
LBL Forum on Future Colliders

Timon Heim
Simon Knapen
Simone Pagan Griso
Jens Osterhoff

August 14th 2024



Current/Upcoming Conferences

Just happened:

- US Muon Collider Meeting
 - Fermilab, August 7th-9th, <https://indico.fnal.gov/event/64493/>)
- Advanced Accelerator Concepts Workshop (Jul 21 - 26, in Naperville near Fermilab and Argonne. <https://indico.fnal.gov/event/59618/>)

Coming up:

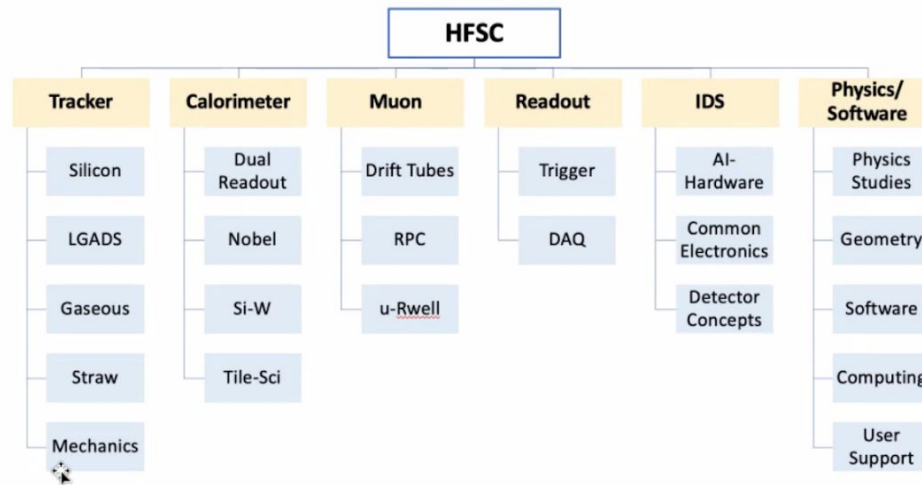
- ECR & Muon Collider, Aug 28 2024, <https://indico.cern.ch/event/1422393/>
- Muon Cooling Demonstrator Workshop, Oct 30 - Nov 1st 2024, Fermilab <https://indico.fnal.gov/event/64984/>
- CPAD 2024, Nov 18-22 2024, <https://indico.phy.ornl.gov/event/510/>
- ECFA Workshop on e+e- Higgs Factories, 9-11 Oct 2024 <https://indico.in2p3.fr/event/32629/>
- ICFA mini-workshop on beam-beam effects in circular colliders, 2-5 Sep 2024 <https://indico.cern.ch/event/1344947/overview>

HF Steering committee

US Higgs Factory steering committee for Physics & Detector study

- recent call for convener nominations

Updated L2/L3 Structure



The committee chairs visited LBL on Aug 6th

- meeting with lab physical science area management, Physics division leadership, ATLAS and Theory groups (including postdocs and students)
- possible synergies with EIC

Analogous committee is being setup for the accelerator side, more news soon

Useful mailing lists

We'd like to collect a list of useful mailing lists and websites on future collider activities.

Please help us contributing to this list!

https://docs.google.com/document/d/1YEKxuk2cMWgVnsZGvHHjDMpHQ5BAduxmTRkmj_IOUIs/edit?usp=sharing

Useful Mailing Lists & Websites	
- General	
Muon Collider	General
General	• 2024 European Strategy: https://europeanstrategyupdate.web.cern.ch/welcome
Accelerator	•
Detector	Muon Collider
Physics	
FCC-ee	General
General	
Accelerator	
Detector	
Physics	Accelerator
FCC-hh	
General	Detector
Accelerator	• IMCC <u>Physics&Detector</u> MUONCOLLIDER-DETECTOR-PHYSICS@cern.ch
Detector	
Physics	
ILC	Physics
General	• IMCC Physics MUONCOLLIDER-DETECTOR-PHYSICS@cern.ch
Accelerator	•
Detector	
Physics	

A New Study for a 10 TeV pCM wakefield collider

6.4.1 Particle Physics Accelerator Roadmap

P5 Report

Wakefield concepts for a collider are in the early stages of development. A critical next step is the delivery of an end-to-end design concept, including cost scales, with self-consistent parameters throughout. This will provide an important yardstick against which to measure progress along this emerging technology path.

In responding to the P5 call, we propose a study with the following features:

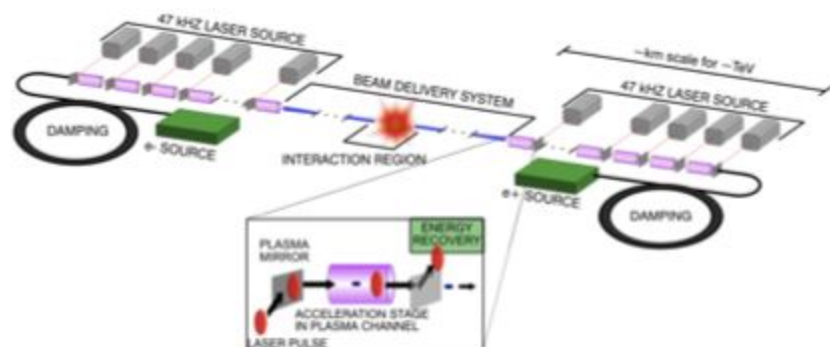
- Self-consistent beam parameters.
- End-to-end concept with reduced models where appropriate.
- Environmental impact considered throughout.
- Close partnership with HEP theorists and experimentalists to define a physics program with commensurate machine and detector parameters.
- Community-driven design process. **This study relies on your input and collaboration!**

The study will yield a unified design concept that points a path forward.
Emphasize possible benefits to the broader accelerator community.

Our Suggestion for a Working Group Structure

Working groups are connected to collider components/physics:

- Sources (incl. damping rings)
Drivers
 - Laser
 - Beams - SWFA
 - Beams - PWFA
- Linacs (including staging)
 - LWFA
 - SWFA
 - PWFA
- Beam delivery system
- Beam-beam interactions
- Beam diagnostics
- Machine-detector interface
- HEP detector
- HEP physics case
- Environmental impact



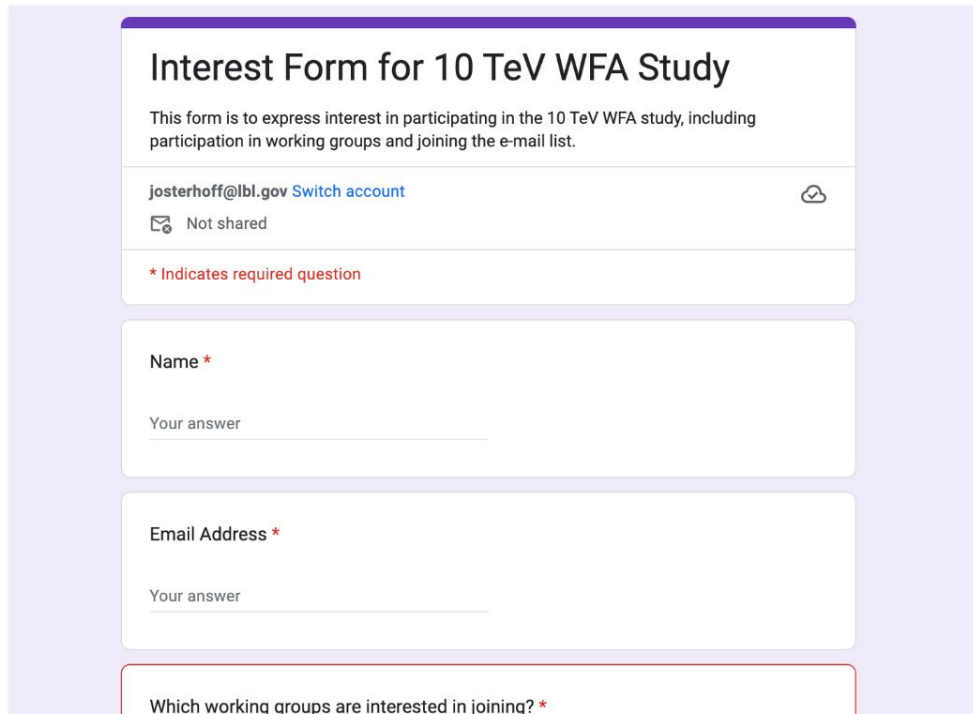
Green = Advanced acc. technology independent
Orange/blue/purple = technology specific
Red = HEP and broader community

The community will decide if this is the appropriate set of working groups.

Questions? Suggestions? Feedback?

Your input is vital to the success of the study

- We ask you to express your interest / nominate conveners / comment



The screenshot shows a Google Form titled "Interest Form for 10 TeV WFA Study". The form is for expressing interest in participating in the 10 TeV WFA study, including participation in working groups and joining the e-mail list. The form is currently filled out by the user "josterhoff@lbl.gov". The form includes a "Name" field with a red asterisk indicating it is required, and an "Email Address" field also with a red asterisk. The "Name" field contains the text "Your answer" and the "Email Address" field contains "Your answer". Below these fields is a question: "Which working groups are interested in joining? *".



link will also be provided by email

5

<https://docs.google.com/forms/d/1PAPKeaLVKSSTG1Ey9arVo2Eup-R7weWLIg4gnBNbhlc/edit?ts=66a07716>

Agenda

Today

15:30 → 15:40 **News**

Speakers: Jens Osterhoff, Simon Knapen, Simone Pagan Griso, Timon Heim

15:40 → 16:20 **Challenges of muon cooling for a future Muon Collider**

Speaker: Tianhuan Luo

Next Meetings

- we can have a few summary of recent workshops (including FCC week in SF). Useful? we should keep them brief
- how to structure more informal discussions and reports?
 - we'd like to see more contributions that are geared towards open discussions and open ideas
 - please reach out about topics you'd like to see! You can send us an email or write them in this [google doc](#).