

About This Workshop

Young-Kee Kim
University of Chicago
KAIST Visiting Distinguished Scholar

KAIST-KAIX workshop for future colliders
July 8 – July 19, 2019

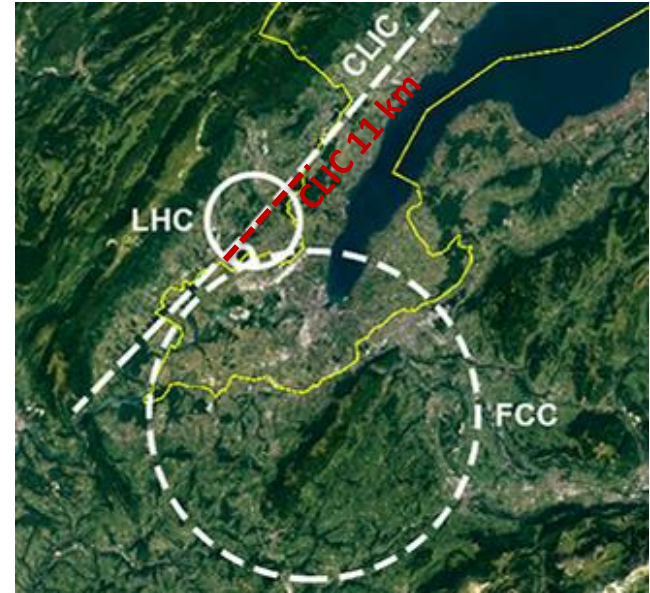
Future Collider Options

Japan



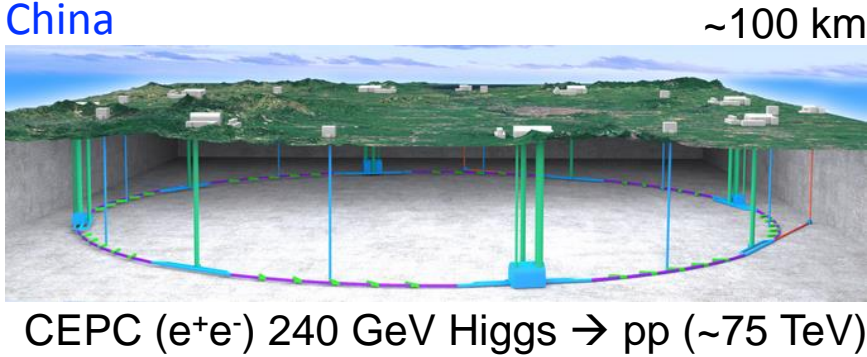
Europe

11 km – 50 km CLIC (e^+e^-)
 380 GeV (Higgs, Top) \rightarrow 1.5 TeV, 3 TeV

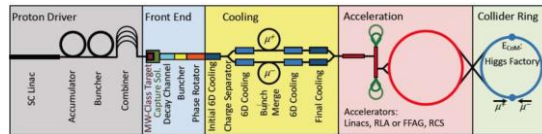


~ 100 km FCC
 e^+e^- (Z factory, 240 GeV Higgs \rightarrow 365 GeV Top)
 ep, pp (~ 100 TeV)

China



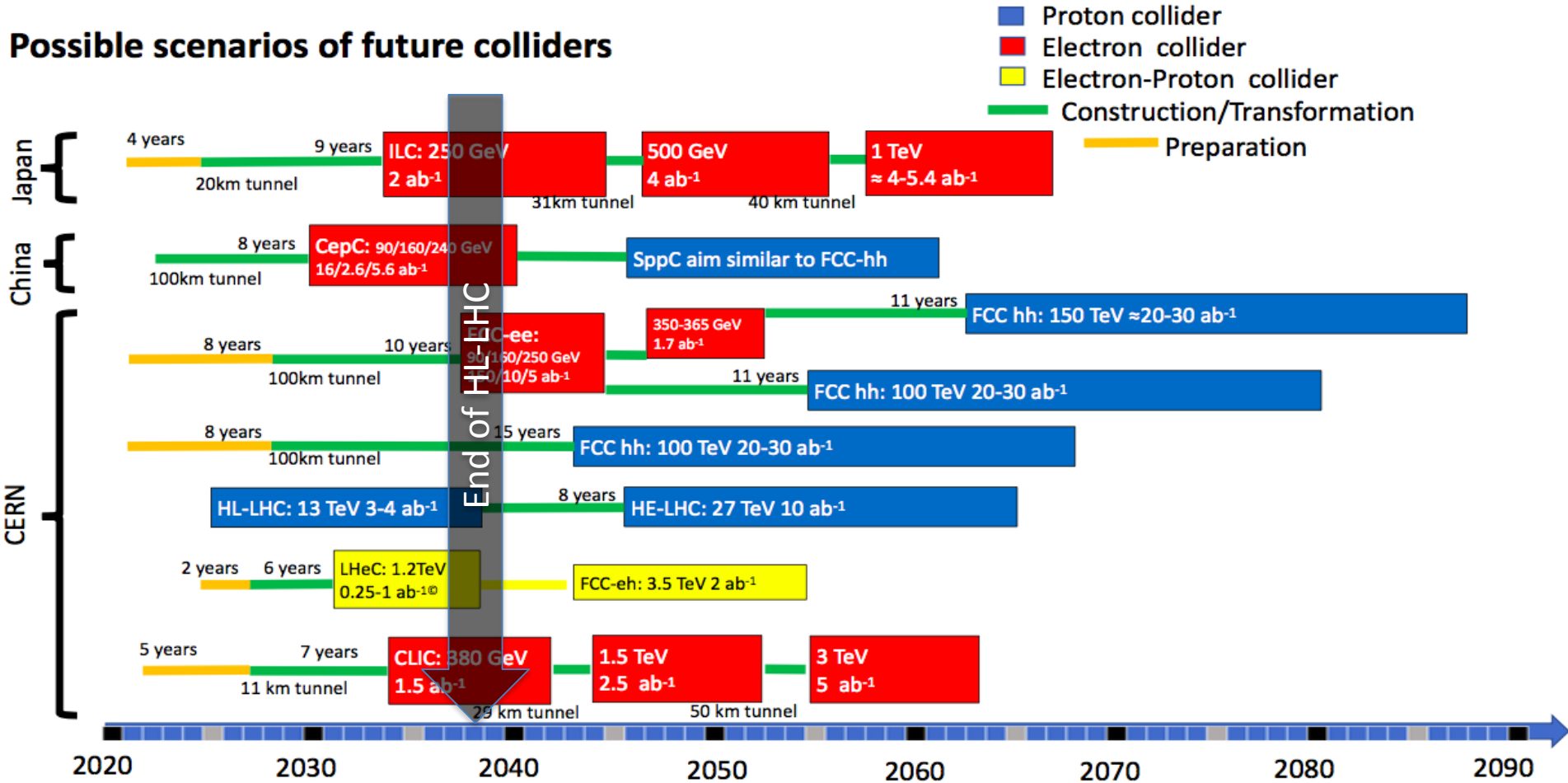
Muon collider:
 Higgs \rightarrow 3~14 TeV
 (currently no funding)



Plasma Wakefield Acceleration-based
 e^+e^- Linear Collider

Future Collider Options

Possible scenarios of future colliders



Other ideas

- FCC-pp at ~40 TeV
- Muon collider
- Plasma Wakefield Acceleration-based e⁺e⁻ linear collider

Brief History about This Workshop

- Invited by KAIST President Sung-Chul Shin as the KAIST Visiting Distinguished Scholar
 - Opportunities to conduct academic activities and research collaboration with KAIST faculty (“and beyond”) during a stay of more than two weeks at KAIST.
- Workshop on future colliders in Korea
 - 2-week workshop on new accelerators for the 21st century at KITP (Kavli Institute for Theoretical Physics) in 2016
 - Conclusion: follow-up workshop in a few years
 - World-wide community’s interest / planning in future colliders / future particle physics (various workshops, meetings, ...)
 - Europe, Japan, China, US, Canada, Latin America, ...
 - International Workshop on the High Energy Circular Electron Positron Collider (CEPC) + CEPC-SppC International Advisory Committee meeting in November 2018
 - Conversation: workshop in Korea

Thank YOU, KAIX!

- KAIX (KAIST Advanced Institute for Science-X) for financial support
 - Proposal by Jonghee Yoo (KAIST) + YKK
- KAIX (Korean government) Rules and Policies
 - Please understand and follow requests by Yeonsoo Seo (KAIX)
- Minho Son (KAIST) + Seung Joon Lee (Korea University) joined the organizing team
- Organizing team for this workshop
 - YKK, chair
 - Jonghee Yoo, co-chair
 - Minho Son, co-chair
 - Seung Joon Lee, scientific program organizer
 - Heewon Kim, admin

Thank YOU!!

- Support for students
 - University of Chicago
 - KAIST's Department of Physics
 - IBS Center for Axion and Precision Physics Research
 - KEK
 - IHEP-China
 - Center for Bright Beams

Workshop Goal #1

- Physics studies
 - Understand what has been done (May 2019 Granada Symposium)
 - Identify areas where we (this workshop) can contribute
 - Perform physics sensitivities (→ continuous work in the future)
- Physics themes and conveners
 - Higgs: LianTao Wang, Zhen Liu, Myeonghun Park, Sunghoon Jung
 - Electroweak: Hitoshi Murayama, Joge de Blas, Suyong Choi, Hwi Dong Yoo
 - QCD: Michelangelo Mangano, Kentarou Mawatari, Jason Lee
 - Flavor physics: Zoltan Ligeti, Emannual Stamou, Tae Jeong Kim
 - Beyond SM: Michelangelo Mangano, Felix Yu, Un-ki Yang, Jae Hyeok Yoo
- Tools (generators and fast simulations)
 - Manqi Ruan, Felix Yu, Zhen Liu, Jorge de Blas, Dan Yu

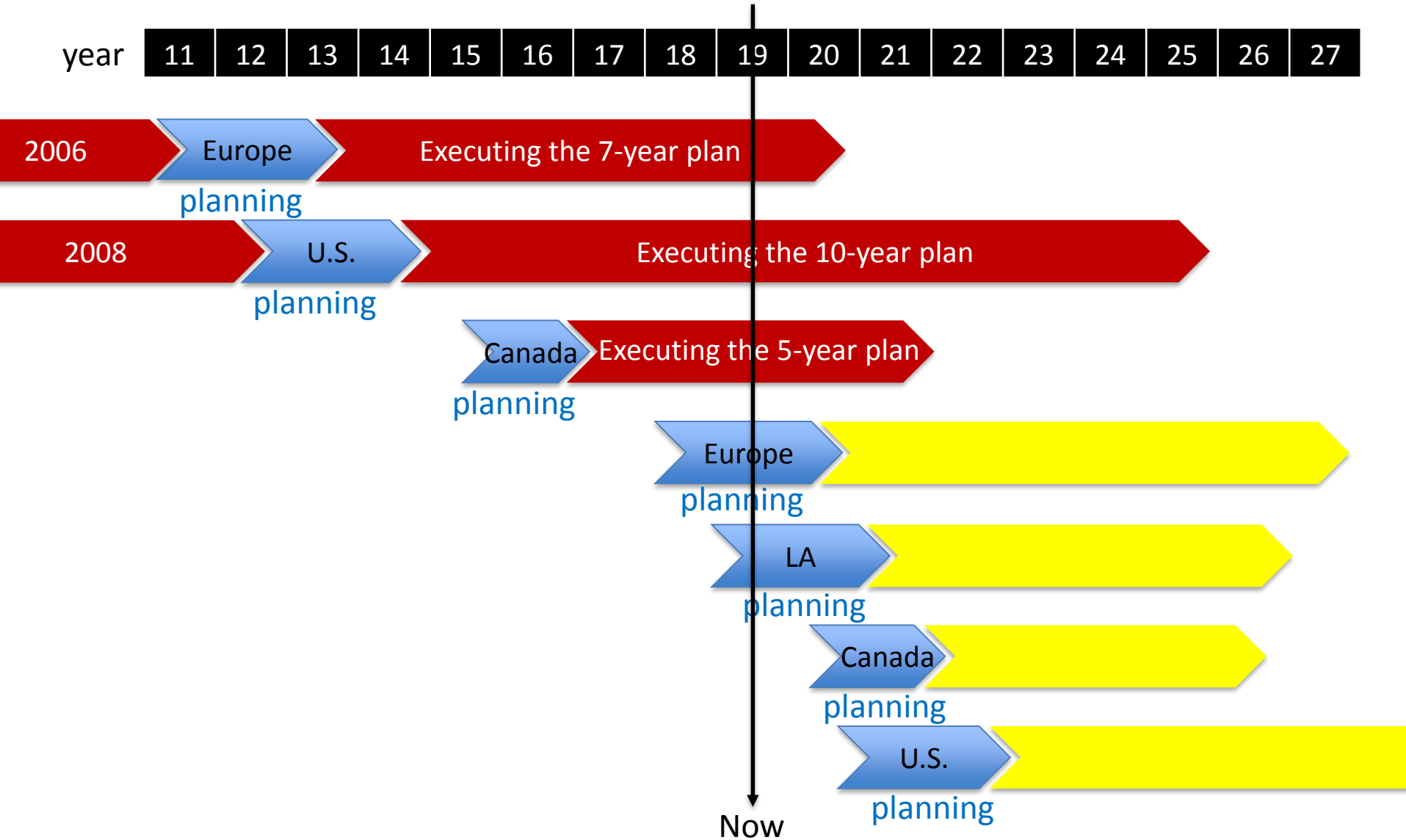
Workshop Goal #2

- Enabling technologies (strengthening collaborations)
 - Identify areas where we can contribute and collaborate
 - “Establish” collaborations
- Themes and conveners
 - Heavy Ion: In Kwon Yoo
 - Accelerator: Moses Chung, Chong Shik Park
 - Instrumentation and Computing: Daniela Bortoletto, Joao da Costa, Jaehoon Yu, Inkyo Park

Workshop Goal #3

- Making Asia's activities (as a whole) more visible and better understood by the world community
 - Exceptions: ILC, CEPC, SuperKEKB/Belle-II, T2K/Hyper-K,
- Is this important?
- If so, what can we do?

Planning and Executing



Program at a Glance

All presentations are plenary

Morning and afternoon breaks will take place at ~10:30-11:00 am and 3:30-4:00 pm, respectively

Working time:

- Designed for participants to learn tools (generators and fast simulation) and perform physics sensitivities.
- Theme meetings could take place during this time

* Postdocs/students (excluding conveners) present their achievement during the workshops (~3' each on July 18)

Other rooms available for working groups (E6-2 1501, 1322, 1323)

	Mon July 8	Tue July 9	Wed July 10	Thu July 11	Fri July 12	Mon July 15	Tue July 16	Wed July 17	Thu July 18	Fri July 19
9:00 am – 12:30 pm	Overview <i>Auditorium</i>	Higgs <i>E6-2 1501</i>	EWK <i>E6-2 1501</i>	Flavor <i>E6-2 1501</i>	Working time	QCD <i>Auditorium</i>	BSM <i>Auditorium</i>	Working time		Theme Summary <i>Auditorium</i>
	Lunch (12:30 – 2:00 pm)									
2:00 pm – 6:30 pm	Overview <i>Auditorium</i>	Joint Accelerator and Heavy Ion <i>E6-2 1501</i>	Working time	Detector Comp. <i>E6-2 1501</i>	Working time (2:00 – 4:00 pm)					Closing <i>Auditorium</i>
			Q/A session for postdocs and students (4:00 – 5:00 pm)							
			Public lectures	Detector Comp. <i>E6-2 1501</i>	Working time (5:00 – 6:30 pm)				*See above <i>Auditorium</i>	
Meeting with conveners at 7pm	Reception at 7pm <i>Sky Lounge</i>	Dinner / Tour of CAPP (Munji)	<i>Sky Lounge</i>	Dinner <i>Faculty Club</i>				Public lecture <i>Sky Lounge</i>	Dinner <i>Sky Lounge</i>	

Tuesday, July 9: Dinner Tour of CAPP

IBS/CAPP, 2019

Center for Axion and Precision Physics Research



IBS/CAPP Prospects



- All the ingredients together, we will reach the DFSZ sensitivity even for 10% axion content in the local dark matter halo.

