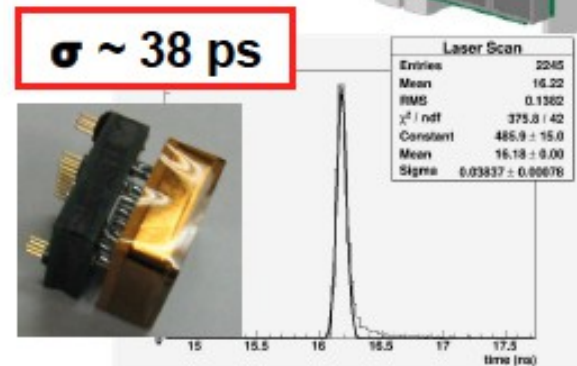
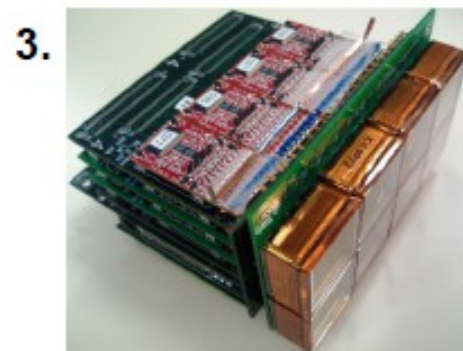
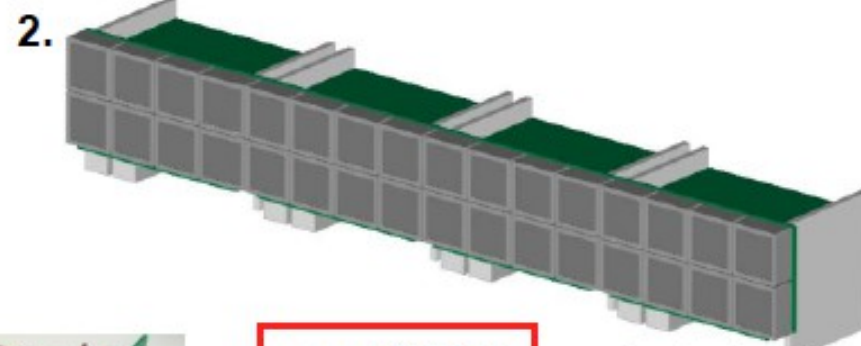
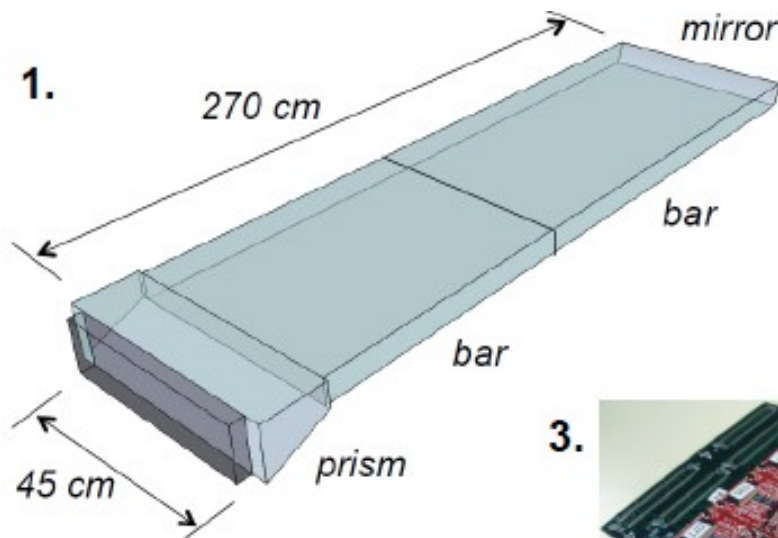
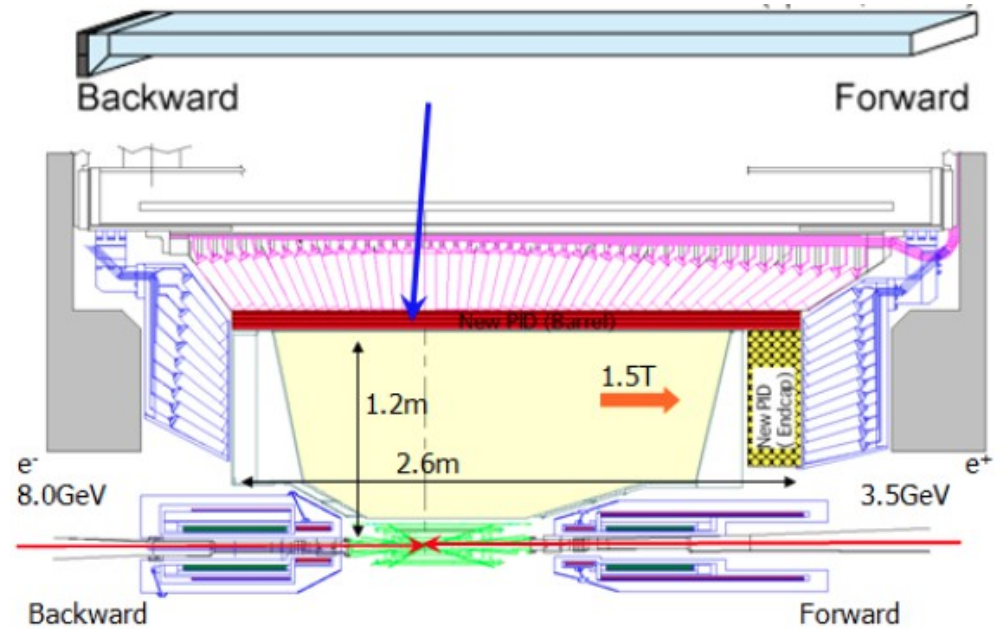
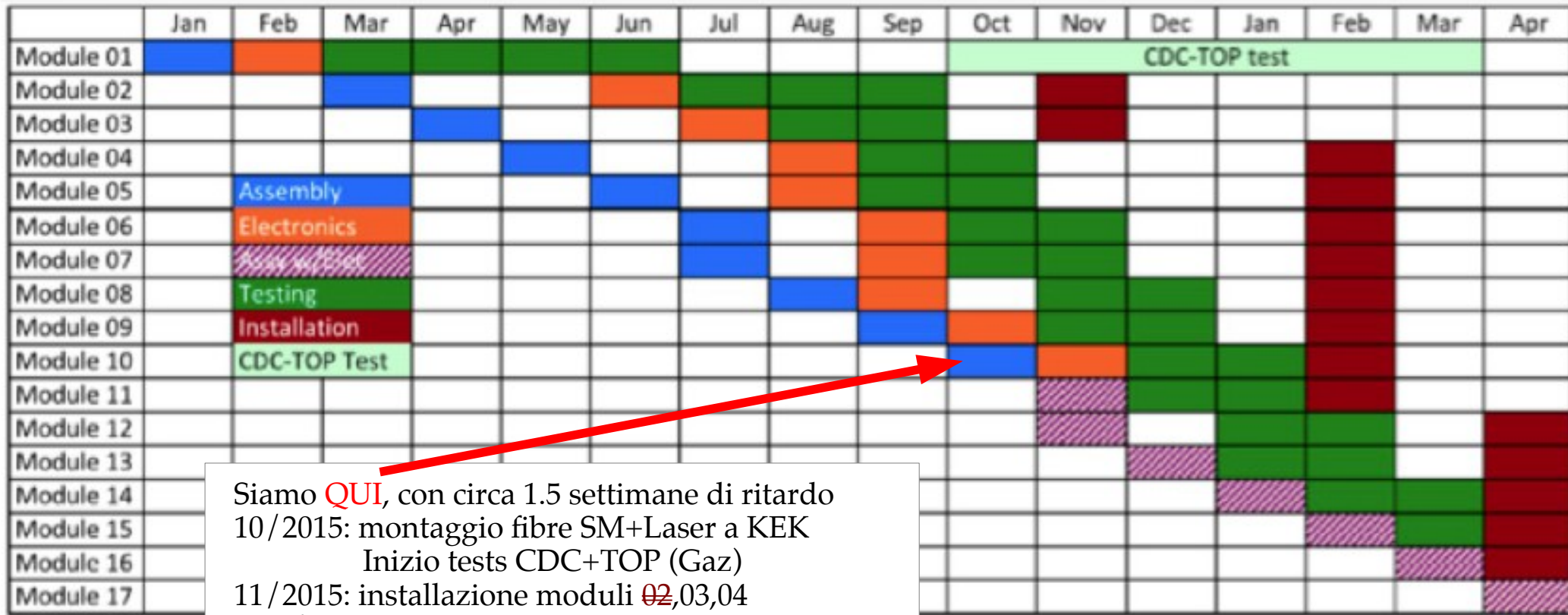


TOP : overview installation schedule



TOP: assemblaggio + installazione, schedule generale



Siamo **QUI**, con circa 1.5 settimane di ritardo
 10/2015: montaggio fibre SM+Laser a KEK
 Inizio tests CDC+TOP (Gaz)
 11/2015: installazione moduli 02,03,04
 7-12/2015: produzione+test di tutto il Front End
 2/2016: installazione moduli 02,05-11
 4/2016: installazione moduli 12-17

Il test del Module 01 sta terminando a Fuji Hall, presto M01 andra' a Tsukuba Hall per il CRT con la CDC

Abbiamo circa 3 mesi di ritardo sul test delle barre assemblate, per via dei problemi di firmware sull'elettronica di Front-End (ma non solo ...): per questo testeremo le 2 barre M03 e M04 insieme, a partire dalla prossima settimana (M02 ha ALD-PMT, andra' dopo)

Recentemente, ci e' stato richiesto di contribuire anche a rinforzare **la task-force per la produzione del FE:** Contribuiremo con 1 mese-uomo a Manoa in Novembre (Francesco Rotondo, TO, tecnico elettronico)

- Module10
 - Outer honeycomb panel was cleaned and stored in BF2.
 - Enclosure was delivered yesterday.
 - Will work on dry fitting and enclosure assembly in this weekend
- Module11
 - Strongback + inner panel tuning was done.
- Frontend installation
 - PMT modules have been installed to Module07. (now 02,03,06,07 done)
 - Module03/04 will be installed in November.
 - Install conventional PMTs and frontend as soon as possible
 - Module03 will be ready today/tomorrow.
 - Rearrange cart configuration and then move to test area.
- Module01 will move to F1 today.

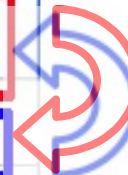
Manpower assemblaggio delle Quartz Bar Boxes (QBB)

31/08/15	11/09/15	12	08/09	Inami	Suzuki	8/31-9/14	Nagoya
14/09/15	28/09/15	15	09/10	Schwartz	Suzuki		Glasgow
28/09/15	07/10/15	10	10	Schwartz		9/28-10/7	Erzen
08/10/15	16/10/15	9	10/11	Inami	Fast?	10/8-10/16	Erzen
B2GM 10/19/15		23/10/15		Schwartz			
26/10/15	09/11/15	15	11/12	Inami	Suzuki	10/22-11/7	Ramina, Rebeschini
10/11/15	24/11/15	15	12	Fast	Inami	11/7-11/19	Oscar?
24/11/15	08/12/15	15	12/13	Inami	Suzuki	11/23-12/4	Benettoni
09/12/15	22/12/15	14	13/14	Fast	Suzuki/Inami	12/7-12/26	Nagoya
22/12/15	24/12/15	3	14	Inami	Suzuki	12/7-12/26	Nagoya
Christmas/New Years							
12/21/15		05/01/15					

Ramina,
Rebeschini

Oscar?

Benettoni



OK allo scambio

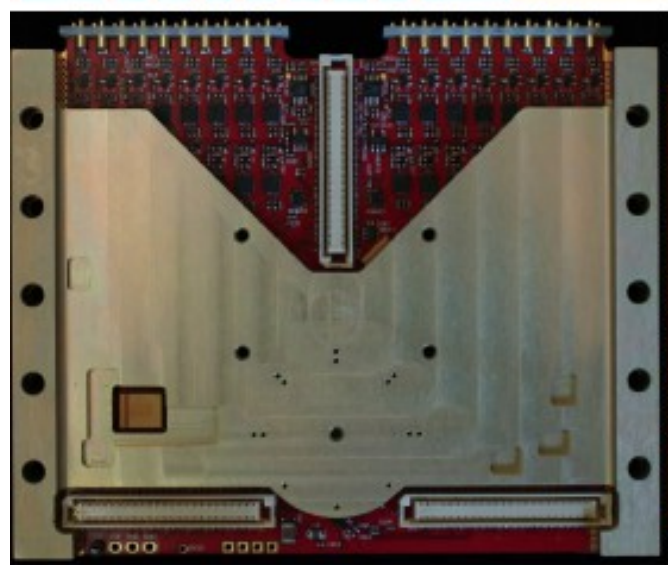
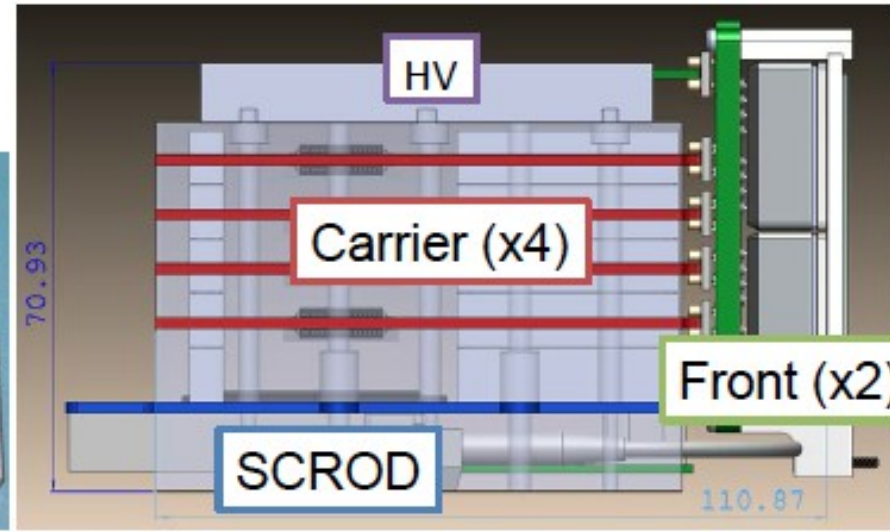
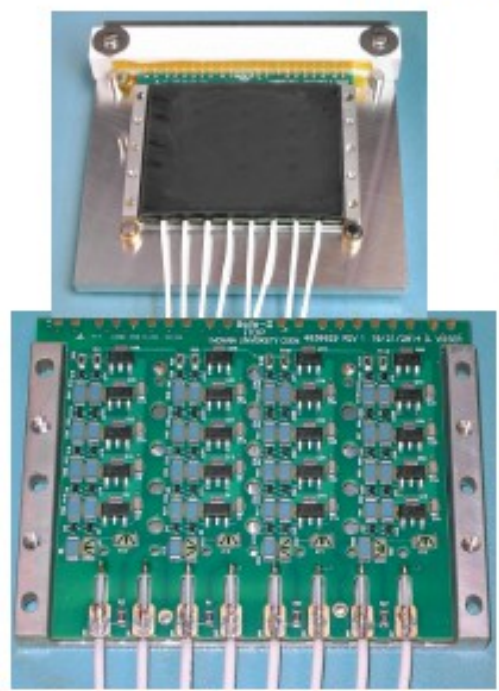
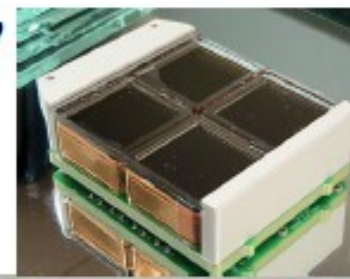
Nell'anno 2016 rimane da coprire un turno in Marzo

06/01/16	24/01/16	19	14/15	Schwartz
27/01/16	31/01/16	5	14	Inami
B2GM 2/1/2016		05/02/16		
BPAC 2/8/2016		10/02/16		
11/02/16	18/02/16	8	14/15	Schwartz
19/02/16	02/03/16	13	15/16	Inami
03/03/16	23/03/16	21	16	Fast
26/03/16	15/04/16	21	17	Schwartz



iTOP Readout "boardstack"

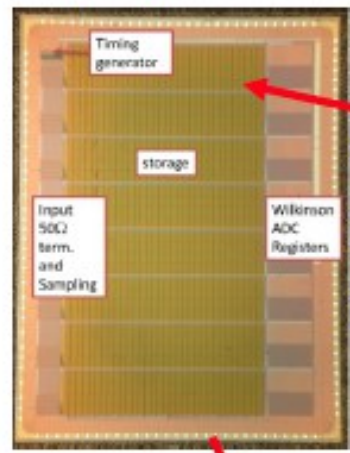
(1 of 4 per TOP Module)



TOP Readout

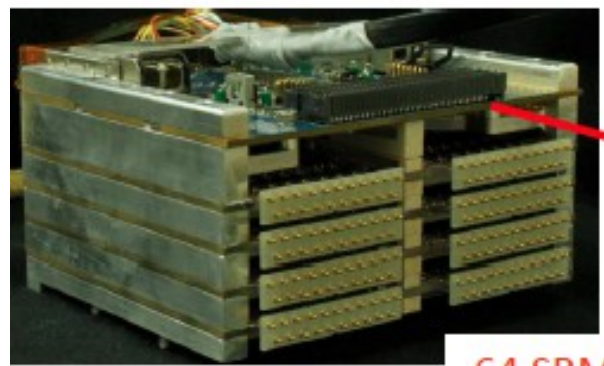
64 HSLB fiber link receiver cards

Waveform sampling ASIC



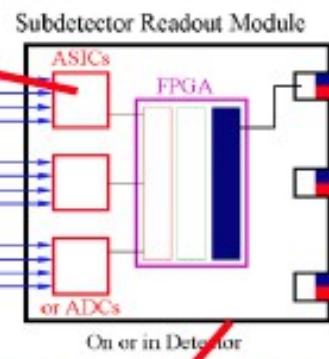
8k channels

1k 8-ch. ASICs
64 "board stacks"



64 SRM

64 DAQ fiber transceivers

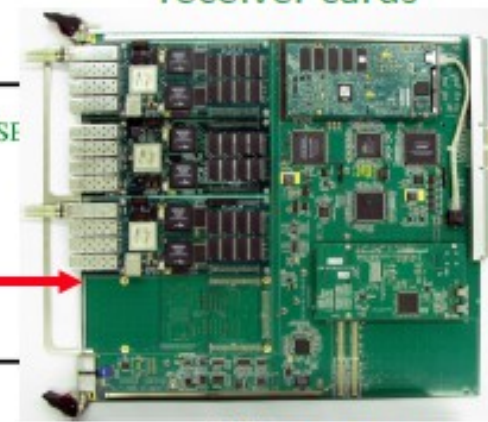
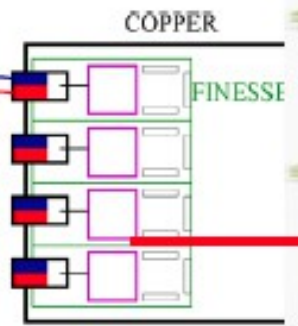


FPGA firmware consists of 3 parts:
1) ASIC/ADC driver (common)
2) Trigger feature extract (subdet. specific)
3) Unified DAQ transport protocol

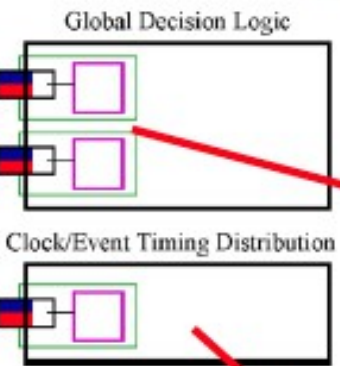
Low-jitter clock



Giga-bit Fiber Transceiver Links



16 COPPER Data Cards



2x Univ. Trigger modules (UT3)

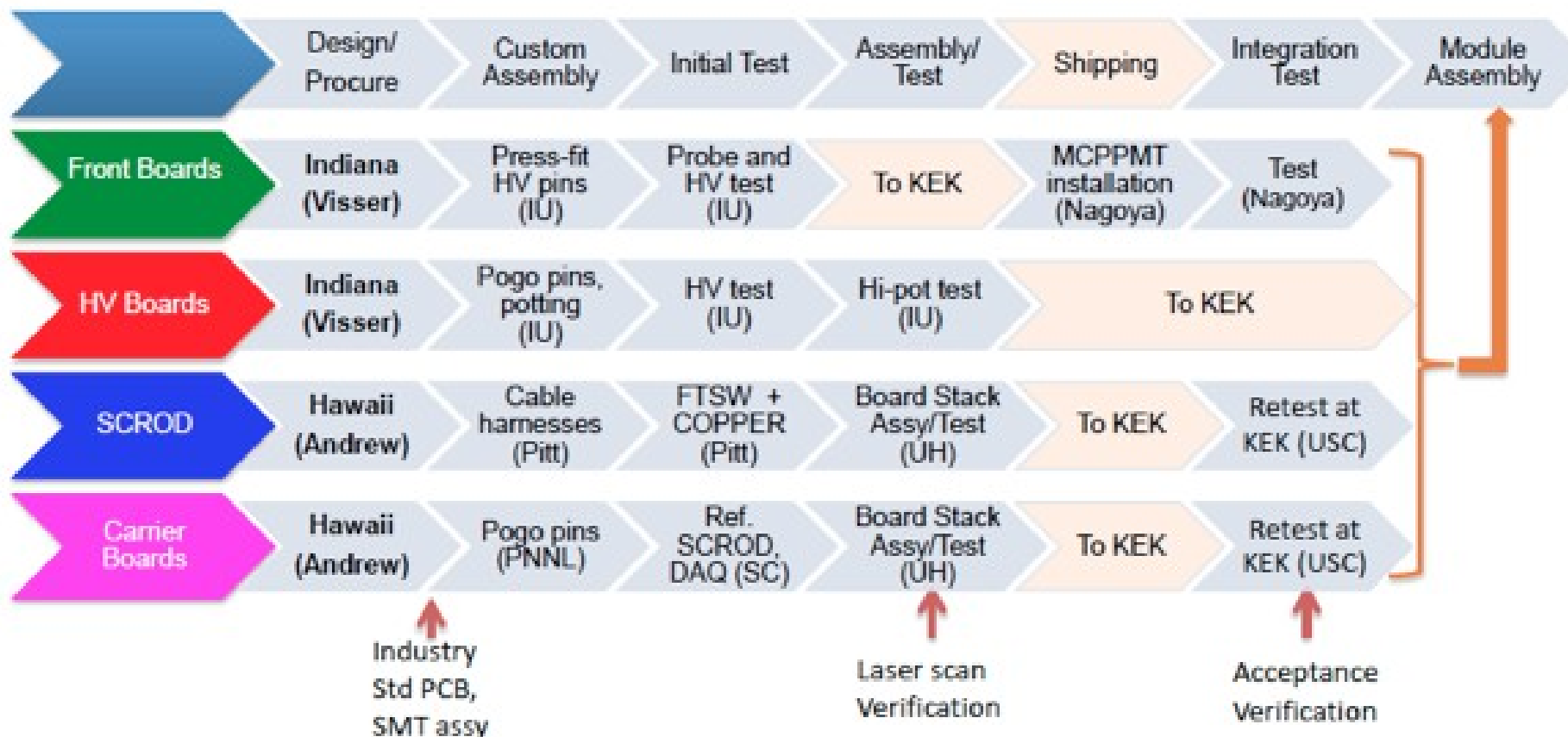
Clock, trigger, programming module (FTSW)



8 FTSW

4

Production workflow



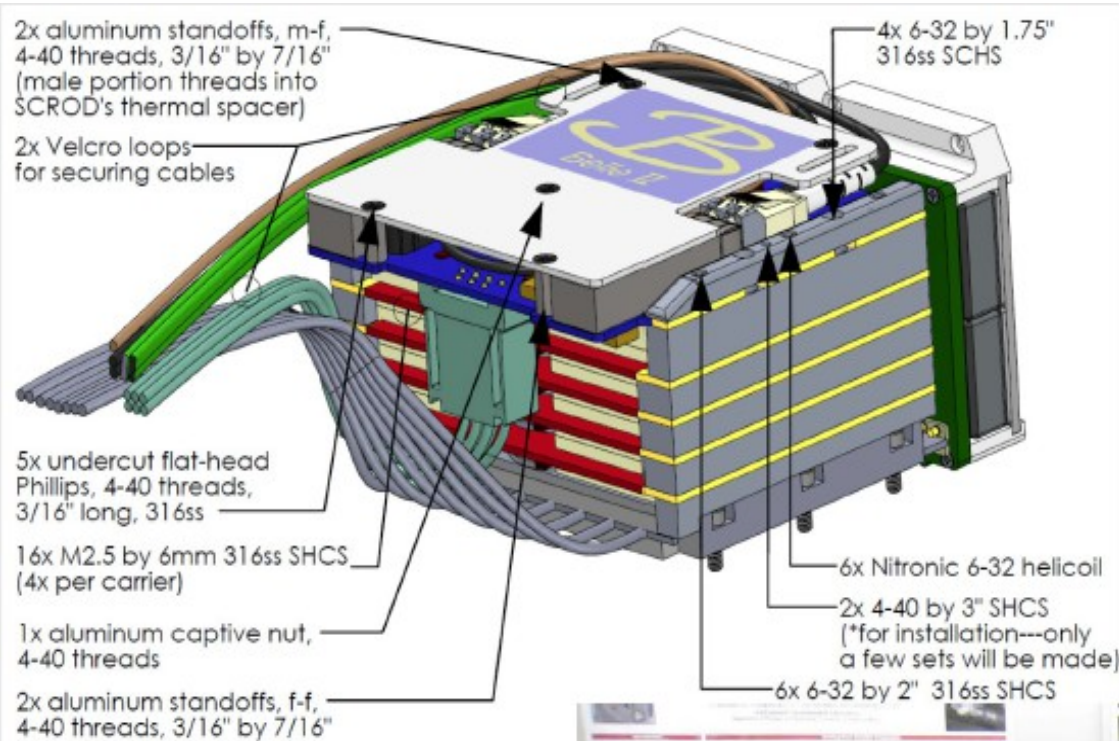
Electronics production (30-SEP-2015)

Production Boardstack: Schedule to Completion	9/28	10/5	10/12	10/19	10/26	11/2	11/9	11/16	11/23	11/30	12/7	12/14	12/21	12/28	1/4
travel & other schedules				B2GM											
HVB to cable assembly (Indiana)	20	16	8												
HVB assy / pot / pogo (Indiana)	5	5	5	5	5	5	5	5	5	5	5	5	5		
HVB final test (Indiana)	4	5	5	5	5	5	5	5	5	5	5	5	5		
Front test (Indiana)	10	10	12												
carrier verification (South Carolina)	16	16	16	16	16	16	16	1							
carrier heatsink attachment (UH)		32	32		32	32	32	32	32	22					
T/J cable fab/test (Pittsburgh)	8	8	8		8	8	8	8	1	8 [1]					
SCROD power cable fab/test (Pittsburgh)			8	8	8	8	8	8	8	8	8				
SCROD heatsink attachment (UH)			28	28											
boardstack laser verification (UH)			8	8	6	6	6	6	6	5	5				
boardstacks at KEK		4	4		16		12		12			8			
module (quartz + QBB) ready	m09			m10			m11				m12		m13		
integration with module		m04	m05			m06	m07	m08	m09	m10	m11	m12		m13	
LV power supply procurement (Wiener)											ALL				
LV power cables (estimated) (Nagoya procurement)							ALL								
LV patch boxes (Indiana & UH)					ALL										

Testing (76 KEK [m09] + 22 transit + 10 tested)

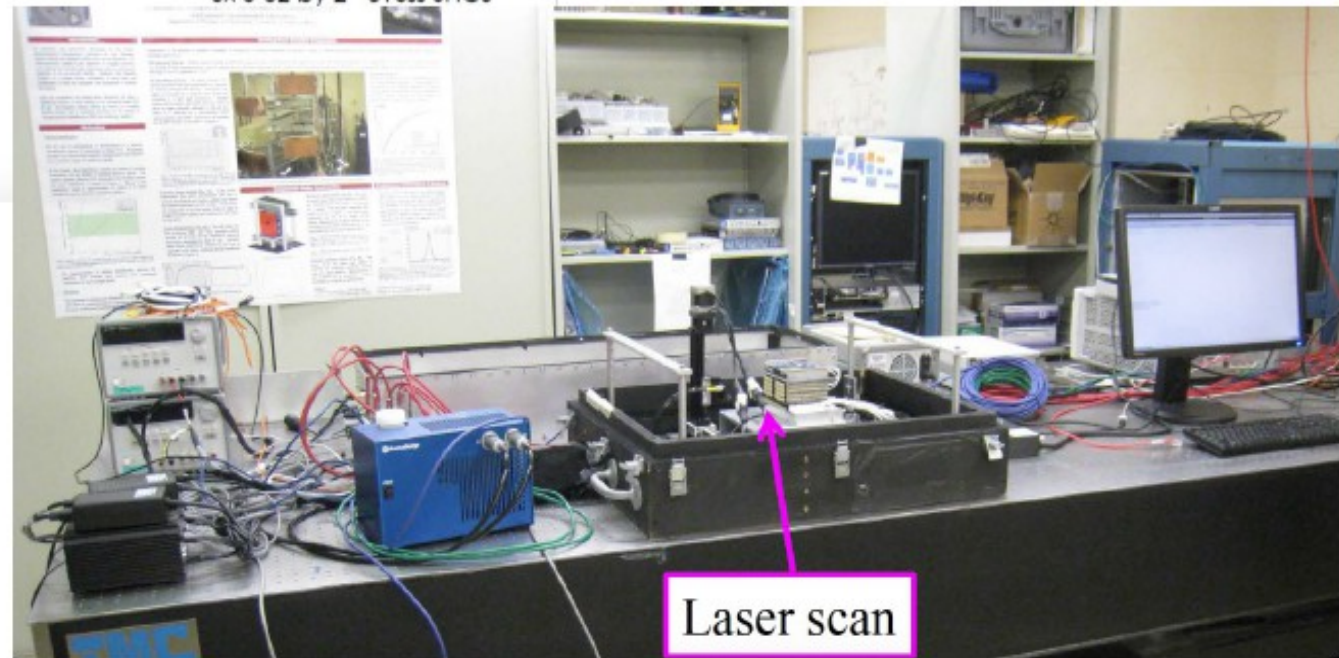
- HVB custom Assy
 - M05 next
 - Technician prep work
- Carrier revE3
 - Summary at back
 - Power, TJ hooker cables
 - M06+ to UH
- Laser testing
 - Trigger timestamping
 - Next batch heatsinks
 - Continuing to improve automation

TOP Front End Electronics: test dei board stacks

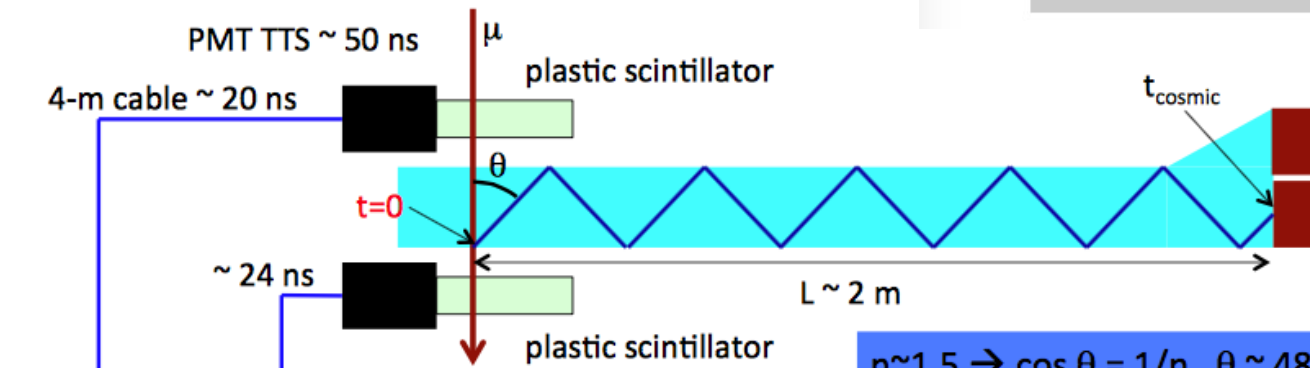


F.Rotondo (tecnico elettronico) andra a UH Manoa a novembre per contribuire ai test di quality control dei board stacks e imparare a usare le FPGA

Nel 2016 , intendiamo portare in Italia un board stack in modo di poter riprodurre totalmente la catena di read-out della time calibration

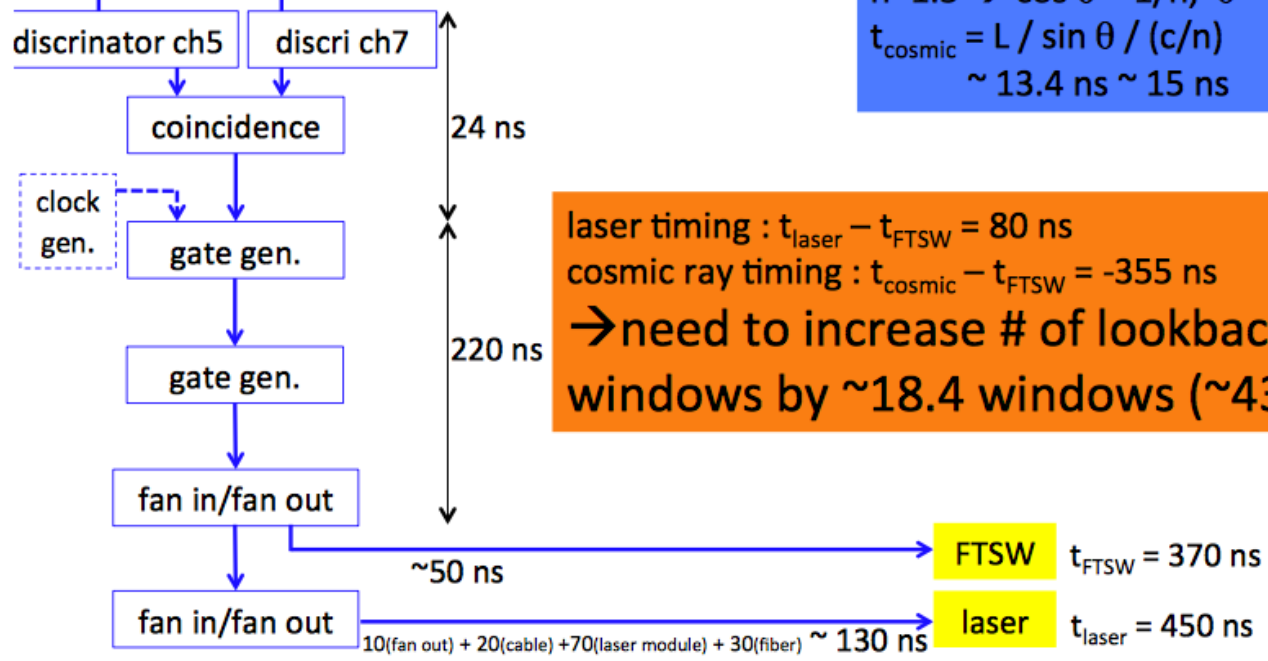


Cosmic Ray Setup a Fuji Hall



$n \sim 1.5 \rightarrow \cos \theta = 1/n, \theta \sim 48^\circ$
 $t_{\text{cosmic}} = L / \sin \theta / (c/n)$
 $\sim 13.4 \text{ ns} \sim 15 \text{ ns}$

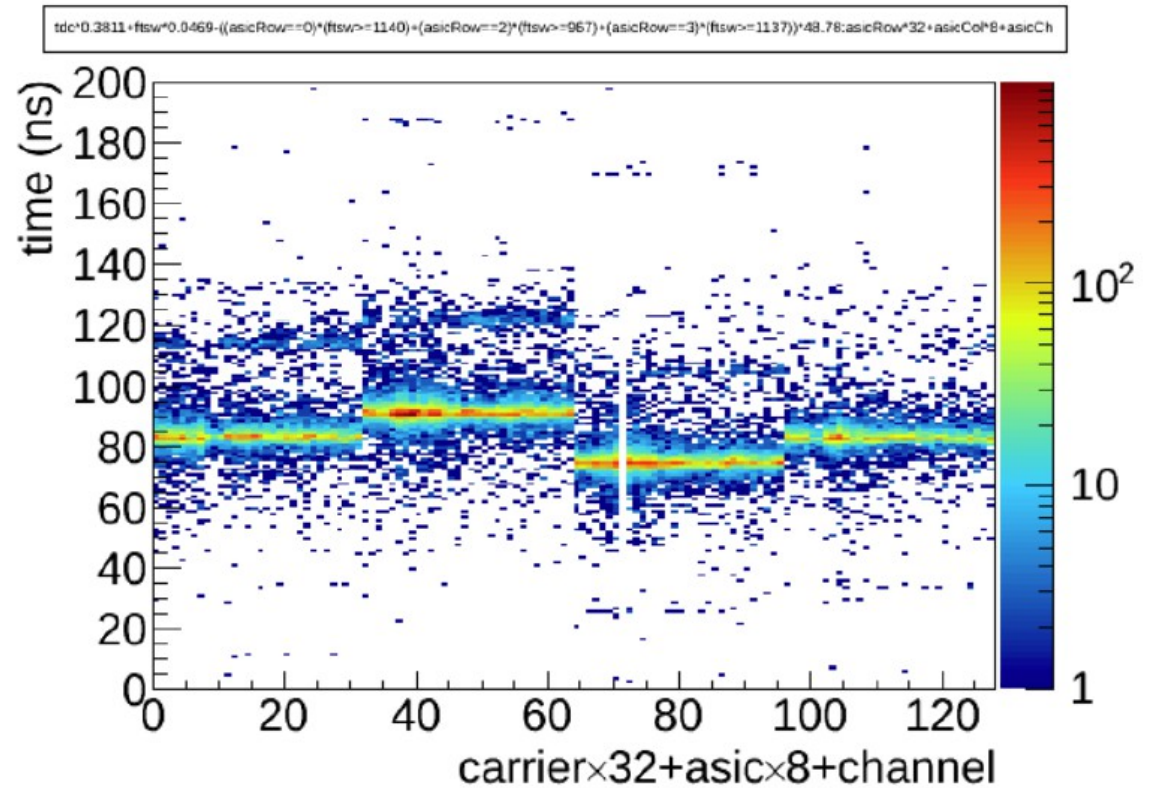
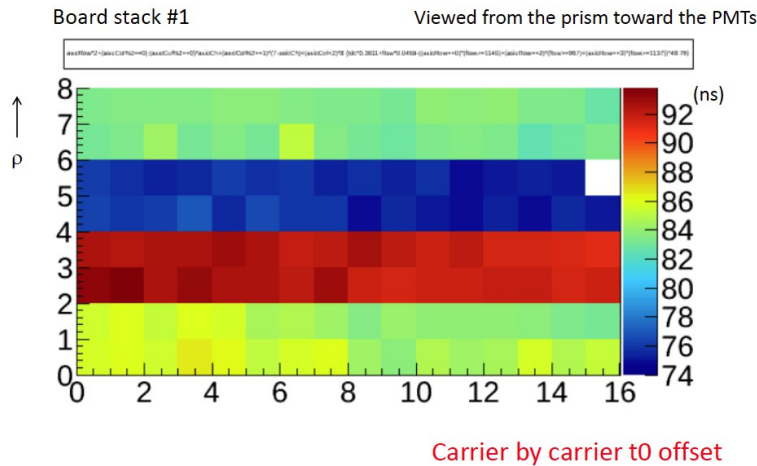
laser timing : $t_{\text{laser}} - t_{\text{FTSW}} = 80 \text{ ns}$
 cosmic ray timing : $t_{\text{cosmic}} - t_{\text{FTSW}} = -355 \text{ ns}$
 \rightarrow need to increase # of lookback windows by ~ 18.4 windows ($\sim 435 \text{ ns}$)



Primi segnali calibrazione laser da M01

TDC distribution of each channel

Mean TDC distribution



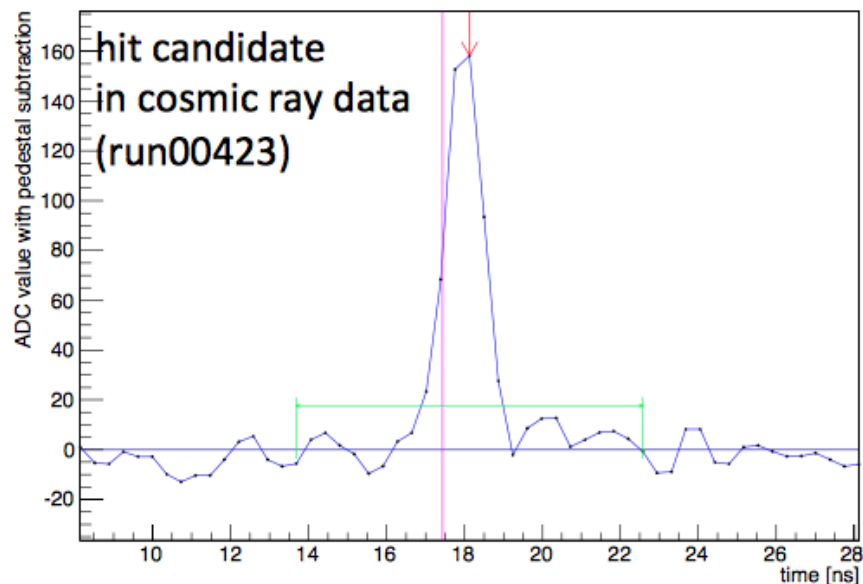
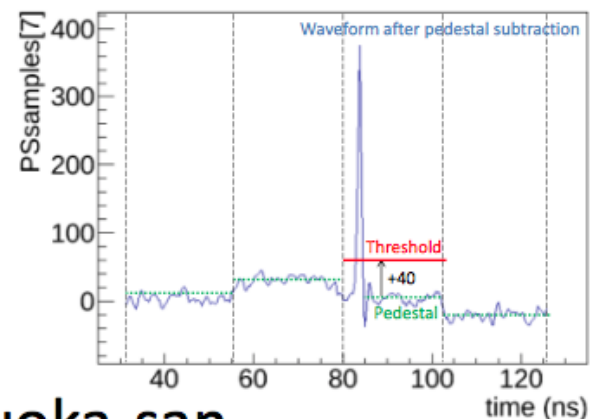
Discussione nel talk di Stefano
Richiesta di G.Varner: provvedere un PLC e una
splitter a 4 canali per Fuji Hall

Raggi cosmici in M01 a Fuji Hall

quick look of the data

from Matsuoka-san's slide

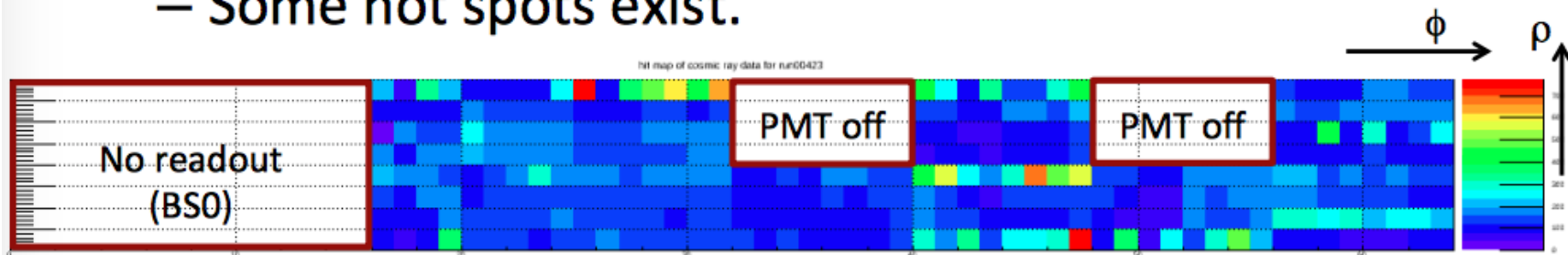
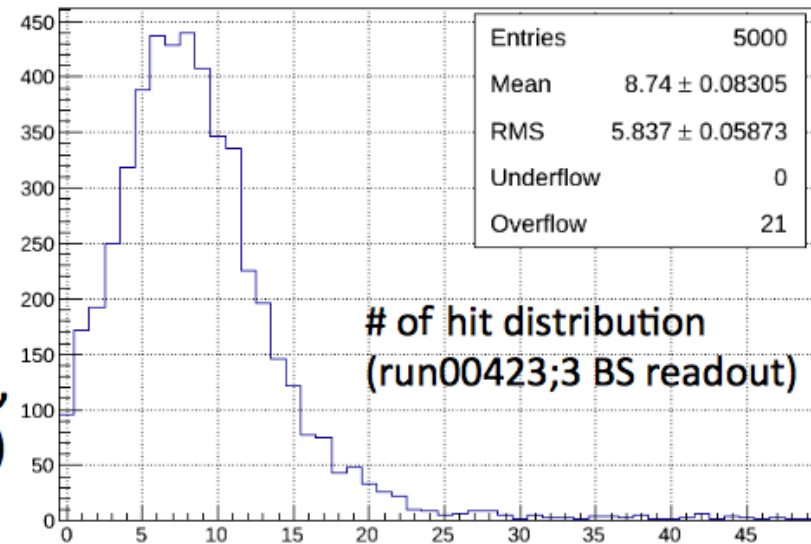
- analysis procedure
 - pedestal subtraction
 - window by window baseline correction as was done by Matsuoka-san
- hit identification
 - local maximum with >50 ADC counts



Raggi cosmici in M01 a Fuji Hall

hit distribution – run00423

- # of hits
 - no timing selection
 - 8.7 p.e. in average
 - smaller than expectation, ~ 20 p.e. \times coverage (62.3%)
 ~ 12.5 p.e.?
 - to be compared with MC simulation
- hit map
 - Some hot spots exist.



Test su Modulo 01: Sommario delle conclusioni (Luo, Maeda e Kichimi-san)

- Ancora firmware problems : a tutt'oggi non riusciamo a leggere tutti i 4 BS insieme ad alto rate
- Spiacevole che 1 ASIC rotto faccia spegnere 2 PMT

Issues on module test in Oct.

1. One BoardStack readout : **4windows x 4carriers**
Stable data taking for a few hours
 - (1) Ring buffer of 64 windows
 - (2) Centering signal by lookback
2. Setup of BS 2 hours for setup
 - (1) FW download (~5min)
 - (2) Configuration (~40min)
 - (3) Centering signal in the windows
16 win → 4 win for 4 carriers (~40min)
3. Data collection at 10Hz
 - (1) Pedestal run (10Hz)
 - (2) Calibration run (10Hz)
 - (3) Laser run (10Hz) 100Kevents 3 hours.
 - (4) cosmic run (~1Hz) over night run

Mdule01 test at Fuji-CRT (gigE-DAQ): Sept.14-29

1. DAQ with various windows
 - (1) One carrier readout with 16windows (Sept.14) (after misalignment fixed)
4 carrierx 4 win/BS is OK.
Centering signal in the windows is well controlled by lookback.
 - (2) One BS readout with **4 windows** (sept.15-24) for BS1,2,3,0
Pedestal/ Calibration/ Laser/ Cosmic .
Almost stable in a long run for a few hours. Only this mode is usable.
2. Status of BS1,BS2,BS3,BS0, tested by calibration signal.
 - (1) BS1 : all 16 asics are OK.
 - (2) BS2 : carrier2-asic1 is bad. (pmt25&26 off)
 - (3) BS3 : carrier3-asic0 is bad. (pmt29&30 off)
 - (4) BS0: car0-asic2,3, car1-asic2,3, car4.(all pmts off)
bad: no signal is seen for calibration signal input (ch7).
We did not investigate the individual 8 channels.
3. Several trials of multi-BS readout, but not stable (Sept.25-30) due to "Daq.error **Timeout** sending xml string". We could continue DAQ.
 - (1) 2BS readout with 4 windows
 - (2) 3BS readout with 4 windows
 - (3) 4BS readout with 4 windows (BS0 HV-off)

Data analysis is in progress by Matsuoka-san and Maeda-san et.al.

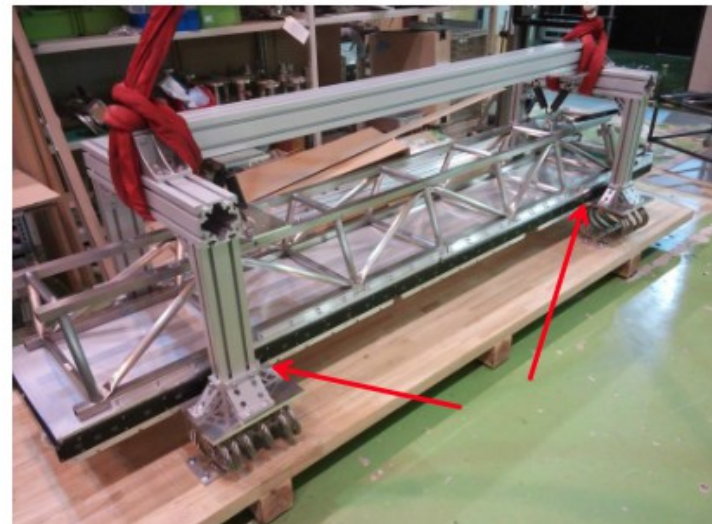
24hours /BS

4. Run script / waveform analysis : to be user-friendly.
5. Difference between rev.A and rev.B
6. How to fix bad asics and how much time.

unknown

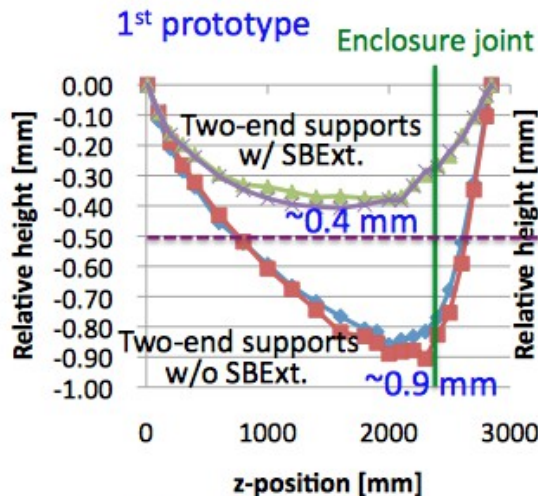
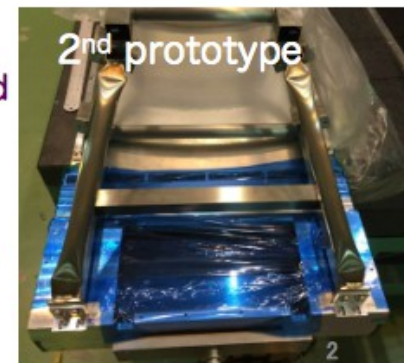
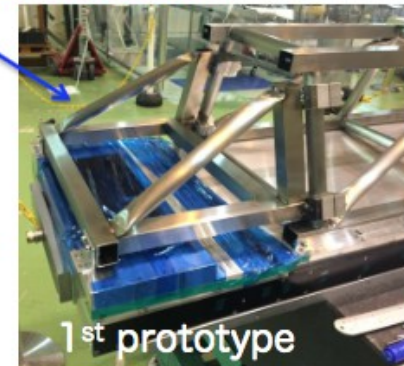
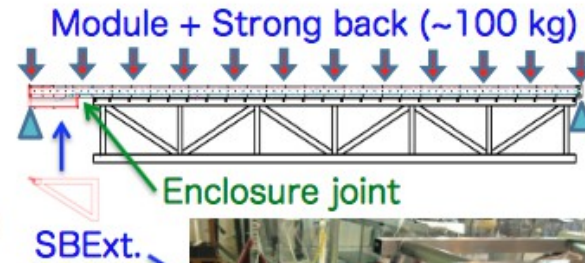
For Installation practice

- Platform at Belle detector is in progress.
 - Will be done this week
- Pallet was tested with Prototype4
 - Changed the vertical frame to be longer
 - It looks OK for other things. Will be tested with G meters
- Prototypes and jigs is moving to Tsukuba now

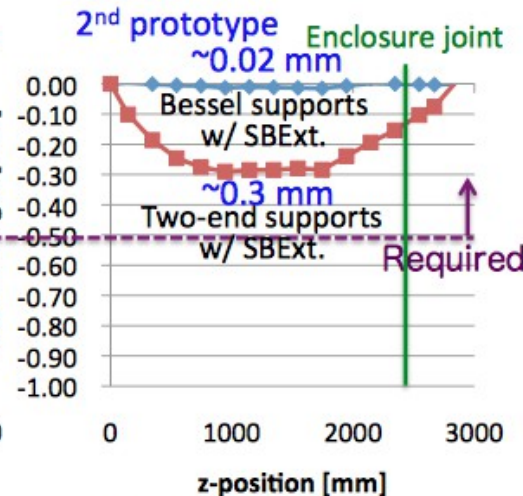


Preparation status (1)

- Strong Back Extension
 - 2nd prototype shows similar performance with the 1st one.
 - The 2nd prototype will be the design for mass production.
 - To be ordered soon for the first 2 modules to be installed in Nov.



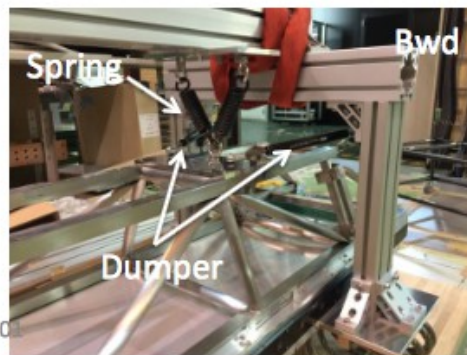
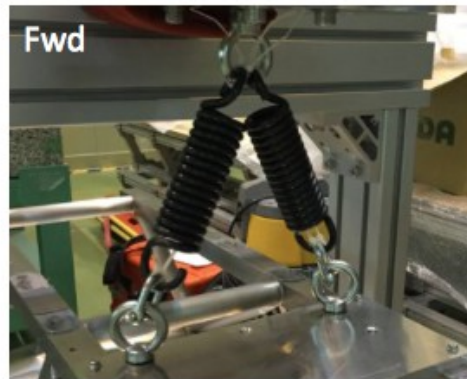
15.10.01



PID upgrade meeting

Preparation status (3)

- Transportation pallet
 - To be tested today using a truck with G-meters.



15.10.0

PID upgrade meeting



TOP: nel 2020/1 dovremo cambiare meta' degli MCP/PMT!

INVESTIGATIONS REPORT

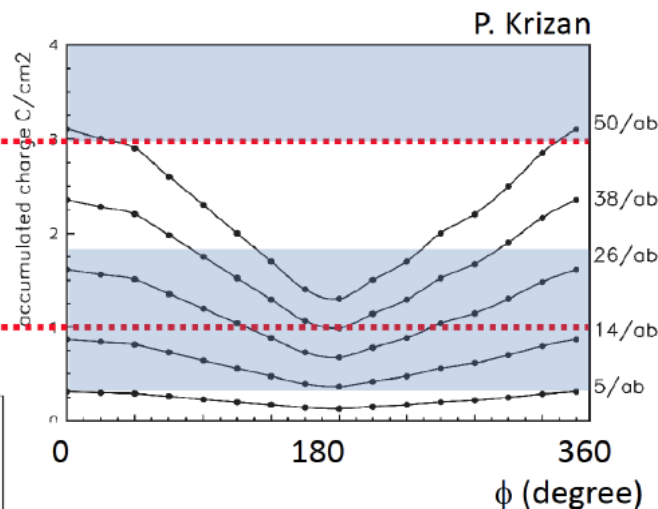
1 MHz/PMT at 5×10^5 gain at design luminosity

→ about $1 \text{ C/cm}^2/50\text{ab}^{-1}$

Plot the accumulated charge for expected summer shutdown luminosities

Min. lifetime,
ALD MCP PMT
($>3 \text{ C/cm}^2$)

Average lifetime,
Conventional
MCP PMT
($0.3\text{-}1.8 \text{ C/cm}^2$)



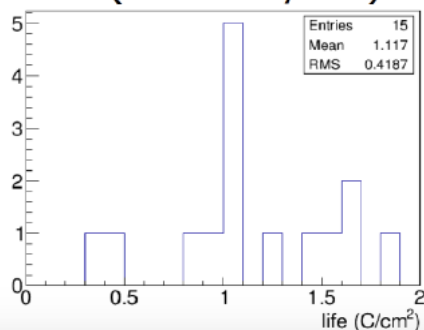
2023: 50/ab

2022: 38/ab

2021: 26/ab

2020: 14/ab

2019: 5/ab

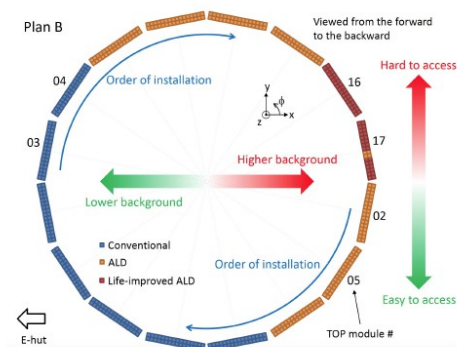
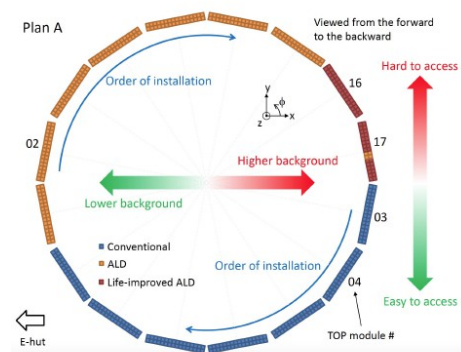


Plan A

- 7 TOP modules with the conventional MCP-PMTs are placed at the bottom positions, which are easy to replace the PMTs.
 - Replace all the conventional MCP-PMTs in 2020.
 - We can avoid placing the ALD MCP-PMTs at the highest background positions to use them as long as possible above 50 ab^{-1} .

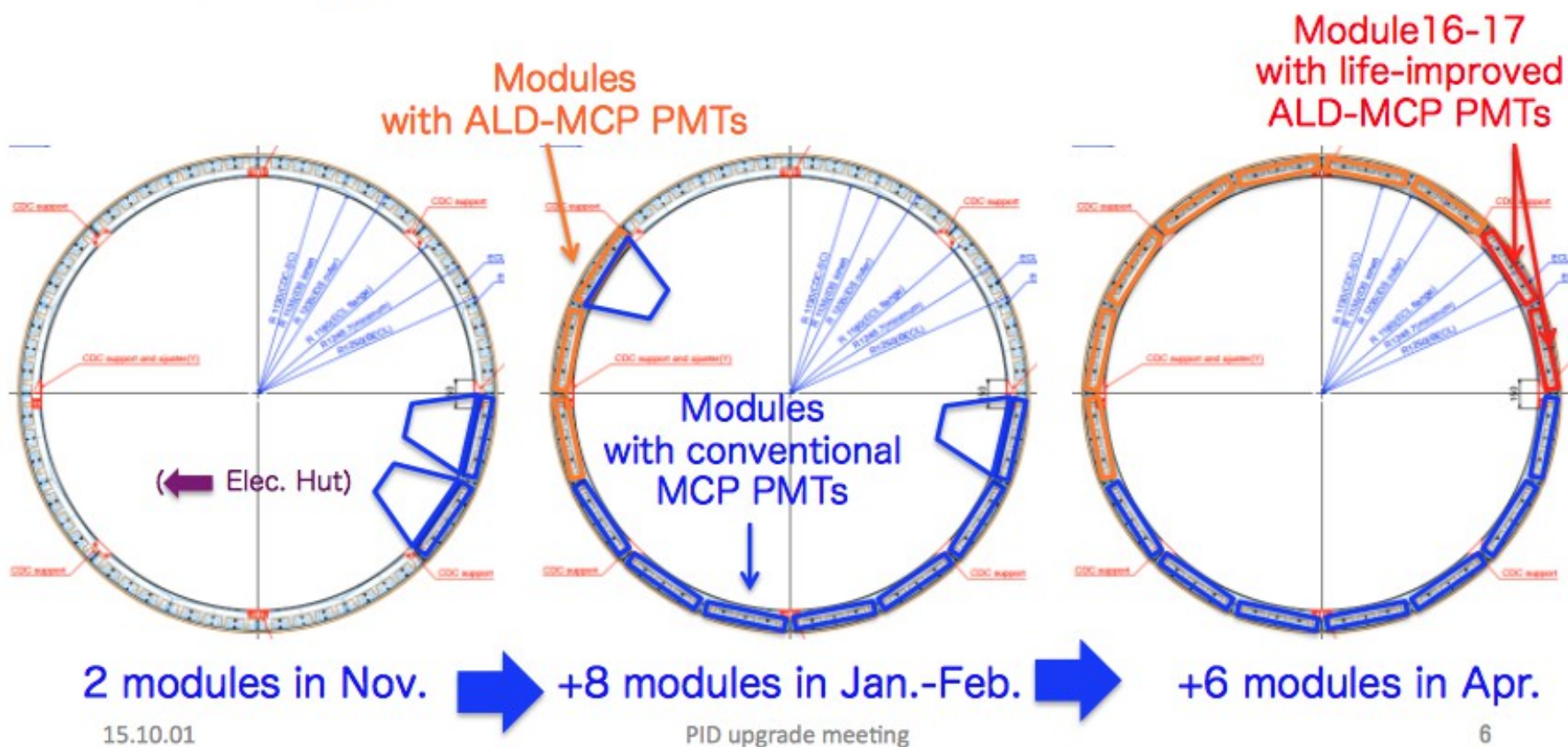
Plan B

- 7 TOP modules with the conventional MCP-PMTs are placed at the lower background positions.
 - Replace 2 modules in 2020 and 5 modules in 2021.
 - 2 of them are placed at the upper side, which will be hard to access.
 - We cannot avoid placing the ALD MCP-PMTs at the highest background positions.



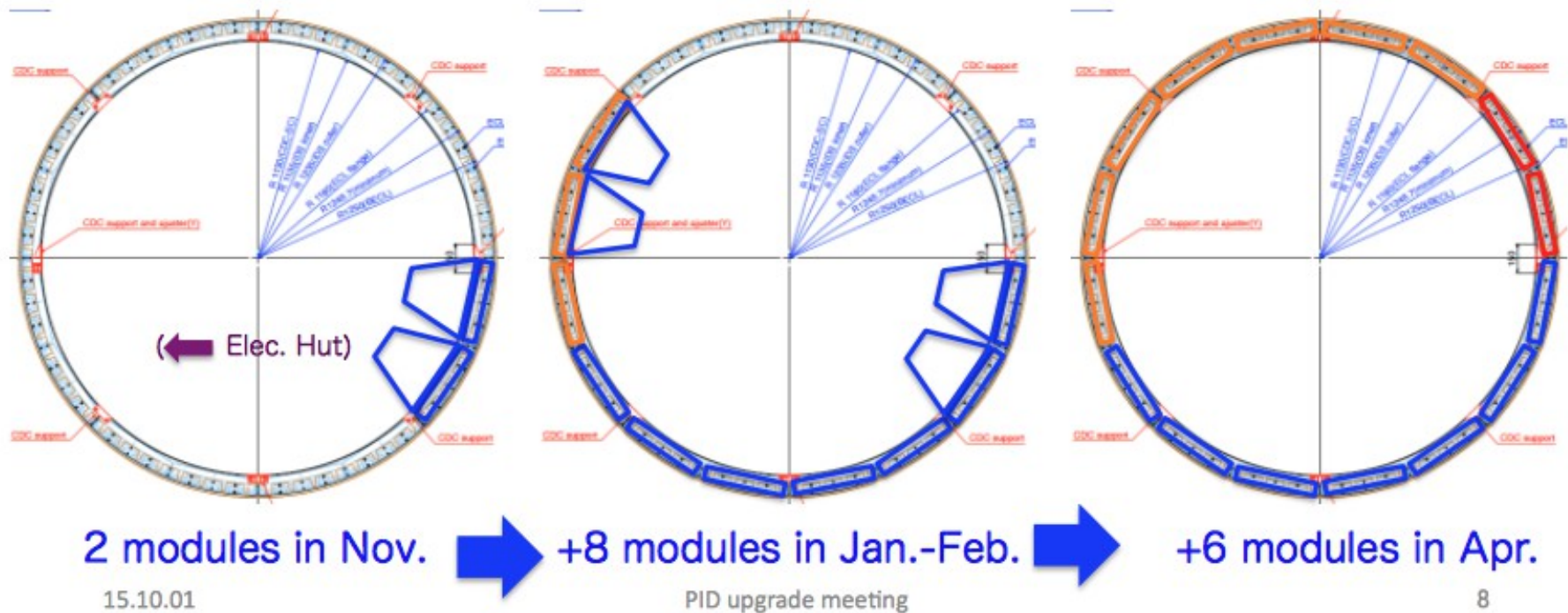
Plan for the 2nd installation (1)

- 10 modules in continuous slots?
 - If so, need to prepare the PMT integration that way.
 - Any suggestions?

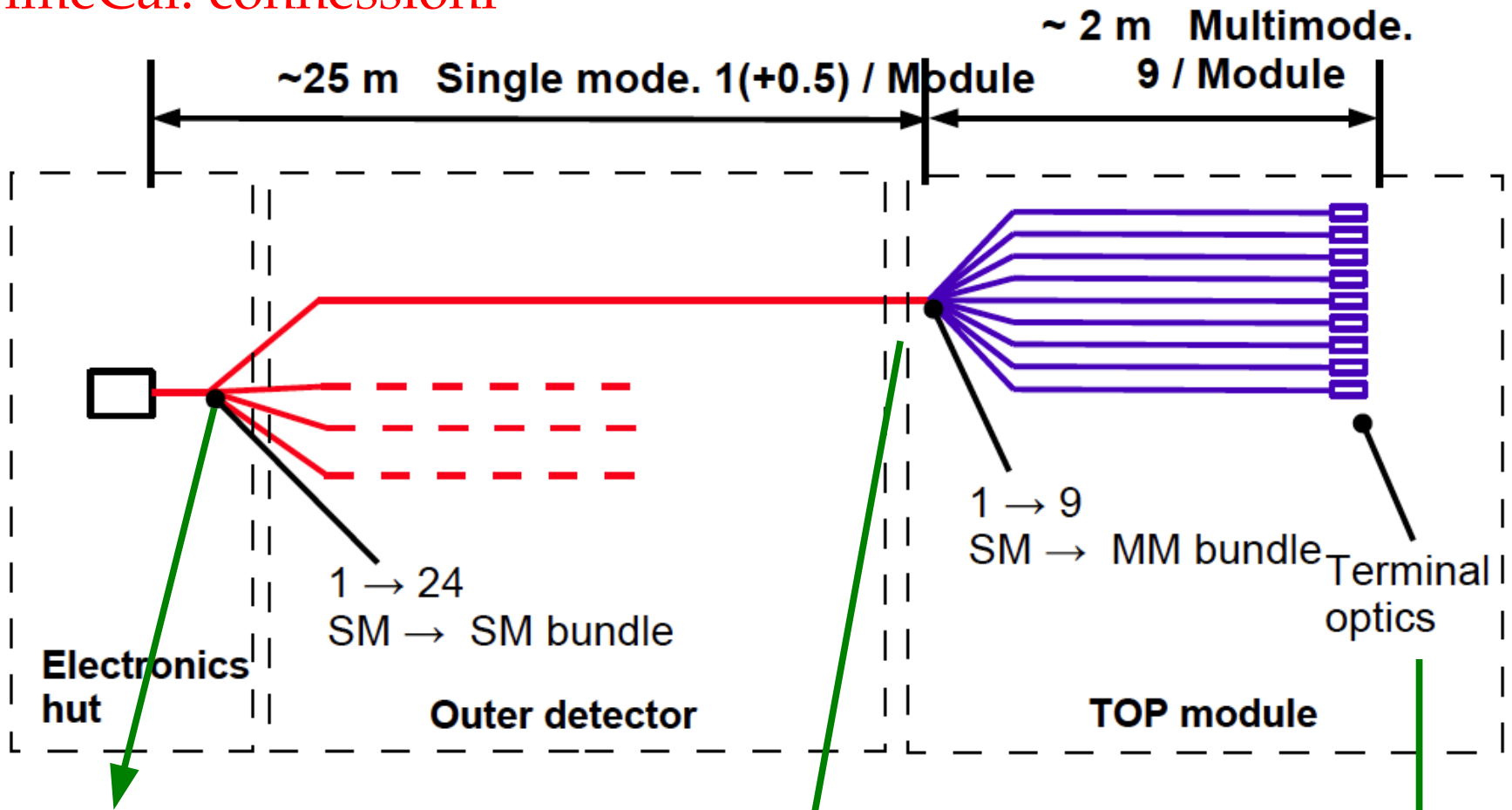


Plan for the 2nd installation (3)

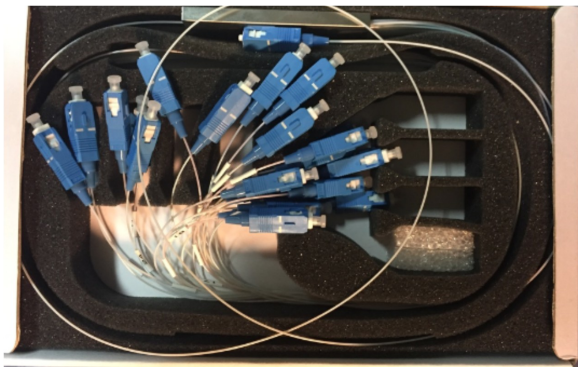
- Or can we leave just the 4 SB+SBExts after the 2nd installation?
 - Not to bother the time and cost before the 3rd installation.



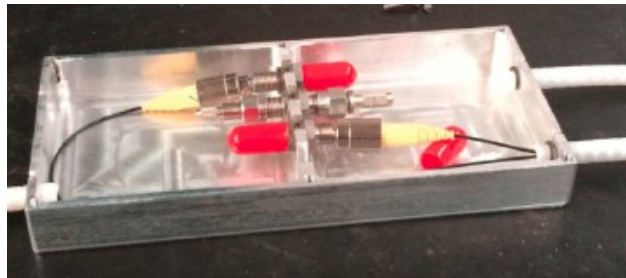
TopTimeCal: connessioni



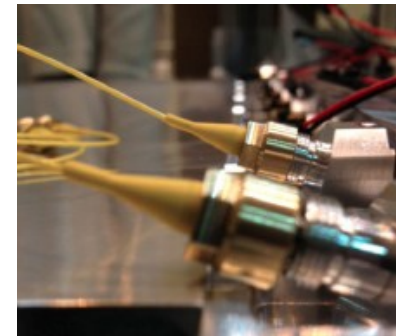
NEW: Splitter 1-24 via PLC
(Planar Light Circuit)



Connettore SM-MM: custom (TO)

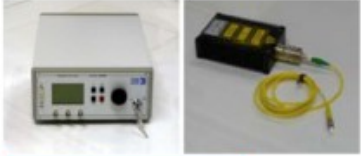


Connettori + GRIN
Lenses: custom (PD)



TopTimeCal: milestones

Parts Procurement



PiLas Laser 100% (1+1 spare)



SM Fibers 100%



GRIN Lenses 100%
Cylinders + Blocks 100%



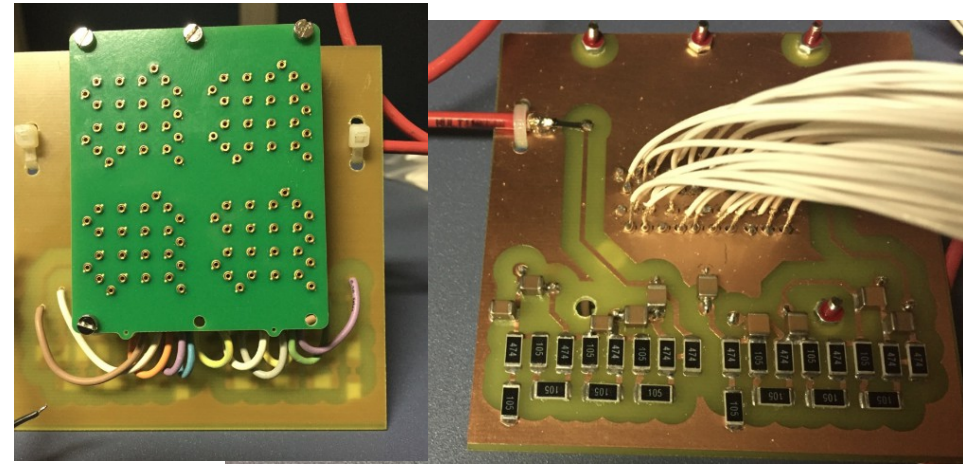
MM fiber bundles 50%
(100% ordered, delivery residual
50% in Oct.2015)



Installazione Fibre SM (Ottobre 2015)

Dopo l'installazione delle fibre SM, il sistema di calibrazione temporale verra' testato in-situ, tramite una coppia di ALD-MCPPMT letti da CAEN V1742.

Una scheda custom di frontend, con partitore e cavi mini-coax, e' stata preparata recentemente da M.Mignone (TO)



Scopo del test:

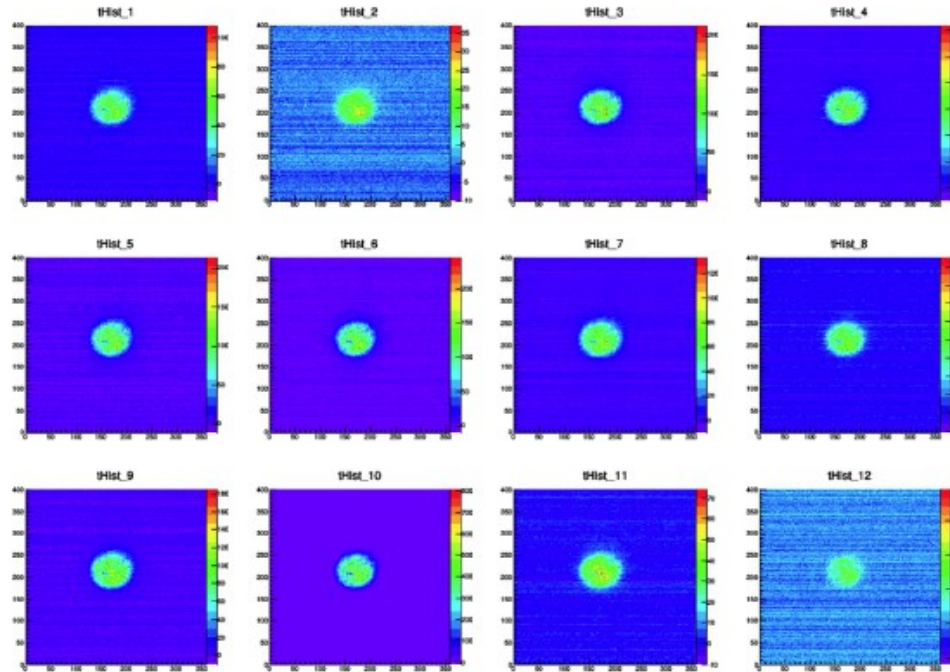
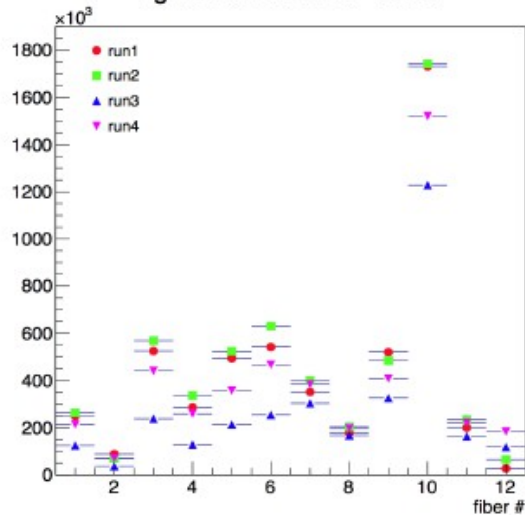
- check risoluzione temporale di SM fibers
- misura ritardo relativo tra le fibre
- ottimizzazione della connessione

Tests sui PLC splitters

I PLC (Planar Light Circuits) sono mini guide ottiche che consentono di aumentare di parecchio la piping efficiency, limitata dal fattore geometrico $\sim (R_{core}/R_{clad})^2$, con fibre SM. Stiamo testando questi splitters per cercare di aumentare la nostra piping efficiency, senza però introdurre disomogeneità e altri tipi di inefficienza.



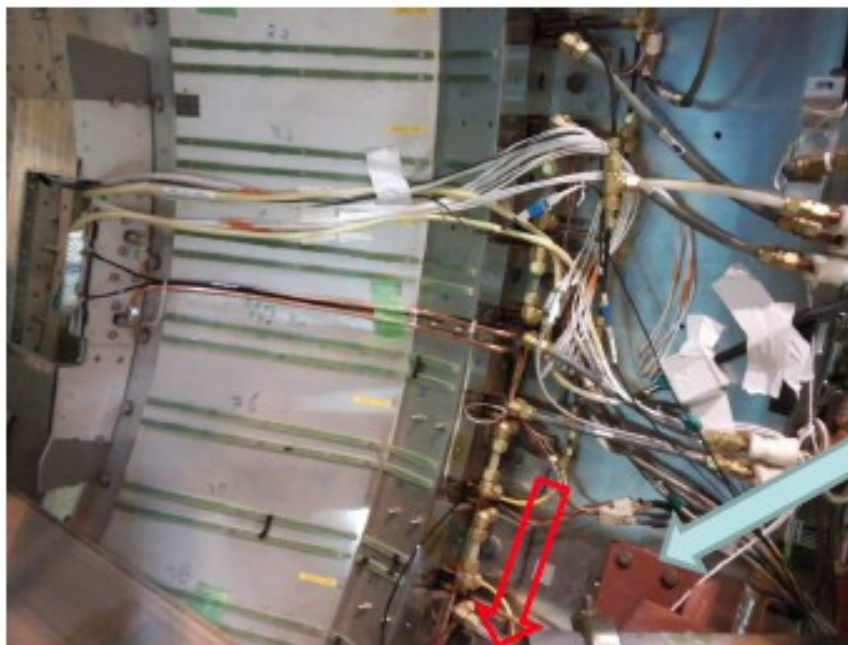
light transmission - PLC1



Connection box in fabbricazione
in officina (Brunasso)
Talks sui tests di A.Gaz e U.Tamponi
in questa riunione

New cable routing

- We need to confirm the route of cat-7 and calibration cables.
 - One proposal is rounding around the magnet region.
- I cannot access the detector yet, but the route looks quite narrow.
 - We can pass through only on the inner surface and the gap between endcap fixture and ECL pipe.
 - It may be possible to pass the cables for one module.



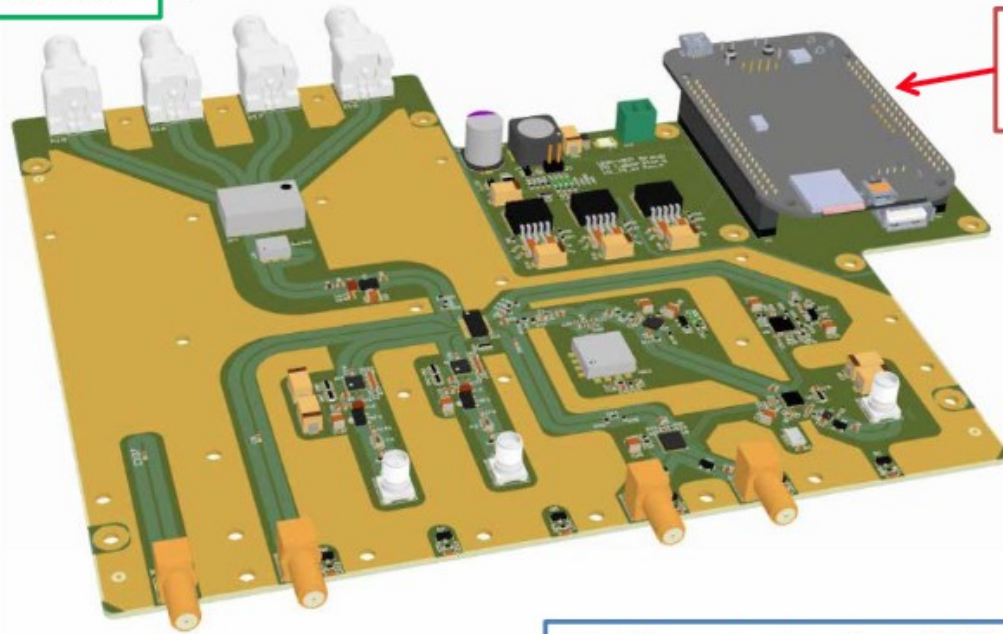
E-hut power line

- **Checked power lines at E-hut F2 TOP rack area**
 - We now have 1P200V50A, 3P200V50A and 1P100V20Ax5.
- **We need**
 - 1P200V30Ax3 for LV power supply with L6-30 connector
 - 1P200V15Ax2 for HV power supply
 - Currently we use 100V15A lines. So, we will change the connector.
 - A few 100V lines for PCs, laser, calibration box, etc
- **Asking the company to make new breakers and sockets**
 - I am proposing 1P200V50Ax4 breakers with L6-30R sockets, but still discussing with the company and other Belle-II members

Per quanto sia poca la potenza che ci serve, dobbiamo assicurarci che il laser abbia alimentazione e protezioni adeguate.

Calibration Master Module

4x out
to
fanout



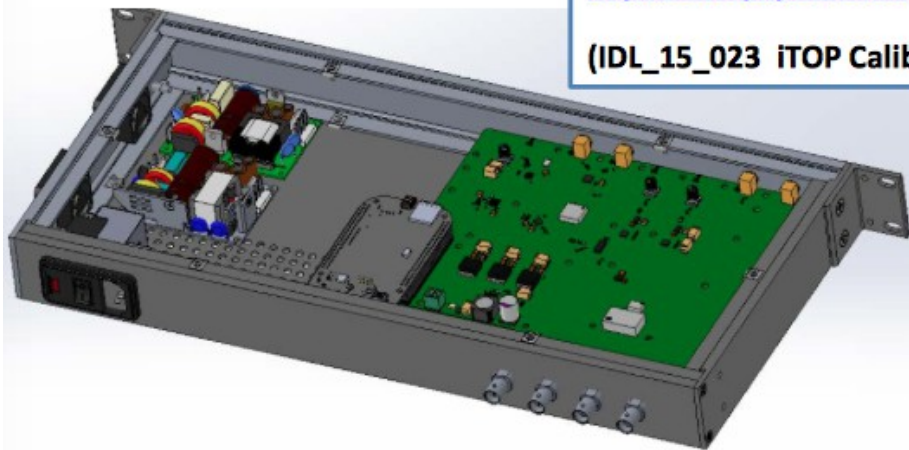
Beagle bone processor
(control/ethernet)

Signal options

- AD9102 Waveform Gen.
- Laser sync
- BPMs (Oho, Nikko)
- Ext. Trigger
- Aux Input (arbitrary)

http://www.phys.hawaii.edu/~idlab/taskAndSchedule/PCBs/PCBs_homepage.html

(IDL_15_023 iTOP Calib Unit – Main Board, Rev. A)



- Final Design Review passed, in fab
- Fanout Design Review next
- Long (35m) LMR-400 equivalent cables ordered

3

Da discutere nella sessione del trigger (Dal Corso)

AGENDA del meeting di oggi

10:00 R.Mussa: Overall schedule and installation plans

Test del modulo 01

10:30- S.Lacaprara: simulazioni vs dati

Misure di Irraggiamento Gamma

11:00- E.Torassa

11:20- U.Tamponi

Tests and measurements with PLC

11:40 - A.Gaz

12:10 - U.Tamponi

12:40-14:00: Lunch break

14:00 Gemba meeting nel nostro lab

15:00 A.Gaz : preparativi e obiettivi del CDC-TOP CR test

15:30 F.Dal Corso : sistema di controllo stabilita' del PiLas

16:00 varie e eventuali

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Backup

Firmware task status

Continuing issues

- ▶ Belle2Link
 - Lots of progress this last week (see additional slides)

- ▶ Register write timing
 - Hardeep has implemented a ~40MHz serial clock FSM; needs to be tested

- ▶ Data read timing
 - Luca testing faster version on laser test stand at Hawaii
 - Gary indicated additional speedup possible (shorter SS_INCR strobe)

- ▶ Feature extraction
 - Frustrating; Ryan back from vacation and digging in

New issues

- ▶ Humidity sensor → Matt A.
 - Will have revB2 boards in Module03/04

- ▶ Loss of communications during large data taking at KEK?

Other high priority issues

- ▶ vPed stability!

Belle2Link Status

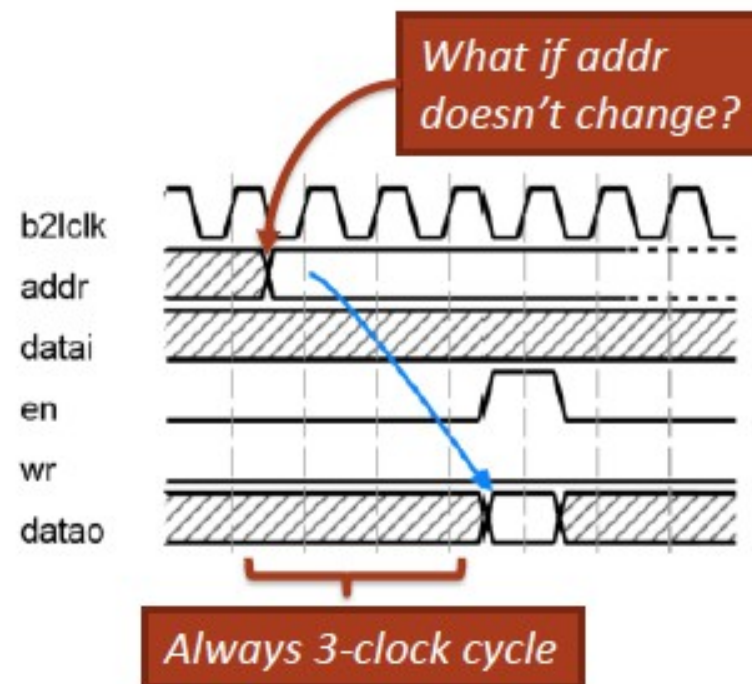


Pacific Northwest
NATIONAL LABORATORY

Prudly Operated by Battelle Since 1965

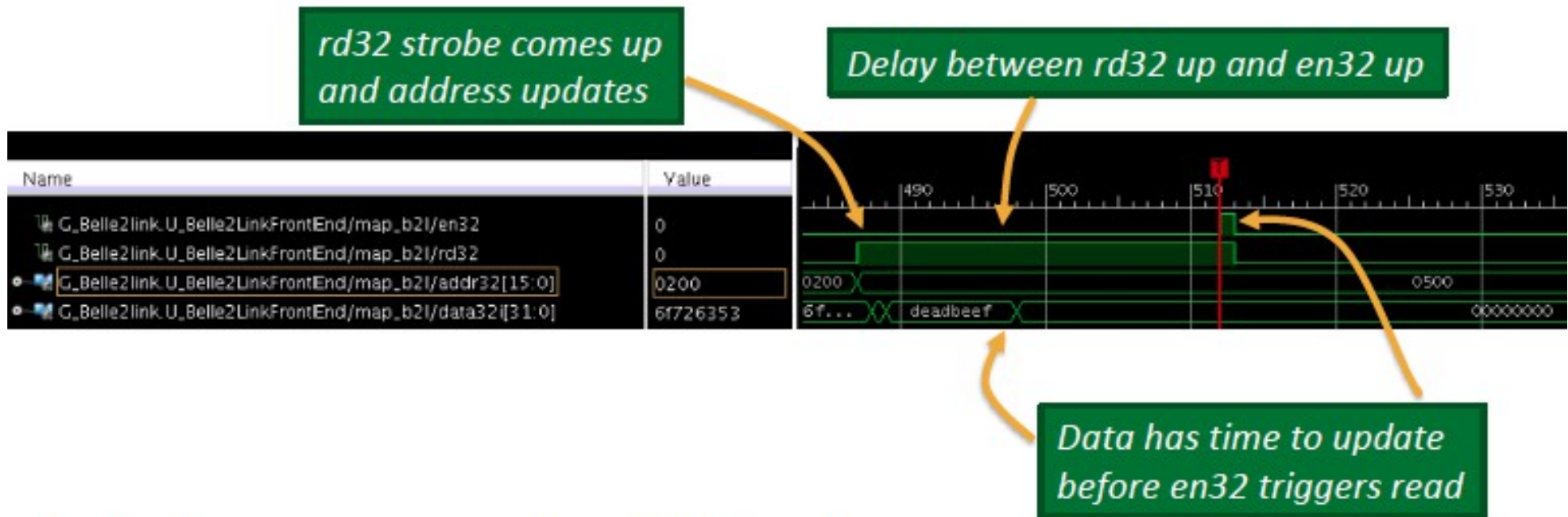
- ▶ Latest gigE changes merged into B2L branch on Friday
- ▶ Added new register mapping this weekend
 - Some odd behavior going on; can read from some devices (SCROD AXI, XADC) but not others (SCROD PS, anything on carrier)?

- ▶ Thought a lot about the B2L register interface for iTOP and tried some improvements
 - Only way to tell that a read is occurring is if address changes
 - Added “rd32” strobe to indicate reads
 - Current B2L requires data in 3 clocks, but SCROD/carriers take 11+ clocks
 - Added “read32slow” operation to allow >3 clocks to present data



Changes implemented and being tested

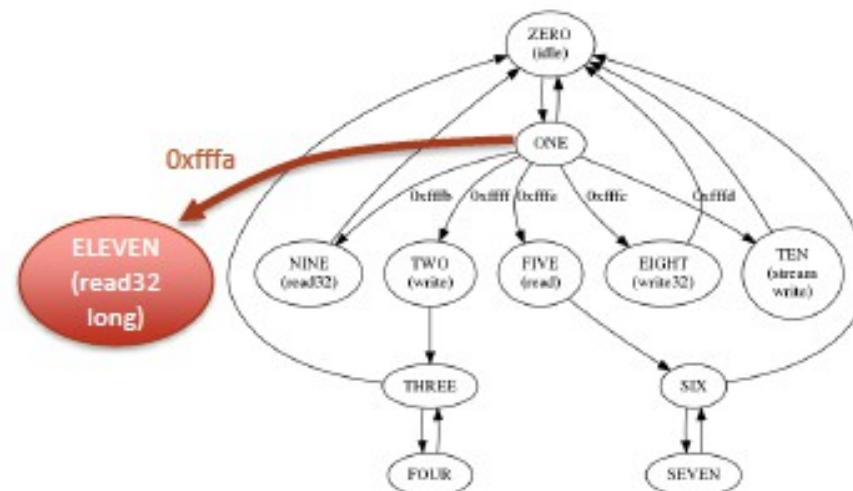
- ▶ Latest version (proper B2L code, ugly AXI interface hack)



- ▶ Looks promising, avoids a lot of hassle
 - Eric working on proper update to AXI interface

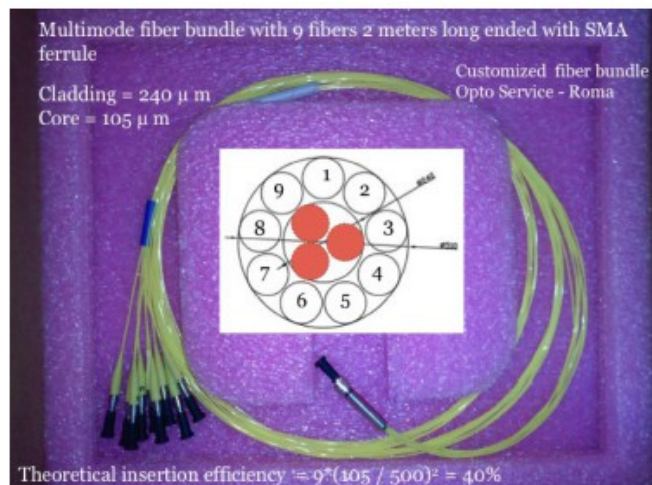
Make these official Belle2Link changes?

- ▶ I have sent descriptions of changes to Nakao-san and Itoh-san
 - Propose making these official changes
 - Designed so they will NOT affect other users (but they can use them if they want)

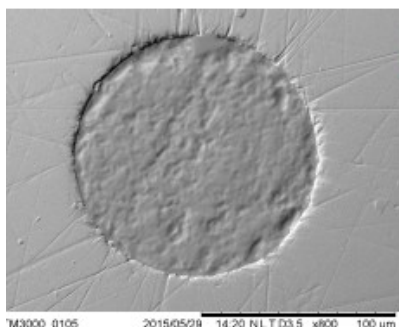
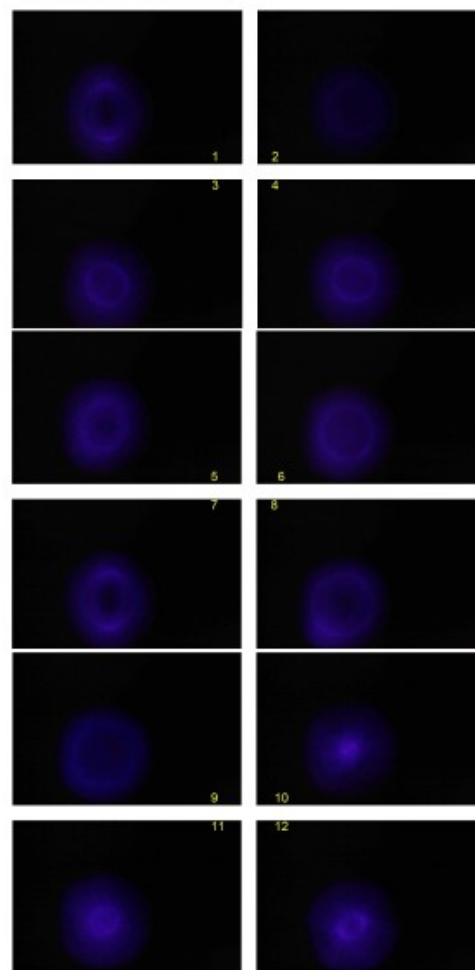


Controllo di qualita' delle fibre

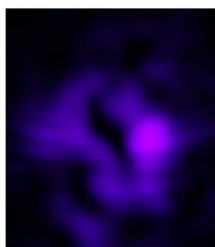
Ottimizzazione polishing fibre SM:
SEM(sn) , Laser (dx)



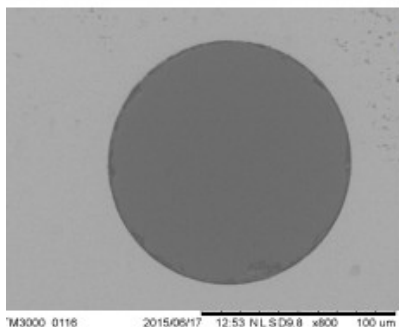
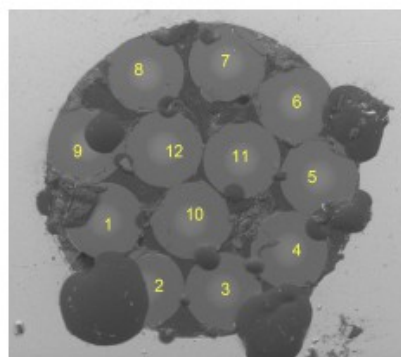
Laser spots da catena SM+MM bundle (senza GRIN lens)



BAD



MM bundle al SEM



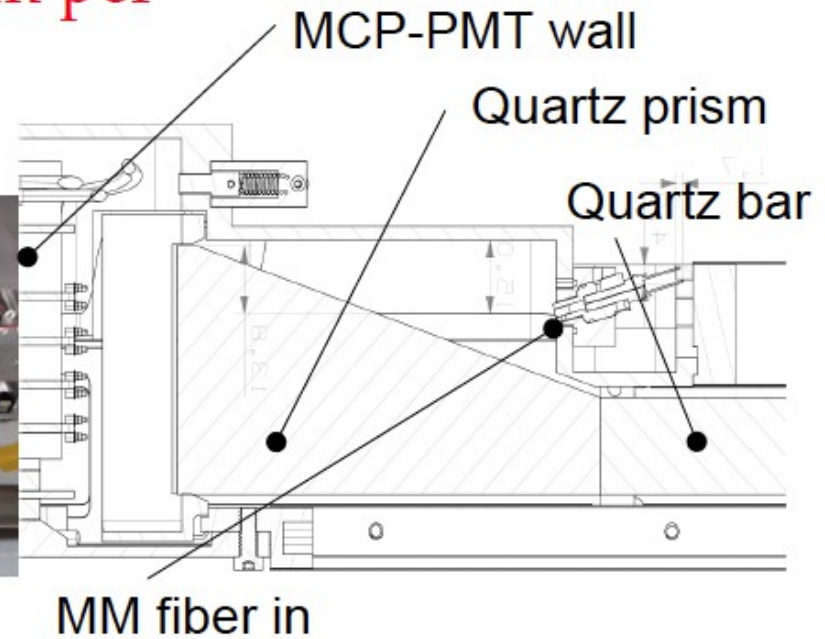
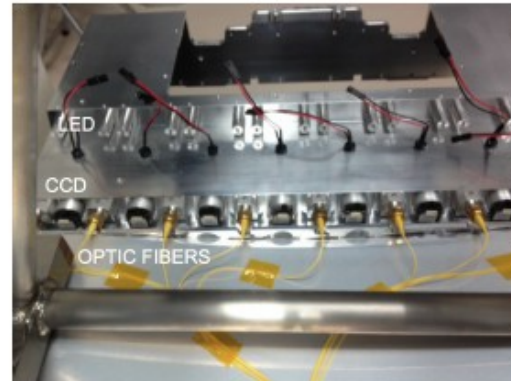
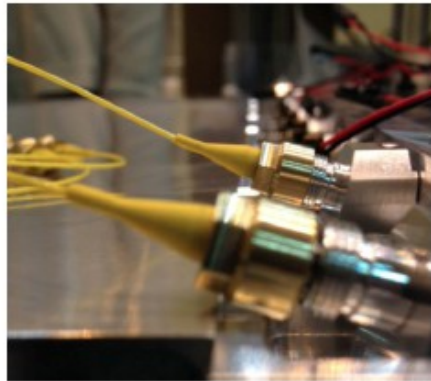
GOOD



(*) foto SEM fatte all'INRIM (M.Pisani)

Realizzazione di connettori custom per il TOPTIMECAL

Conessioni fibre MM sulla QBB (PD)



Conessioni fibra SM- bundle MM (TO)

