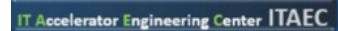


The next 4 years of the SiW-ECAL

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in behalf of



***CALICE meeting,
Utrecht Uni,
10/04/2019***

Working hypotheses

① The ILC is decided this year

- We still have 3–4 years of R&D before launching the production

| ILD assembly timeline for Hybrid option (CMS style assembly)) | | | | | | | | | |
|---|------|------|------|-----------------------|------|------|--------------|--------------|---------|
| 2017 | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 |
| Sub-detector | Y-3 | Y-2 | Y-1 | Y1 | Y2 | Y3 | Y4 | Y5 | Y6 |
| ECAL (Barrel) | R&D | TDR | | Construction off site | | | | Ass. On site | Install |
| ECAL (End cap) | R&D | TDR | | Construction off site | | | Ass. On site | Install | |
| HCAL (Barrel) | R&D | TDR | | Construction off site | | | Ass. On site | Install | |
| HCAL (End cap) | R&D | TDR | | Construction off site | | | Ass. On site | Install | |

– The organisation

adapted from 2014 ressource survey

- should switch from “loose R&D” to **project mode**,
- “ILD-like” steps-up in 2020 as main organisation (view of IN2P3)
 - CALICE to publish legacy papers for references
- Decision on staging scheme \leq end 2020 ?
- Decision on 1 vs 2 experiments \leq end 2020 ?
 - if 2) conservative: decide on SiW-ECAL parameters
 - if 1) merge SiD & ILD concepts:
 - highly political \rightarrow 1(2) year delay ?

② The ILC is not decided; CEPC becomes the NLO machine and N^{1.5}LO CLIC

- Decision within 3–4 years ? CLIC TDR in 2025 ?
- Detector R&D must foster on continous operation mode:
 - Adapted electronics and DAQ
 - Active cooling
 - ILD model must be revised (esp. cost, granularity):
 - 2 detectors for 500M\$? [2019-03 CEPC Calo Topical WS]
- The organisation stays R&D oriented, *à la CALICE*
 - partial evaporation of interest and support are unavoidable

③ CEPC and CLIC don't concretise; FCC-ee as N²LO projects

- The organisation stays R&D oriented, *à la CALICE*
- Planning is fuzzy; same case as ② in worse...

① The ILC is decided this year

Module-0 = pre-production goal (4 years)

- 1 “Module-0” : demonstrator or module #1 ?
 - **CRFP+W Structure** of 26(?) layers × 5 alveola
 - 2–3×13(?) Long Slabs
 - with “final” cooling + DAQ HW

Technological (τ) Long Slabs (~3 years)

- 3–5 Barrel Slabs pre-module-0 production
 - “SK3” chip (corrected auto-trigger, full 0 suppr.)
 - Wafer thickness,
 - PCB technology × design (couple options)
- ≥ 2 –3 End-cap slabs

R&D for τ –Long Slabs (2 years)

- CFRP+W H
- Production with full DQ tracking of elements
 - Upgrade of test benches → semi-automatisation
- Tests of SK3

Prototypes (1 year)

- **e-Long Slab**: signal & power scheme for **FEV14**,
 - 725 μ m – 8” wafers ?
- **m-Long Slab**: connections + termination + cooling
- **τ –prototypes**: tests in beam of FEV12–CoB, FEV13, FEV11, new SK2a-packaging ?
- **Compact DAQ prototype**
- (Existing) **CRFP+W structures** full characterisation

② NLO: CEPC, CLIC

③ NNLO: FCC-ee

τ -prototypes (2 years):

- Completion of the stack to 20 layers (material is available).
- Tests in beam of FEV12–CoB, FEV13, FEV11, new SK2a-packaging ?
- Publish updated PFA (with timing) papers

From HGAL to CEPC or CLIC

- Continuous operation (CEPC)
- 50Hz, 0.5ns Δ bunch (CLIC)
- Stack of ASU's (4 years):
 - **new ASIC** (~HGROC)
 - with or w/o trigger ? Occupancy, ...
 - improved timing vs SK2a (if needed for CEPC)
- **1 Long Slab (5-6 years)**
 - Active cooling CO₂ *à la* HGAL
 - Reduction of costs: #layers, granularity, ...

Hibernate after τ -prototype testing:

- legacy papers, code, data-sets, MC models, schematics
- be ready for unexpected contacts