SiW-ECAL Beam test 2015
Kick-Off meeting

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École polytechnique, Palaiseau

Agenda

Goal of meeting:

- information on project, preparation of participation, organisation

Physics program

Technical Status:

- HW, SW, DAQ, Online Analysis

Practical details:

- ~~€€€~~, Logistics, Shift plans

Organisational issues

AoB

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(prelim) Physics program

Physics commissioning:

- Check proper running with high intensity μ's (X-check of cosmics)
- Thr. adjustment vs noise environment. (Maybe require shielding).

EM-Core Set-up: All slabs after 5 X_0 of W → Strong correlation between SLAB's

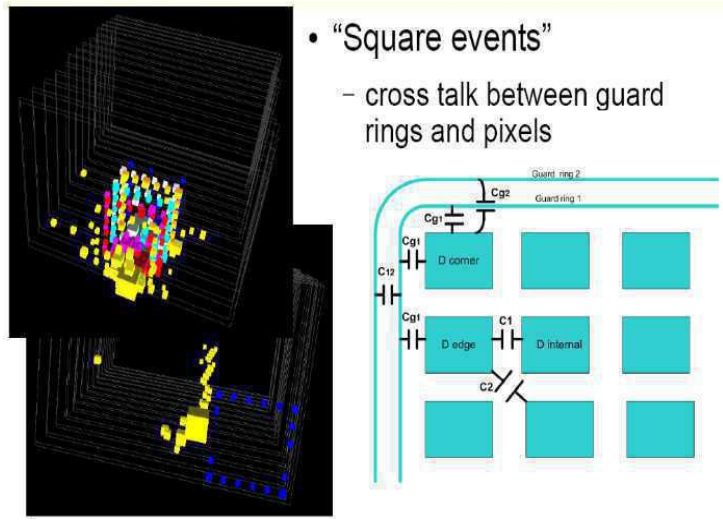
- Response at the core of a EM shower:
  - Explore the full dynamic range (1–2500 mips) using shower profile (for all mem depth).
    - e– runs of all energies, beam rates → linearity
  - Check the responses at the wafers edges with ≠ types of wafers (square events)
    - Scan in positions

HAD-Core set-up: same as EM-core *or* with 1λ of W / SS

- Response to HE hadrons: look for SEU

Mini-ECAL set-up: Sampling with 3-4 × 2.5 X_0 and 2-3× 5 X_0

- Study of theoretical resolution & simulation tuning.
  - Scan in energy, position (and angle).



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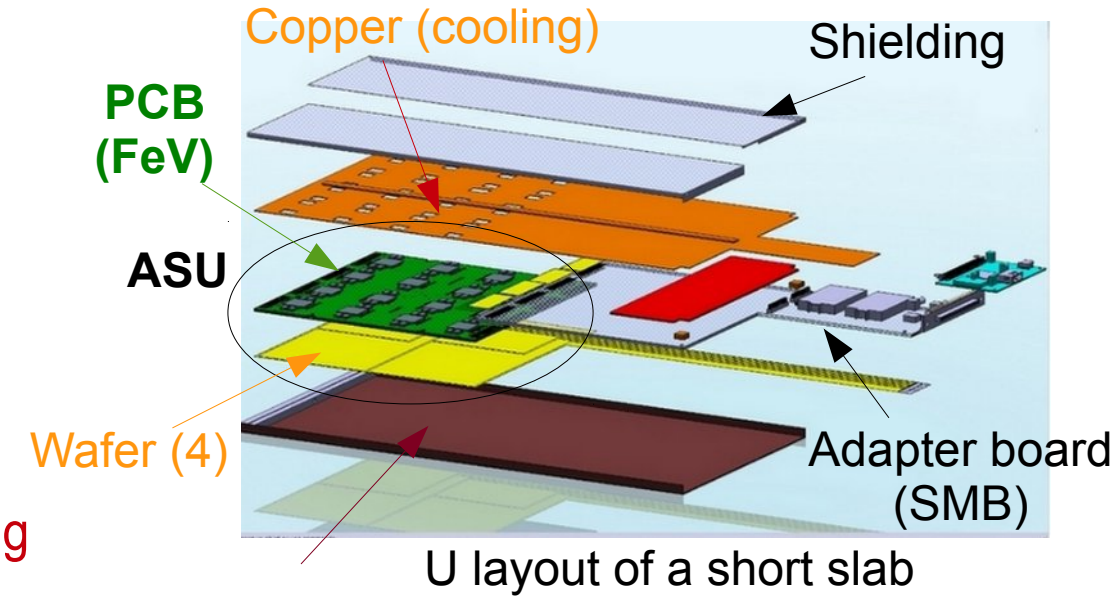
Technical readiness

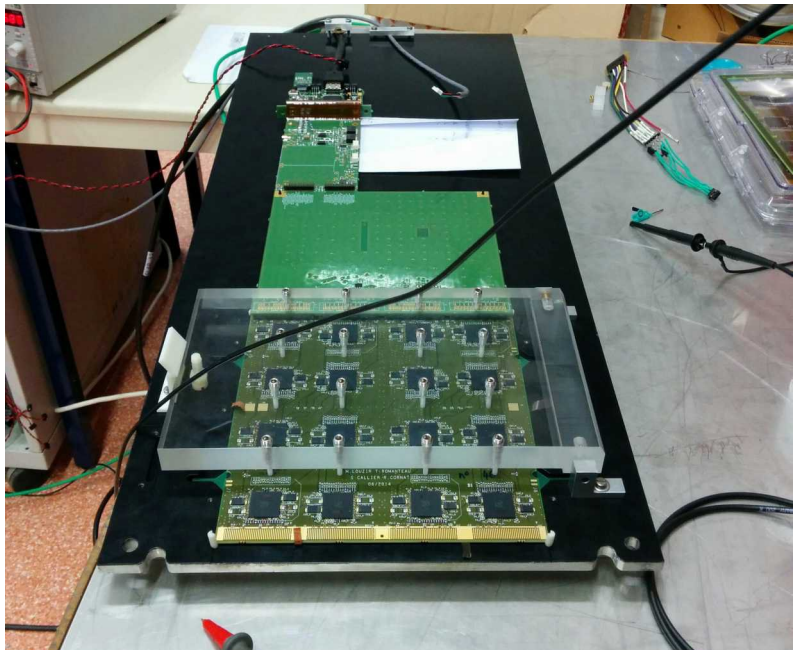
4 ASU have been produced

- 3 OK: ≤5µA of comsumption @ full depletion
- 1 was leaking. I ↘ 15 µA after a month of conditioning
- OK for 3 additionnal ones, including “Edgeless Wafers” (no GR).

Being tested on test plates



U layout of a short slab



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Technical readiness (2)

Data Taking of Cosmics

- Just started this week with 3 test plates
- Minor issue with 1 contacts on 2 slabs.
  - debugging validation signal missing (need fix in FE FW || rec code)

4th plate being prepared

Assembly procedure in SLAB to be assessed end of September & beg of October

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DAQ & Analysis

DAQ HW & FW (LDA, GDCC, DIF)

- no crash in months
- tested in heavy operation (sim)

DAQ SW

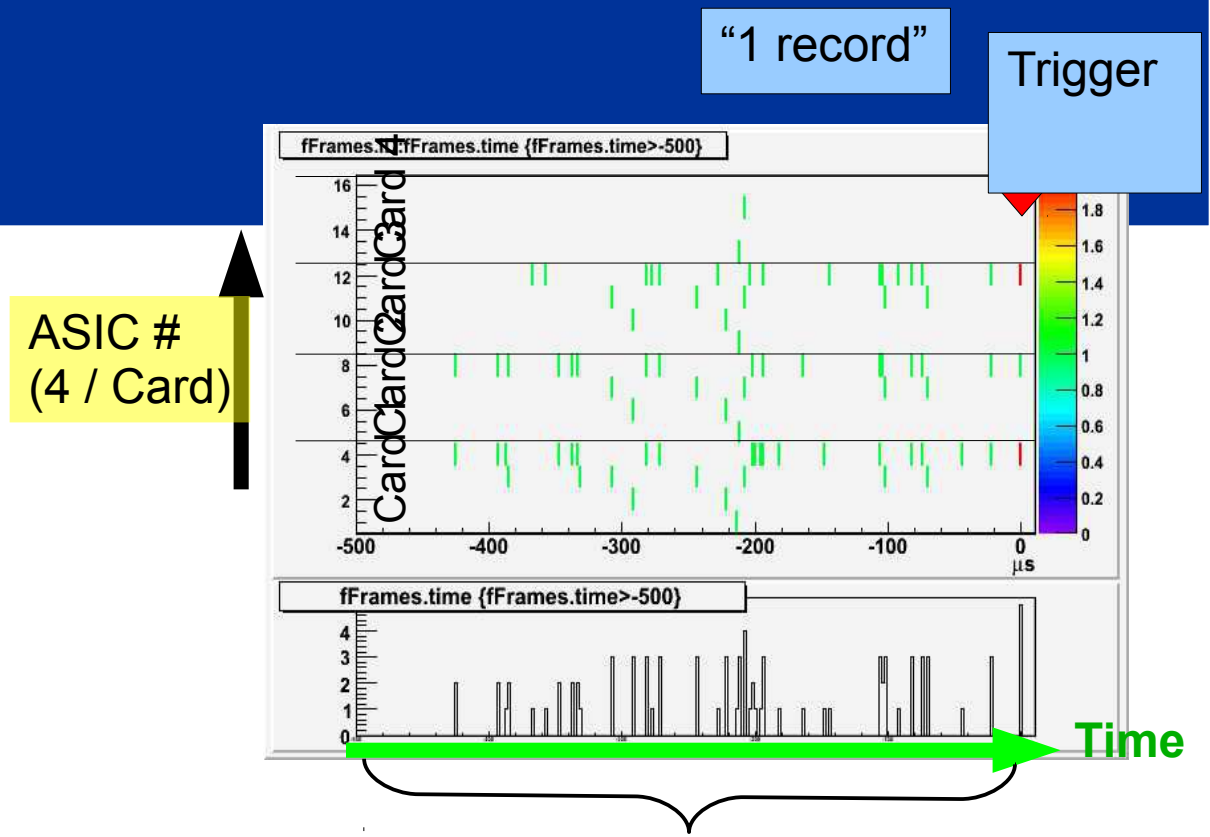
- Low level: (CALICOES & PYRAME)
  - ⊃ config management: ready
- Event Builder being tested

Higher level SW
(RunDB, online monitoring)

- being worked on

Analysis:

- Automatic thr. determination
  - several procedures: being X-checked



1 Spill (DAQ)

Sync on « end signal (TB mode) or Start ILC mode

ILC mode (triggerless with delayed readout)

- 20% duty cycle during SPS spills
  - depends on noise & type of events

TB on CMS beam line

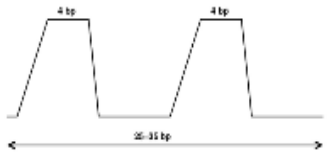
SPS: November 2015

schedule issue date: 01-Sep-2015 Version: 2.5.4

	Mon 2 Nov	Tue 3 Nov	Wed 4 Nov	Thu 5 Nov	Fri 6 Nov	Sat 7 Nov	Sun 8 Nov	Mon 9 Nov	Tue 10 Nov	Wed 11 Nov	Thu 12 Nov	Fri 13 Nov	Sat 14 Nov	Sun 15 Nov	Mon 16 Nov	Tue 17 Nov	Wed 18 Nov	Thu 19 Nov	Fri 20 Nov	Sat 21 Nov	Sun 22 Nov	Mon 23 Nov	Tue 24 Nov	Wed 25 Nov	Thu 26 Nov	Fri 27 Nov	Sat 28 Nov	Sun 29 Nov	Mon 30 Nov	Tue 1 Dec	Wed 2 Dec	Thu 3 Dec	Fri 4 Dec	Sat 5 Dec	Sun 6 Dec
Week	45							46							47							48							49						
Machine	UA9							Coldex							setup																	UA9			
North Area T2 - H2	NA61 SHINE			CMS ECAL D. Lazic PPE172											A. Aduszkiewicz PPE152							NA61 SHINE													
North Area T2 - H4	RD51 (+GIF)			NA58 ECAL G. Mallot PPE134							H. Dong PPE134				HERD			NUCLEON L. Tkachev PPE134				RE21 CBM D. Emschermann PPE134													
North Area T4 - H6	ALICE FOCAL			CMS Outer Tracker D. Lazic PPE156 EUDET																															
North Area T4 - H8	RD52 DREAM			LHCb H. Schindler PPE138											UA9 W. Scandale PPE138			RE29 DAMPE X. Wu PPE138				RE25 CALET/SuperTIGER J. Mitchell PPE138													
North Area T4 - K12	A. Ceccucci			NA62																															
North Area T6 - M2	J. Bernhard			NA58 COMPASS																															

For further information contact the PS/SPS-Coordinator. Email: Sps.Coordinator@cern.ch, Tel: +41 75 411 3845.

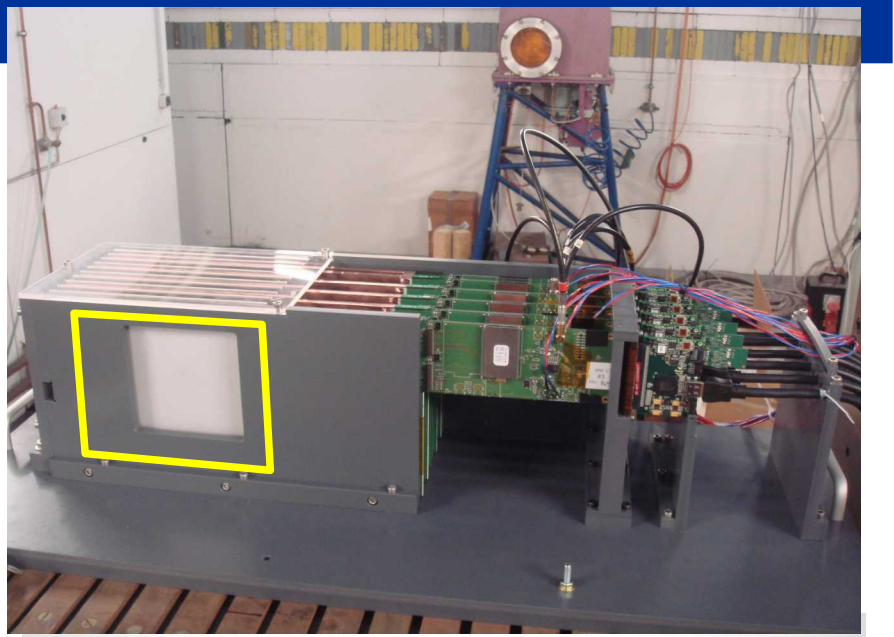
The latest version of the schedule are available here: http://sps-schedule.web.cern.ch/sps-schedule/
This schedule in synchronized with injector schedule v1.10
2 extractions with a 4.8s(4bp) flat top per supercyle.
No beam during Technical Stops (TS) and Machine Developments (MD)
For TS a cool down time is needed and will be announced in the days preceding the stop.



Set-up

For SLAB's:
Re-use the DESY structure (could be an issue @ CERN)

- with increased opening for 18×18 cm².
- (x, y) Moveable table (20×20 cm² in range)
  ~ 100kg
- Absorbers (5X_0 of W and/or 1λ of W or SS)
  in front.



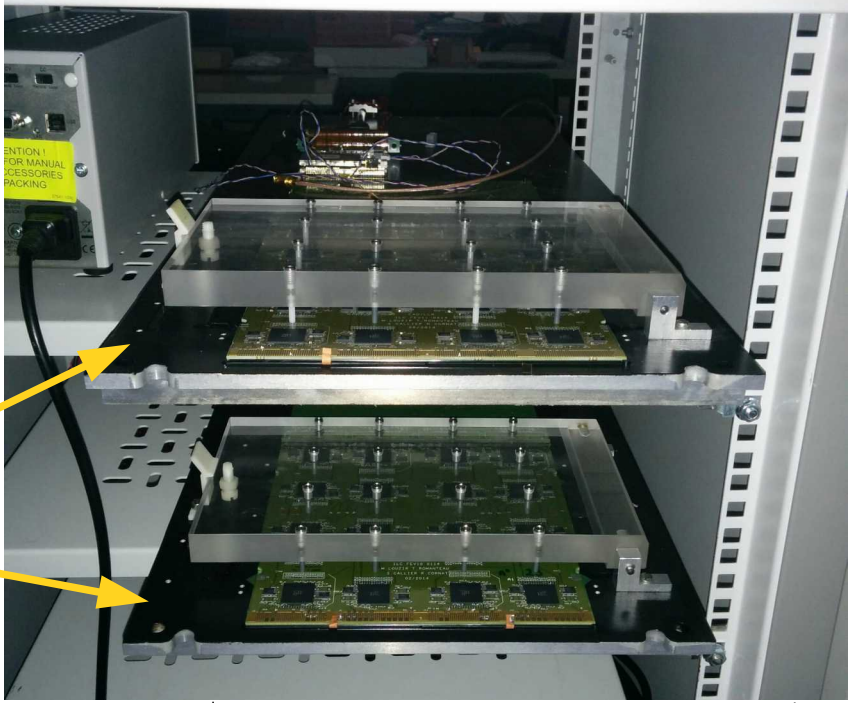
(Beam hodoscope for beam monitoring)

- eventually in "BC" particule time-stamping
  (special device needed).

Backup plans (if SLAB assembly schedule is too tight)

Aluminium testboard's:
(0.25 X_0)

- Vertical stand needed (in design)



Admin

Green light: end of August (D. Lazic)

Schedule:

- beam line: H2 from Nov wed. 4th– Mon 16th.
  - 2–3 days for in-beam commissioning (engineers)
  - 9-10 days of running

Participation

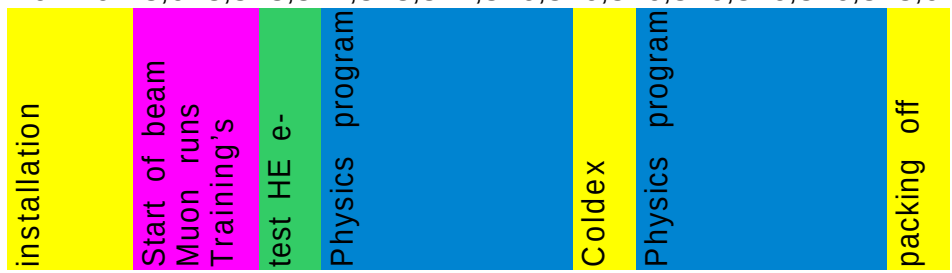
- ILC: LLR, LAL, LPNHE, LPSC, KYUSHU
- CMS: LLR, Imperial, (CERN)

Support:

- AIDA-2020 TNA
- Needs help from IN2P3 (TB was not scheduled for this year).

TB & Shifts Plans (prelim)

Name	Lab	Status (Perm, PD,	Days		mer. 07	lun. 02	03	mer. 04	05	ven. 06	07	08	lun. 09	10	mer. 11	12	13	14	15	lun 16
V. Boudry (lead)	LLR	Perm	15	1		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
V. Balagura (coord.)	LLR	Perm	15	1		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
M. Frotin	LLR	Perm	3	1		1	1	1												
Meca LPNHE ?	LPNHE	Ing	3			1	1	1												
J. Nanny	LLR	Ing	7	1		1	1	1	1	1	1	1								
R. Cornat (Tech.)	LLR	Ing	2									1	1							
F. Magniette || MR	LLR	Ing	5			1	1	1	1	1										
K. Shpak	LLR	PhD	4					1/5	1/3	1/3	1/3	1/3	1/3	1/3	1/3	1/3	1/3	1/3	1/3	1/8
D. Yu	LLR	PhD	4					1/5	1/3	1/3	1/3	1/3	1/3	1/3	1/3	1/3	1/3	1/3	1/3	1/8
R. Poeschl	LAL	Perm	4					1/5	1/3	1/3	1/3	1/3	1/3	1/3	1/3	1/3	1/3	1/3	1/3	1/8
D. Zerwas	LAL	Perm	4					1/5	1/3	1/3	1/3	1/3	1/3	1/3	1/3	1/3	1/3	1/3	1/3	1/8
S. Bilokin	LAL	PhD	4					1/5	1/3	1/3	1/3	1/3	1/3	1/3	1/3	1/3	1/3	1/3	1/3	1/8
D. Lacour	LPNHE	Perm	4					1/5	1/3	1/3	1/3	1/3	1/3	1/3	1/3	1/3	1/3	1/3	1/3	1/8
A. Lleres	LPSC	Perm	4					1/5	1/3	1/3	1/3	1/3	1/3	1/3	1/3	1/3	1/3	1/3	1/3	1/8
C. Ochando ?	LLR	Perm	4					1/5	1/3	1/3	1/3	1/3	1/3	1/3	1/3	1/3	1/3	1/3	1/3	1/8
R. Salerno ?	LLR	Perm	4					1/5	1/3	1/3	1/3	1/3	1/3	1/3	1/3	1/3	1/3	1/3	1/3	1/8
Person 1	IC		4					1/5	1/3	1/3	1/3	1/3	1/3	1/3	1/3	1/3	1/3	1/3	1/3	1/8
Person 2 ?	IC	Perm	4					1/5	1/3	1/3	1/3	1/3	1/3	1/3	1/3	1/3	1/3	1/3	1/3	1/8
T. Suehera	Kyushu	Perm	4					1/5	1/3	1/3	1/3	1/3	1/3	1/3	1/3	1/3	1/3	1/3	1/3	1/8
Student ?	Kyushu	PhD	4					1/5	1/3	1/3	1/3	1/3	1/3	1/3	1/3	1/3	1/3	1/3	1/3	1/8
Total			**101,892**	4		6	6	8,6	8,3	8,3	7,3	8,3	7,3	6,3	6,3	6,3	6,3	6,3	6,3	3,6



TNA AIDA-2020

Support for the stay of non-CERN and non-swiss participants possible

- http://aida2020.web.cern.ch/content/cern
- up-to 138CHF/day, no travel reimbursement

Contacted Henric Wilkens (contact for CERN PS&SPS)

- asked not to go over **~80 days** (for 130 estimated)
  - from lim. for CALICE & 2015

Filling of the demand:

- Names, # of travels, # days, status (Perm, PhD, …)
- Signature of Agreement @ CERN

Reimbursement by CERN to **individuals** (i.e. not to institutes)

- IBAN's to be provided

Data & Publications

Test of part of device, not a full prototype

⇒ This test will **NOT** be a CALICE one (nor CMS, Atlas…)

Data & Analysis and Publications
internal to the group of participants, based on good will and practises

Pre and Post-Data taking analysis meeting to be set-up

to be started within a month from now (we are in W-7)

Training with analysis SW

Wiki page under construction with all relevant information

Extras

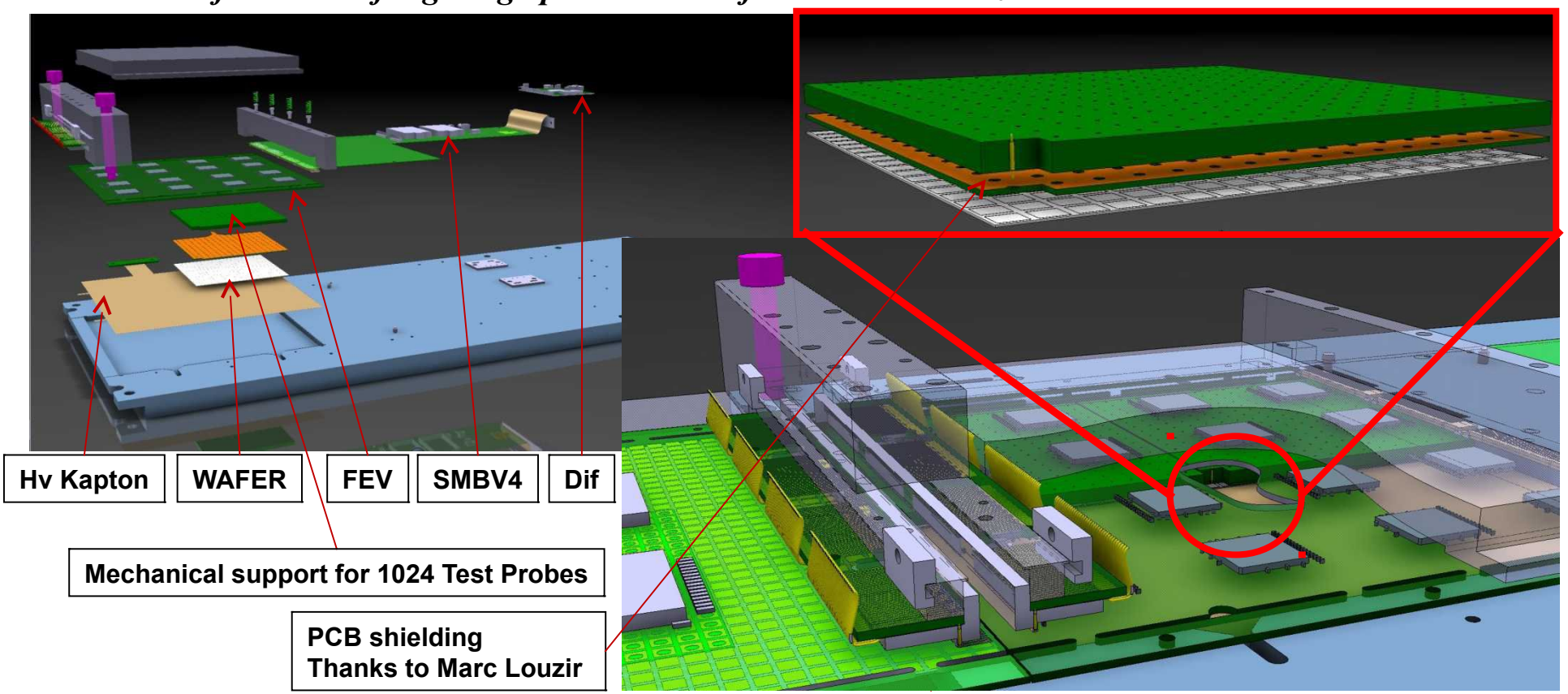
ASU Setup“4 wafers without glue”

Mickael Frotin @ Annecy

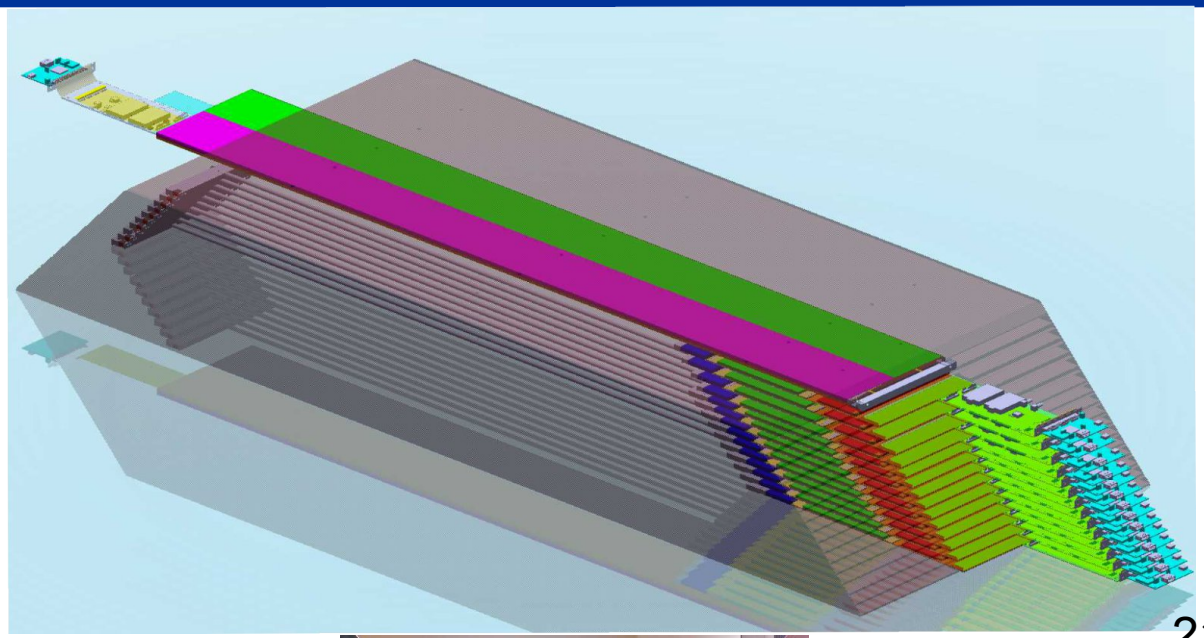
⇨ **The goal:**

2.0 – Setup option with support of test electric probes for connecting WAFER to FEV

- Realize an assembly with removable wafer in order to acquire cosmic data. This assembly will test the entire acquisition chain (Wafer-FEV-SMBV4-DIF-GDCC-CCC-PC-Software) before the wafer gluing operation. The first test was realized last week

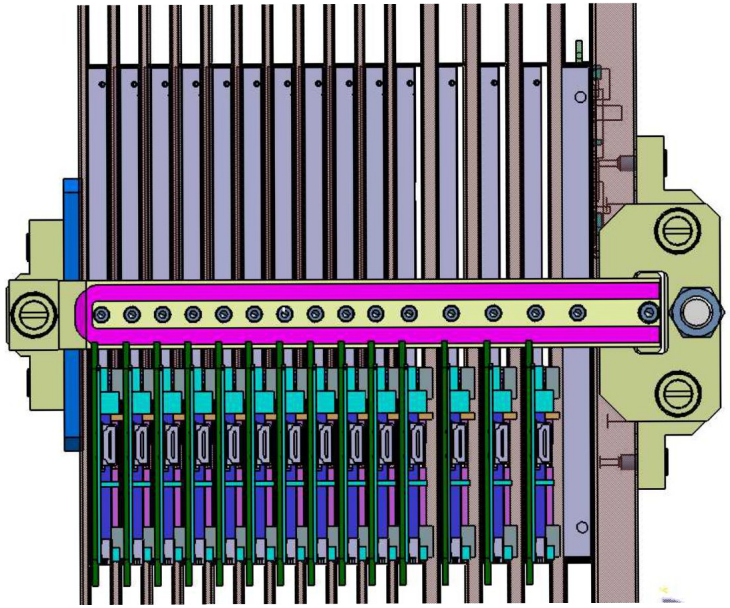


“Final” prototype test (2016+)



Tower of 18×18 cm² (2×2 wafers)
14 Short SLABs
1 Long SLAB

2×2.1mm/lay 2×4.2mm/lay



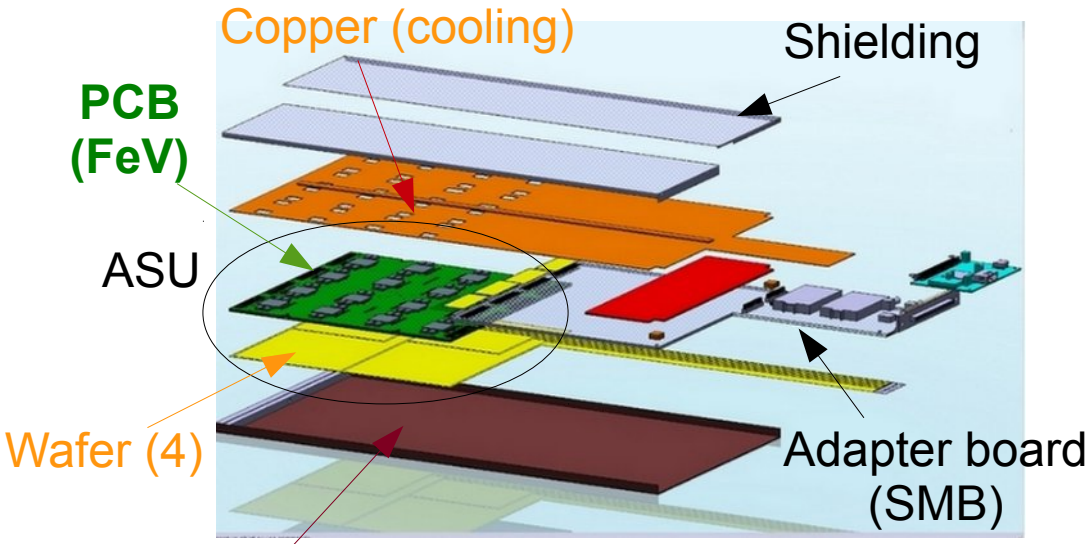
SLAB's

R&D for "mass production" and QA

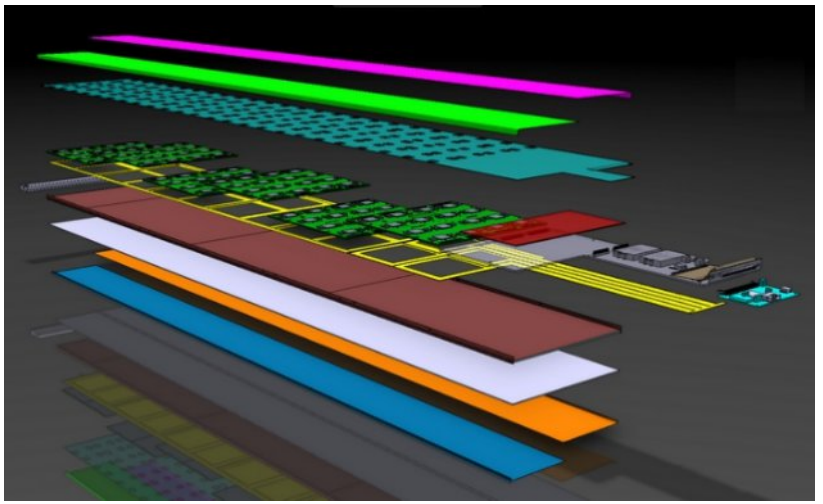
- Quality tests & preparation of large production
- Modularity → ASU & SLABs
  - Choice of square wafers (≠ from hex: SiD, CMS HGCAL)

Numbers (R_{ECAL} = 1,8 m, $|Z_{Endcaps}|$=2,35m) (likely to be reduced by 30–40%)

- **40** Barrel modules: 40 (as of today all identical)
- **24** Endcap Modules: 24 (3 types)
- **9600** Slabs = 6000 (B) + 3600 (EC)
  - many ≠ lengths
- **~75K** ASUs
  - **300K** Wafers (2500 m²)
  - **1.2M** VFE chips
  - **77M** Channels



U layout of a short slab



U layout of a long slab