

High Energy Colliders

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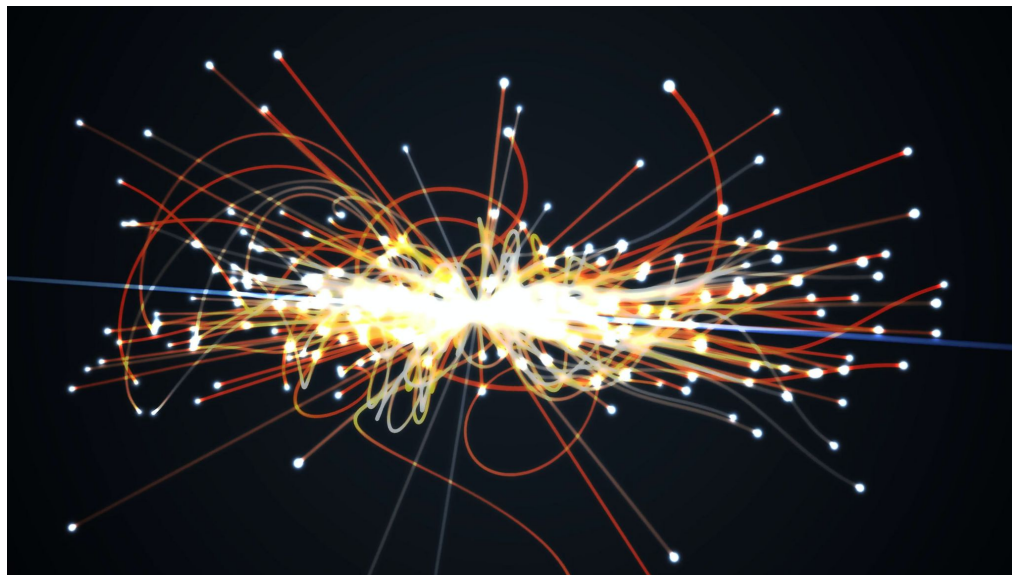


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Roadmap for today

- Our goal for this session is to discuss unique contributions to the energy frontier from LBNL.
- Plan:
 - Very High Energy $e^+e^-/\gamma\gamma$ colliders
 - Low energy e^+e^- collider demonstrator (on site??)
 - Hadron colliders
 - Muon colliders

(Very) High Energy e^+e^- and gamma-gamma Colliders

- The physics case of a Higgs factory (ILC, FCC, CEPC, C^3) and multi-TeV (CLIC) have been well-fleshed out.
- It is clear that the main technologies proposed for the above e^+e^- colliders can't go higher than few-TeV on any realistic budget
- After that, we need new accelerator technologies: plasma accelerators?
- An exciting possibility for achieving high energy using leptons (and bringing the energy frontier back to the US?)
- What is the physics case? What are the requirements on energy/lumi/polarization?
- We need R&D now to be ready for a post-ILC/FCC/etc. collider.
- Snowmass cases needed to integrate physics interest and accelerator options to motivate R&D at high level up to and potentially beyond 15 TeV

Low energy demonstrator

- Plasma accelerator technology is becoming rapidly mature. This could be a candidate for a VHE collider (or also just HE).
- Given that no plasma collider has ever been built, we need a low-energy demonstrator. If this is tens of GeV, it would be the combination of a couple of stages on either side and could be potentially built on site (!)
- We'll discuss the specs of such a collider in the session
 - ... as well as a potential physics case!
- If enough interest, this could be a good target for a white paper!

Hadron colliders

- The FCC-hh has an extensive program building up
- We'll talk about magnets (an area of expertise from LBNL) and a bit about physics

Muon Colliders

- There is a renewed interest in muon colliders in this Snowmass
 - An exciting possibility for achieving high energy using leptons (and bringing the energy frontier back to the US?)
 - As with plasmas, a new accelerator technology for energy frontier physics beyond near term machines like ILC using leptons
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- Relatively uncovered by last P5, European Strategy Update
 - Muon collider forum is coordinating physics case and accelerator options, strong LBNL involvement - integrated white paper under development
 - We'll talk about the accelerator, detector design/reconstruction, and physics

Let's get started!