



# Report on status and plans

Ties Behnke

8.10.2024

ILD meeting Paris



ILD meeting at CERN, 1-2024

# Today's Schedule

Update of the ILD detector and its systems

ILD and its more global role and contributions

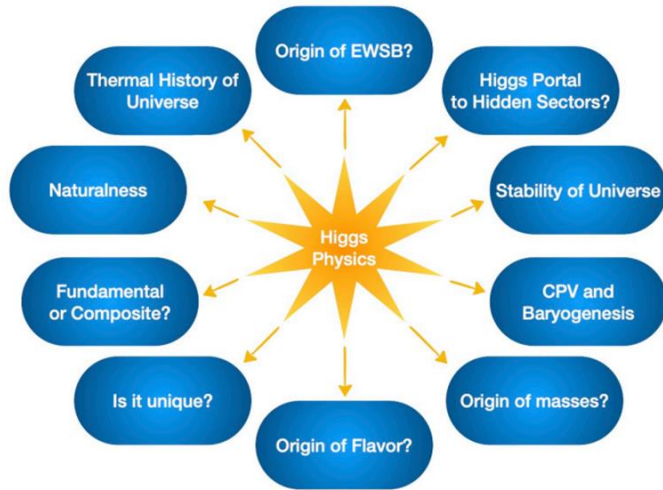
13:00	<b>Welcome and introduction</b> <i>Salle Charpak, LPNHE Paris</i>	<i>Ties Behnke</i> 13:00 - 13:20
	<b>The ILD concept at a circular collider</b> <i>Salle Charpak, LPNHE Paris</i>	<i>Daniel Jeans</i> 13:20 - 13:40
	<b>Status of ILD-TPC at a circular collider</b> <i>Salle Charpak, LPNHE Paris</i>	13:40 - 14:00
14:00	<b>Update on ECAL developments</b> <i>Salle Charpak, LPNHE Paris</i>	<i>Vincent Boudry</i> 14:00 - 14:20
	<b>HCAL Status</b> <i>Salle Charpak, LPNHE Paris</i>	14:20 - 14:40
	<b>Backgrounds in ILD at a circular collider</b> <i>Salle Charpak, LPNHE Paris</i>	<i>Yan Benhammou</i> 14:40 - 15:00
15:00	<b>Coffee/ tea</b> <i>Salle Charpak, LPNHE Paris</i>	15:00 - 15:30
	<b>Report from the IA</b> <i>Salle Charpak, LPNHE Paris</i>	<i>Daniel Jeans</i> 15:30 - 15:50
	<b>Report from the ILD PSB</b> <i>Salle Charpak, LPNHE Paris</i>	<i>Ivanka Bozovic Jelisavcic</i> 15:50 - 16:10
16:00	<b>Software for future collider studies: ILD and beyond</b> <i>Salle Charpak, LPNHE Paris</i>	<i>Frank Gaede</i> 16:10 - 16:40
	<b>Report from the LCVision team, the case for a LC</b> <i>Salle Charpak, LPNHE Paris</i>	<i>Jenny List</i> 16:40 - 17:20
17:00	<b>ILD future developments and discussion</b> <i>Salle Charpak, LPNHE Paris</i>	<i>Kiyotomo Kawagoe et al.</i> 17:20 - 17:40
	<b>The ILD contribution to the EPPSU</b> <i>Salle Charpak, LPNHE Paris</i>	<i>Kiyotomo Kawagoe et al.</i>
18:00		

# What do we want to achieve

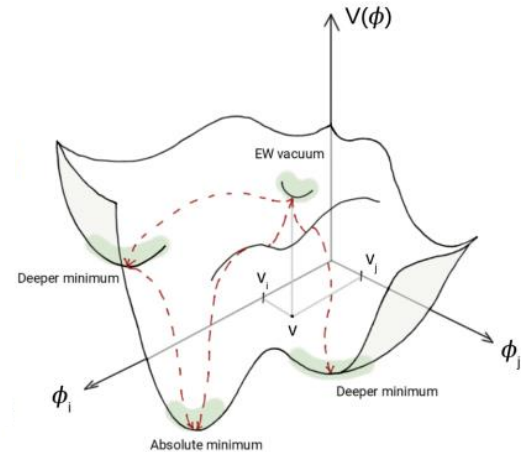
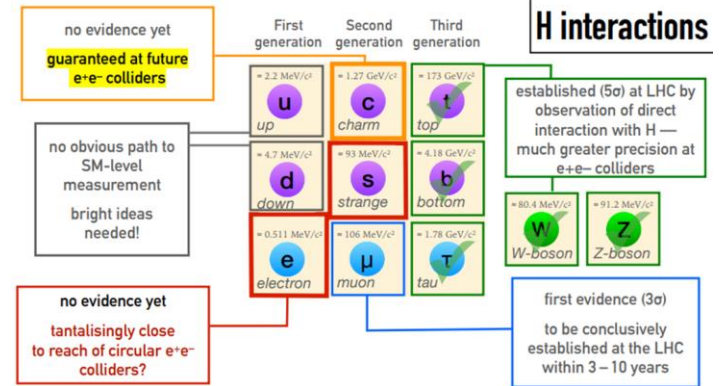
- Get an update on recent work on ILD
- Get an update in the inclusion of ILD into the circular collider community, FCC-ee in particular
- Status of the ILD group
- Our contribution to the global studies towards a H/EW factory
- Our contribution to the EPPSU effort 2025/ 2026

# The science perspective

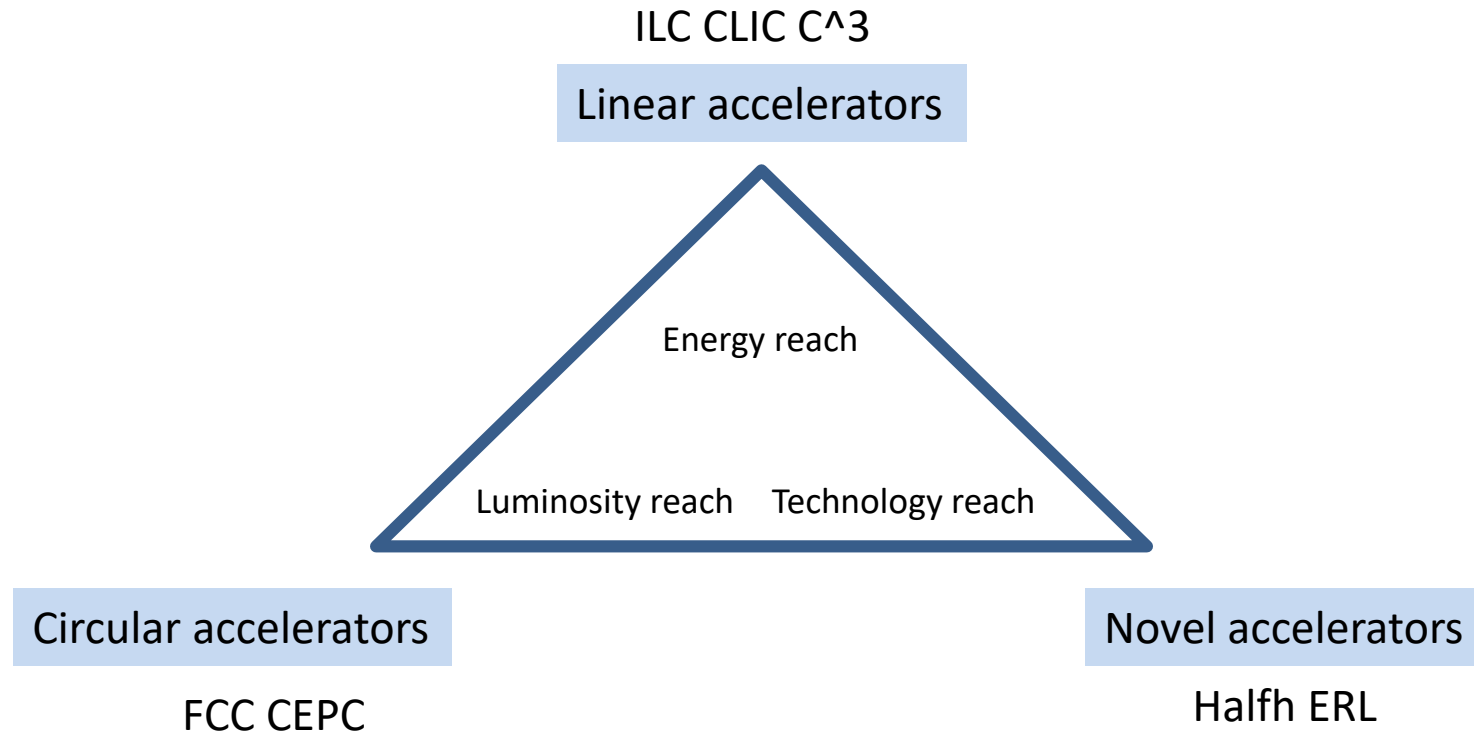
## Higgs Physics



## Electroweak physics

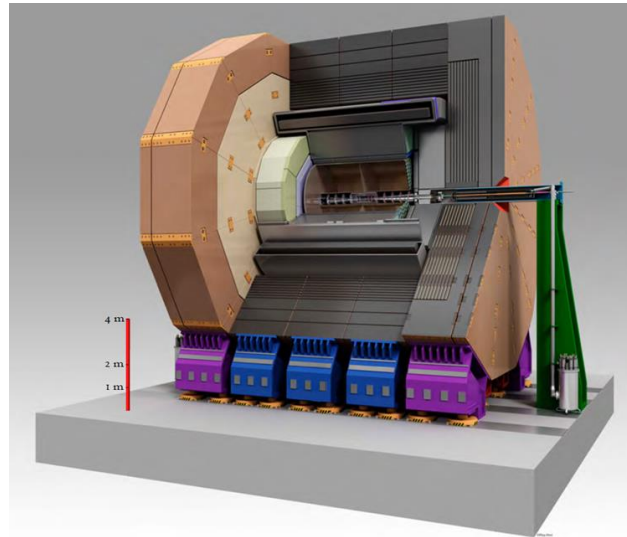


# The environment/ Options



# Role of ILD

- Well developed detector concept
- Adaptable to any of the proposals under discussion
- Common platform to study potential science performance



The ILD concept

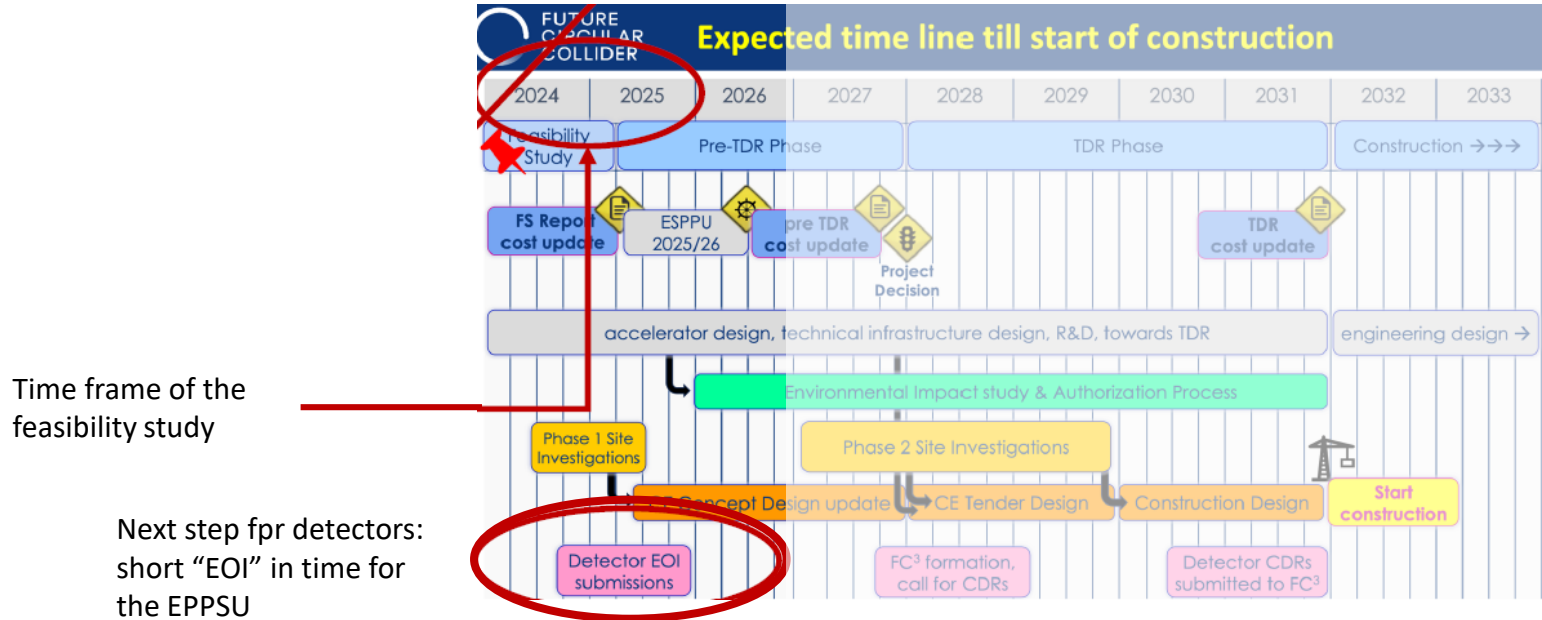
# ILD at FCC-ee

- Consensus at CERN meeting that we should make the case for ILD@FCC-ee
- Development of ILD options for FCC-ee: see talk by Daniel later today
- Our goal:
  - Show that ILD is feasible at a circular collider
  - Explore the impact this has on the hardware
  - Discuss the advantages and the disadvantages of ILD@FCCee: we should take an “impartial” role and discuss options

# FCC-ee timeline

- Final results from the FCC Feasibility study: March 2025 (in time to give input to the EPPSU)

Speculation



Time frame of the feasibility study

Next step for detectors: short "EOI" in time for the EPPSU (See discussion at the end)



# An ILD work program: a reminder



1. The forward tracking region of ILD has a number of shortcomings. A dedicated optimization for this region, in particular of the acceptance of the vertex detector, should be done. This region will also be heavily affected by different environmental conditions at different collider projects, and might need dedicated solutions for each proposal.
2. Circular colliders will have a smaller inter-bunch timing difference than ILC, and also do not deliver bunch-trains, but rather continuous beams. This significantly changes the possibility to do power-pulsing for the front-end electronics of the ILD sub-detectors. The current design of the ILD sub-detectors depends crucially on their capability to manage the thermal load through power pulsing. Using the ILD sub-detectors at FCC will require a very detailed study of how the systems can perform without power pulsing, and the development of a concept of how the thermal management can work in this new situation, while minimising additional dead material in the system.
3. The close inter-bunch spacing and lack of inter-bunch train quiet periods puts additional challenges on the operation of a TPC in this environment. ILD should explore how an ILD-like TPC would perform in these different conditions, and where the limits are for the TPC. Since the TPC adds significant particle identification power in particular at lower center-of-mass energies, this study should focus on the lower range of energies at a Higgs/ EW/Top factory.
4. A focus of experimentation at circular colliders is a high-luminosity Z program. ILD should investigate how well the detector performs under these conditions, and identify components which might need replacement or modification.
5. Circular colliders will have a very different forward region, in order to control the machine backgrounds, and in order to provide the beam focusing. ILD should develop a concept for a forward region compatible with FCC-ee and study the impact this changed region will have on the detector performance.
6. A central challenge for a detector like ILD, optimized for precision physics, is the delivery of an excellent and stable calibration and alignment environment. These considerations need to be included from early on in the design. The different running conditions and beam conditions might impact the way the detector is to be calibrated and aligned, and need to be studied.

# ILD 2024



- We have managed to maintain our structures and (some) significant level of activities
  - We have loosely connected to FCC-ee (but not as much as we had thought)
  - We have continued to major progress on the physics side: ILD is still a main driver of the ECFA focus studies
  - We have managed to continue to push software and methods
- 
- It is difficult to maintain the level of activities
  - The voice of ILD however is very important to remind people that there is more than FCC-ee and that there are option
  - We should point out the science merit for FCC-ee and for the options (ILC, CLIC, etc)