3$  flagship physics targets for FCC-pp?
  - It's good to have 50 things that you might do, but also need a high-level story
  - For LHC the story was Higgs + SUSY (as a proxy for the new physics of EWSB)
  - For FCC-pp I have heard several candidates:
    - Direct probe of the Higgs sector and EW phase transition (also with FCC-ee)
    - Test of naturalness
    - Dark matter
    - Search for new heavy particles
    - Getting closer to the “flavor scale”
    - SM in a new regime

# Questions for FCC-pp

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- How do we optimize the energy for FCC-pp?
  - Just accept 100 TeV as the largest round number we can imagine doing?
  - What about 30, 40, 60, 80 TeV?
- How do we optimize the luminosity for FCC-pp?
  - Staged approach, with different flagship physics at each stage?
  - What detector limitations to fold in?

# Questions for FCC-pp

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- More focus on new physics objects and SM at high energies?
  - Boosted everything
  - Resumming W,Z radiation?
  - Neutrino jets?
  - Are jets really the best physics objects?