

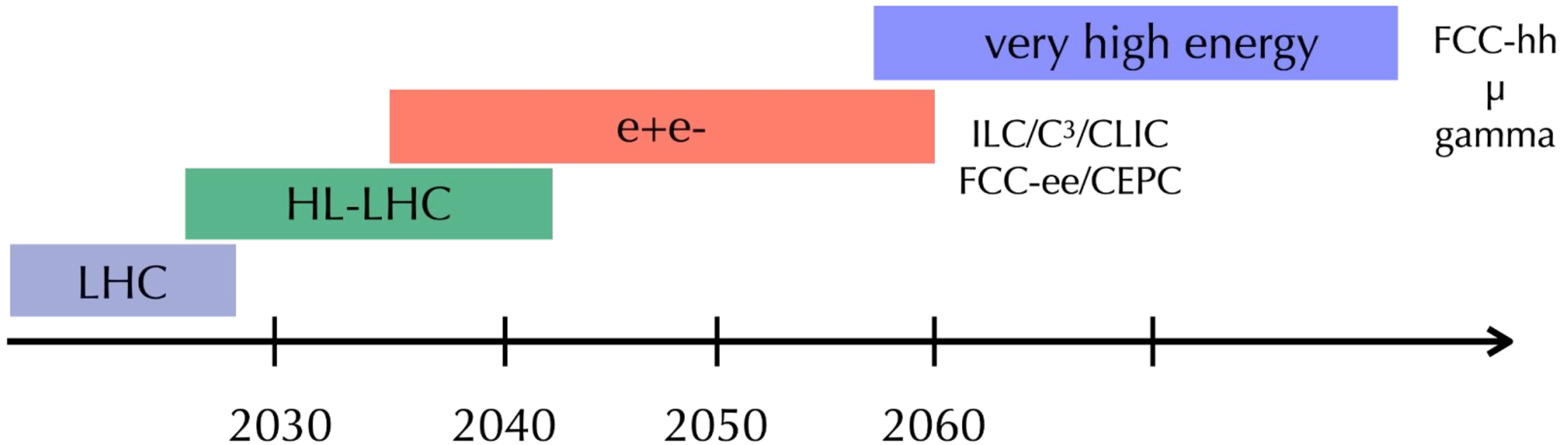
Welcome!

C³ workshop

Emilio Nanni and Caterina Vernieri

October 13, 2022

What's Next for the Energy Frontier?

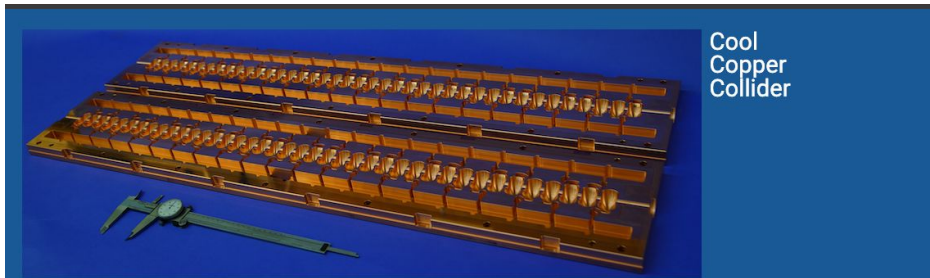


Physics goals beyond HL-LHC:

1. Establish Yukawa couplings to light flavor \Rightarrow needs precision
2. Establish self-coupling \Rightarrow needs high energy

Recap from Snowmass

C³ on the list of possible Higgs factories



1 November 2022
America/Los_Angeles timezone

Overview

Timetable

Registration

Participant List

Next workshop October 13-14, 2022 at SLAC - stay tuned for info in the coming weeks.

A program to build a lepton-collider Higgs factory, to precisely measure the couplings of the Higgs boson to other particles, followed by a higher energy run to establish the Higgs self-coupling and expand the new physics reach, is widely recognized as a primary focus of modern particle physics. We propose a strategy that focuses on a new technology and preliminary estimates suggest that can lead to a compact, affordable machine... the Cool Copper Collider (C³).

This page collects the documents about C³ strategy and R&D plans.

Please register if you would like to endorse/support the C³ strategy for Snowmass 2021. With registration your name will be added to the strategy document as an endorser.

[Strategy for Understanding the Higgs Physics: The Cool Copper Collider](#)

[C³ Demonstration Research and Development Plan](#)

[C³: A "Cool" Route to the Higgs Boson and Beyond](#)

There is a distribution list - please let us know if you would like to be added to it to receive updates about C³.

c3-developments@slac.stanford.edu

<https://indico.slac.stanford.edu/event/7155/overview>

A "Retro" Collider Design for a Higgs Factory

October 6, 2022 • *Physics* 15, 155

The Cool Copper Collider is a new proposal for a Higgs-producing linear collider that would be more compact than other collider designs.



Emilio Nanni/SLAC

A prototype version of the Cool Copper Collider. The photo shows the central region where the particle beams would pass.

<https://physics.aps.org/articles/v15/155>



C³ at the Snowmass meeting in Seattle

Good community support during Snowmass

- C³ has been evaluated independently from the Implementation Task Force along with the other proposals
 - Their findings are mostly consistent with our estimates
- Strong engagement and support from EF both during the plenaries and in the report

<https://snowmass21.org/media/energy/snowmass-energy-frontier-report-sep7-2022.pdf>

2734 The US Energy Frontier community proposes to develop plans to site a e^+e^- collider in the
 2735 US. A muon collider remains a highly appealing option for the US, and is complementary to
 2736 a Higgs Factory. For example, some options which are considered as attractive opportunities
 2737 for building a domestic EF collider program are listed below:

- 2738 • A US-sited linear e^+e^- (ILC/CCC) Collider
- 2739 • Hosting a 10 TeV range muon collider **Text from the EF report - sec 2.8**
- 2740 • Exploring other e^+e^- collider options to fully utilize the Fermilab site

Proposal Name	Power Consumption	Size	Complexity	Radiation Mitigation
FCC-ee (0.24 TeV)	280	91 km	I	I
CEPC (0.24 TeV)	340	100 km	I	I
ILC (0.25 TeV)	140	14 km	I	I
CLIC (0.38 TeV)	170	13.4 km	II	I
CCC (0.25 TeV)	150	3.7 km	I	I
CERC (0.24 TeV)	90	100 km	II	I
ReLiC (0.24 TeV)	370	20 km	II	I
ERLC (0.24 TeV)	250	60 km	II	I
XCC (0.125 TeV)	90	1.4 km	II	I
MC (0.13 TeV)	200	3 km	I	II
ILC (3 TeV)	~400	59 km	II	II
CLIC (3 TeV)	~550	42 km	III	II
CCC (3 TeV)	~700	26.8 km	II	II
ReLiC (3 TeV)	~780	360 km	III	I
MC (3 TeV)	~230	10-20 km	II	III
LWFA (3 TeV)	~340	1.3 km	II	I
PWFA (3 TeV)	~230	14 km	II	II
SWFA (3 TeV)	~170	18 km	II	II
MC (14 TeV)	~300	27 km	III	III
LWFA $\gamma\gamma$ (15 TeV)	~210	6.6 km	III	I
PWFA $\gamma\gamma$ (15 TeV)	~120	14 km	III	II
SWFA $\gamma\gamma$ (15 TeV)	~90	90 km	III	II
FCC-hh (100 TeV)	~560	91 km	II	III
SPPC (125 TeV)	~400	110 km	II	III

From Seattle

Similar message from AF



Snowmass 2021

Accelerator Frontier “Message”



On Colliders: We need an **integrated future collider R&D program** to engage in the design and to coordinate the development of the next generation collider projects:

- To address in an integrated fashion **the technical challenges of promising future collider concepts** that are **not covered by the existing *General Accelerator R&D (GARD)* program.**
- To enable synergistic U.S. engagement in **ongoing global efforts (e.g., FCC, ILC, IMCC)**
- **To develop collider concepts and proposals for options feasible to be hosted in the U.S. (e.g., CCC, HELEN, Muon Collider, etc)**

This week

Focus on the plans for demo

- Our R&D demo plan is a 5 years plan towards the completion of the CDR and preparation of the TDR
- We will review of the most recent progress in preparation of the proposal for the demo
 - *discussion is important, please contribute with questions and comments*
- On Friday we will have an overview of various R&D activities for detectors
- Two dedicated discussions at the end of each day about general strategy towards P5.

Thu 13/10 Fri 14/10 All days

Print PDF Full screen Detailed view Filter

Session legend

Demo R&D Social

08:00	Welcome and Overview 40/1-195 - Sycamore, SLAC	Caterina Vernieri 08:30 - 08:45
09:00	C3 Demo R&D Overview and Goals 40/1-195 - Sycamore, SLAC	Faya Wang 08:45 - 09:15
	CLEAR Facility at CERN 40/1-195 - Sycamore, SLAC	Roberto Corsini 09:15 - 09:45
10:00	Break and Discussion 40/1-195 - Sycamore, SLAC	
	LANL C-Band Technology Activities 40/1-195 - Sycamore, SLAC	Evgenya Simakov 10:15 - 10:45
11:00	Radiabeam Ongoing Activities and Future Test Capabilities 40/1-195 - Sycamore, SLAC	Alex Murokh 10:45 - 11:15
	APS Linac and Test Areas 40/1-195 - Sycamore, SLAC	Alireza Nassiri 11:15 - 11:45
12:00	Social: Lunch : cafeteria at SLAC	
13:00	40/1-195 - Sycamore, SLAC	12:00 - 13:30
	Power Conversion - Scandinavia 40/1-195 - Sycamore, SLAC	Douglas Eaton 13:30 - 13:50
14:00	Cryogenics Simulations 40/1-195 - Sycamore, SLAC	Kourosh Shoele et al. 13:50 - 14:10
	Cryomodule Design Experience 40/1-195 - Sycamore, SLAC	Vincent Roger 14:10 - 14:30
	Positron Source Concepts 40/1-195 - Sycamore, SLAC	Spencer Gessner 14:30 - 14:50
15:00	Break and Discussion 40/1-195 - Sycamore, SLAC	
	LLRF and Controls 40/1-195 - Sycamore, SLAC	Ryan Herbst 15:20 - 15:40
	Demo Injector Studies, Transport and Diagnostics 40/1-195 - Sycamore, SLAC	Glen White 15:40 - 16:00
16:00	Discussion on P5 preparation	
17:00	40/1-195 - Sycamore, SLAC	16:00 - 17:00

Timetable

Thu 13/10 Fri 14/10 All days

Print PDF Full screen Detailed view Filter

Session legend

Demo R&D Detector Social

09:00	Overview of current designs and R&D opportunities 40/1-195 - Sycamore, SLAC	Jan Strube 09:00 - 09:30
	Overview current design, ILD perspective 40/1-195 - Sycamore, SLAC	Graham Wilson 09:30 - 09:55
10:00	Timing & 4d tracking 40/1-195 - Sycamore, SLAC	Ariel Schwartzman 09:55 - 10:10
	MAPS developments 40/1-195 - Sycamore, SLAC	Caterina Vernieri et al. 10:10 - 10:25
	banded MAPS developments 40/1-195 - Sycamore, SLAC	Magnus Mager et al. 10:25 - 10:40
	Compact RICH for PID 40/1-195 - Sycamore, SLAC	Jerry Vavra 10:40 - 10:55
11:00	coffee break	
	Background simulations 40/1-195 - Sycamore, SLAC	Dimitris Ntounis et al. 11:20 - 11:40
	Polarimeters / source polarimeters 40/1-195 - Sycamore, SLAC	Morris Swartz 11:40 - 12:00
12:00	Social: Lunch: SLAC cafeteria	
13:00	40/1-195 - Sycamore, SLAC	12:00 - 13:30
	Polarized Sources 40/1-195 - Sycamore, SLAC	Jared Maxson 13:30 - 13:50
14:00	Luminosity Upgrades 40/1-195 - Sycamore, SLAC	Emilio Nanni 13:50 - 14:10
	Injector Linac Structure Design and Test Plans 40/1-195 - Sycamore, SLAC	Ankur Dhar 14:10 - 14:30
	Beam Dump Experiments 40/1-195 - Sycamore, SLAC	Dylan Rankin 14:30 - 14:50
15:00	Break and Discussion	
	Discussion - Teaming Strategy and Proposal 40/1-195 - Sycamore, SLAC	
16:00	40/1-195 - Sycamore, SLAC	15:20 - 16:30

Practical information

Coffee breaks are outside this room

Cafeteria is available for lunch

Dinner tonight is at *Trellis* at 6pm

fixed menu with various options
(60\$ including taxes and gratuity)

<https://www.trellisrestaurant.com/>

Please confirm with me that you're joining.

