

Plans for 2020

(a personal sight)

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LR

***CALICE meeting
CERN, 01/10/2019***



A brief overview

ASU's

- FEV11, 7 boards (+1 ? +2 RIPs), 320 μm , SK2
 - DESY-2017, CERN -2018,
 - $S/N_{\text{ADC}} \sim 20^+$; $S/N_{\text{Trig}} \sim 12^-$
- FEV13, 5 boards, 4 \times 650 μm + 1 \times 320 μm , SK2a
 - DESY-2018, (CERN-2018), DESY-2019:
 - Prelim: $S/N_{\text{ADC}} \sim 50$ for 650 μm , small Δ Fr vs Jp PCBs
 - Prelim: $S/N_{\text{ADC}} \sim 21$ for 320 μm
 - Prelim: But time dependance on ped stability ?
- FEV12 & FEV12-COB: (2+2 boards) \times 1/4th equipped, SK2a, 500 μm
 - DESY-2019 \Rightarrow COB: promising results
 - Prelim: $S/N_{\text{ADC}} \sim 24^+$
 - no ch37 pbm
 - no PP

e-Long Slab

- FEV11, 1/64th equipped
 - Required HV decoupling \Rightarrow Noise prop between ASICs through wafer / HV ?
 - Dependency on positioning and ASIC seen (TBC) \Rightarrow opt. power scheme ?

Wafers:

- Sq events 1/10 of physics prototype (DESY-2015)
- Huge gain in signal with 650 μm wafers. Effective depletion thickness ?
- 8", 750 μm wafers: when ?

Significant progress but ... room for improvement

Are we up-to ILD requirements ?

- Noisy ch37 ? Not seen in COB... \rightarrow new packaging ?
- Retriggering by ChipSat \rightarrow better decoupling ?
 - only a pbm if noisy channels... but...
- Powering: stability (FEV13 ?), min. ON period, ...
- ONLY Low-E performances \Rightarrow **DAQ, PFA**

if there is an ILC...

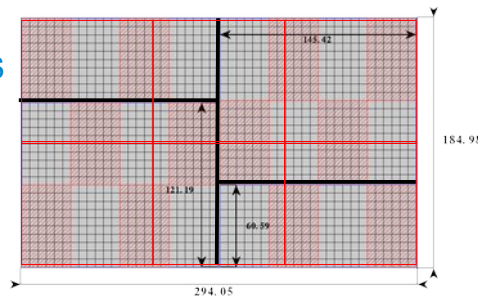
MEXT requests 480 million yen for FY 2020's ILC-related budget – a 50 million yen increase from 2019
The Ministry of Education, Sports, Culture, Science and Technology (MEXT) announced on August 29th that they had requested 480 million yen for ILC-related items within its fiscal year 2020 budget (= 4.1 million Euros). In July, the Japanese, French, and German governments agreed to start a discussion group, and that added a 50 million yen increase (= 430,000 Euros) to the budget compared to what was requested in FY 2019.

Tohoku news, 25/09/2019

Minister of MEXT: “Do a lot of research in Japan” after figuring out how to share the costs of the ILC
On September 25th, Hon. Koichi Hagiuda, Minister of Education, Culture, Sports, Science and Technology (MEXT), sat down to an interview with various media companies where he talked about the effort to bring the ILC to Japan. “If there are countries to partner with and if the financial predictions look good, then it would be great if they do a lot of research in Japan,” he stated, showing great interest in how the international negotiations will turn out regarding sharing the costs of the ILC.

FEV14 (or new)

- Alignment with latest ILD models
 - 8" wafers, 750 μ m \geq june 2020 ?
 - Larger boards: 32 \times 48 cells
 - (2 + 2 \times 1/2) 8"-wafers
 - (2 \times 3) \times 6"-wafers
 - » ~ compatible (smaller readout pads \rightarrow wafers margins)
 - 24 ASICs: SK2a
 - packaging of 400 with Aptasic SA (CH) on-going (10+15k ϵ)
 - » 16.6666 Boards of 24 ASICs
- HV \rightarrow Per board
 - e-LS: HV decoupling of pairs of ASUs (\equiv 32 chips)
- Incremental change
 - Connector scheme ?
 - Flat capacitors ? Murata stopped... stocks ?



Design of τ -Long Slab

- ≤ 6 FEV14 in Barrel
- ≤ 8 FEV14 in Endcaps
- Double sided
- To be done with assembler...
- Capacity to handle high \mathcal{L} scheme?
 - 1 ms \times 5 Hz \rightarrow 2 ms \times 10 (15 Hz) ?

Dev't of testing & quality procedure

- Characterisation before mounting
 - Wafers
 - ASICs
 - Capacitors
 - FEV's

• Automated meas't
• Logging in single DB
• Full & simplified benches
• pairing of matching batches


AIDA++
AIDA-IP, Infralnnov

“No show” or anyways

Completion of tech prototypes

- → 20 layers
 - 16 boards avail:
 - 7(+1) FEV11 + 5 FEV13 + 2 FEV12 + 2 FEV12-COB
 - FEV13: 4 PCB avail.
- Request for BT @ DESY 2×1 wk.
- CERN || FNAL || SLAC in 2021

Analyses

- Response at high E.
 - Resolution
 - Linearity
 - Uniformity in 1 || 2 stack ?
 - Shower shapes
 - Angular resolution
 - Timing
- 
- Auto-gain (+TDC)
 - ?? μs + 2 ms trains
 - X-talks corrections (HGICAL)

PFA & Particle ID

- e^\pm vs γ
- ch/γ separation
- Timing

Response of hadrons

- 1/3 interacting
 - ~10% of $\langle E \rangle$ in ECAL
 - × 10% of h^0 in jets
- “Academic” but critical for ML ?