Belle II
introduzione e quadro generale

18-02–2016

Belle II - riunione con i referee

G. Finocchiaro INFN - LNF

- Funding e schedule SuperKEKB
- Primi fasci in SuperKEKB e BEAST
- Stato e prospettive di attività e richieste italiane

SuperKEKB funding and schedule

- Although JPY2016 budget is better than previous year, it is significantly smaller than needed.
  - Intense interaction with MEXT to get supplemental budget
  - Letter from MEXT shown by Tom is an extraordinary first case → Grateful to MEXT and KEK Management for the effort
  - Some recovery very likely through supplemental budget + KEK general budget
  - Shift in DR commissioning and Phase 2
  - New schedule endorsed by EB.

Accordingly, MEXT has worked very hard to increase budget for large-scale projects of KEK in FY2016 budget draft in spite of very severe Japanese Government budget situation. As for the future, MEXT will make best efforts to ensure sustainability in operation of KEK projects such as Belle II experiment, by means of taking any other measures as well as financial support in cooperation with KEK and of communicating closely with international collaborators.

Longer term prospects

EB comments I

- Although there is now a budget profile for SuperKEKB/ Belle II, the overall level appears to allow only 7 months of running/year rather than the nominal 9 months/year.
- The international Belle II collaboration will NOT *descope* its schedule and physics goals and risk reducing its overall physics competiveness and interest. Less running time makes it much more difficult to commission the newly built accelerator and achieve its design luminosity.
- *Request to the KEK directorate and MEXT*: Examine all ways of increasing funding, reducing power costs and increasing running time back to the nominal level.
- *Request to SuperKEKB:* Examine all scientific or technical methods of reducing power costs in order to run the nominal 9 months/year.

Cost to completion update

- Ushiroda-san presented an update on the cost to completion.
- The situation is improving, but some issues remain.
  - HAPD: Covered by KEK, Ljubljana and U-Tokyo, Some extra spare wanted
  - ARICH HVPS: KEK and Ljubljana can barely cover, maybe. Question remains in the cost of HV connectors.
  - TOP service: Covered by KEK
  - KLM cables: Covered by KEK
  - RPC readout upgrade: Concentrator boards covered by Nichi-bei money.
    - Still looking for coverage of the readout boards.
  - UT3 Trigger boards: Some covered by KEK in JFY2015,
    - Yet some man yen needed
  - Extra B-field measurement: Do what we can do within our budget: KEK + DESY

SuperKEKB phase 1

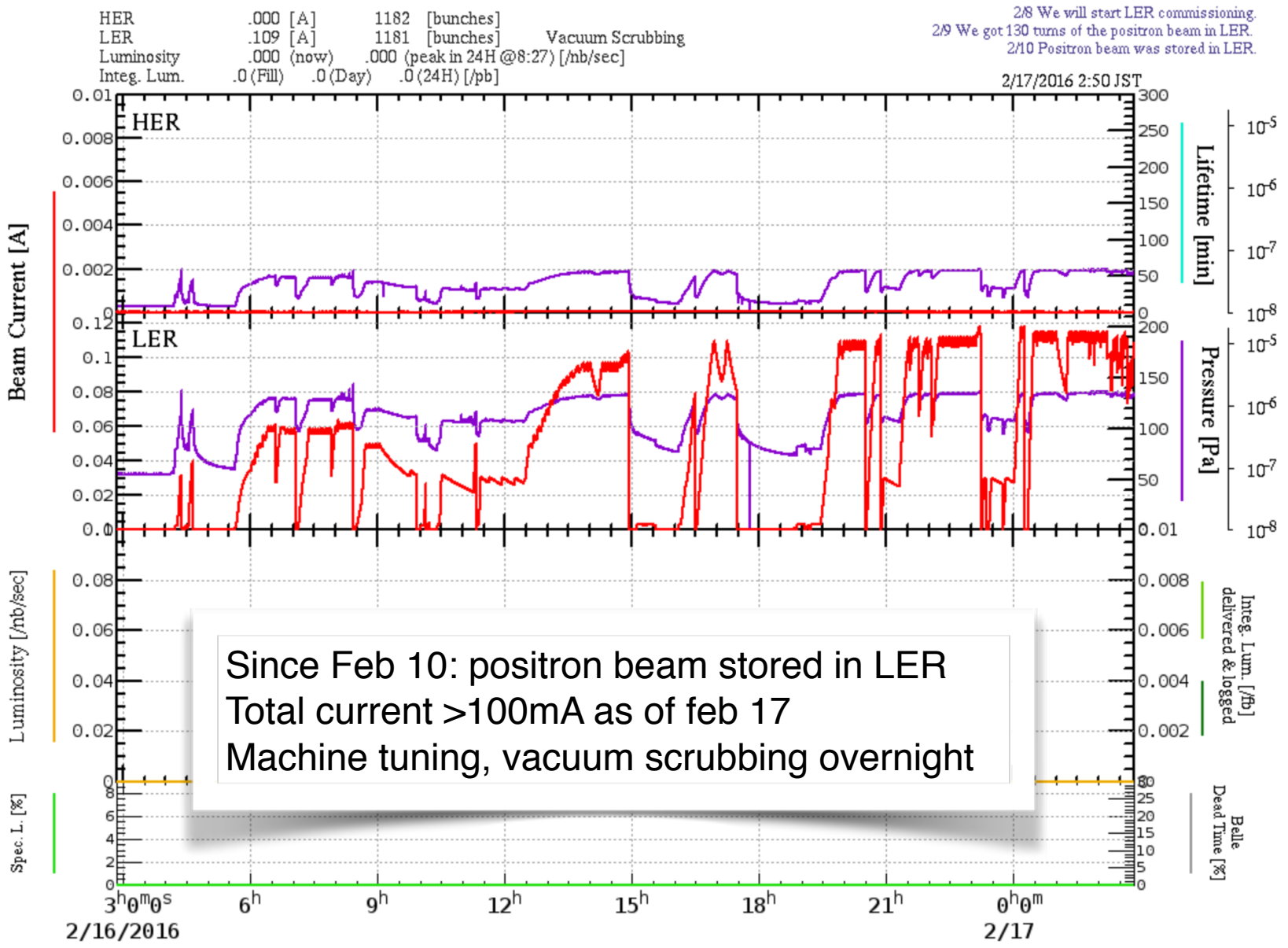
Phase 1 Rough Timetable (5 months)

- Vacuum scrubbing (~3 months)
  - Request from Belle II group: In phase 1 (before installation of Belle II detector)
    - One month vacuum scrubbing with the beam current of 0.5 ~ 1A for both beams
    - Basically the night shifts are devoted to the vacuum scrubbing
  - From the experience at KEKB, it will take about 2 months to store 0.5~1A in both rings.
- Optics measurement/correction/study (~ 1 month 30*2 shifts)
  - The study will be done a small current of ~100mA and so the study is incompatible with the vacuum scrubbing.
- Other tuning/study (~ 1 month)
  - BT tuning (~1 week)
  - Initial commissioning (~2 weeks for both rings)
    - This period is included in the vacuum scrubbing period (of 2 months)
  - Study on detector beam background with BEAST (~6 days)
    - Compatible with the vacuum scrubbing
  - Study on collimators (a few days)
  - Other tuning
  - Other study (2 weeks)
  - Recovery from some troubles…
- Beam off
  - Works of Linac: countermeasures for discharge issues of FC (~3 days, end of March or beginning of April)
  - Radiation Inspection
    - BT: 0.5 shift (March?)
    - Rings: 0.5 ~ 1 shift (May?)
  - Regular maintenance
    - 1 shift / two weeks (from Feb. 25th)

Y. Funakoshi

K. AKAI, SuperKEKB status, schedule and plans, Feb. 1, 2016 @B2GM 15

SuperKEKB 24-hour operation summary



Since Feb 10: positron beam stored in LER
Total current >100mA as of feb 17
Machine tuning, vacuum scrubbing overnight

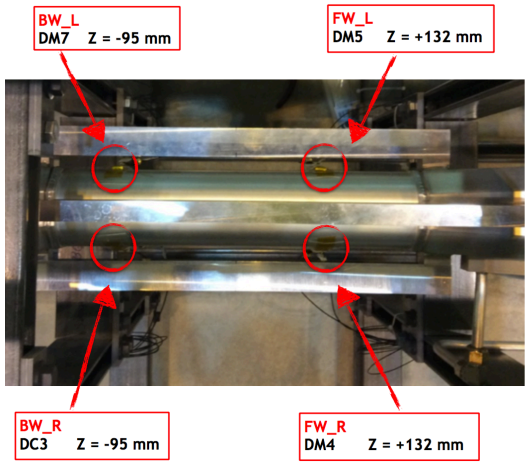
Scopi e detectors di BEAST fase 1

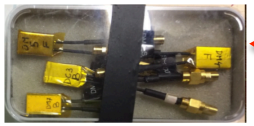
Beam Background Group goals for phase 1

- Measure BG levels near IP
  - X-rays, charged tracks, neutrons
  - online feedback to SuperKEKB
  - offline for analysis
- Test and calibration of diamond sensor VXD beam abort
- First measurements of SuperKEKB injection backgrounds
- First comparison of SuperKEKB beam-loss simulation with experimental data

System	Detectors Installed	Unique Measurement
PIN Diodes	64/64	Neutral vs charged radiation dose
Diamonds	4/4	ionizing radiation dose
Micro-TPCs	4/4	fast neutron flux++
He-3 tubes	4/4	thermal neutron flux
Crystals	6/6 CsI(Tl) 6/6 CsI 6/6/ LYSO	EM energy spectrum
BGO	8/8	luminosity
"CLAWS"	8/8	Injection backgrounds

Beam Loss Monitor - diamonds





- 4 diamond sensors installed (Lorenzo Vitale + Pietro Cristaudo)

Aug. 26th - Sept. 3rd

- DC3: *sCVD*, CIVIDEC metalization (Ti + Pt + Au)
- DM4, DM5: *sCVD*, Micron metalization (Al)
- DM7: *pCVD*, Micron metalization (Al)

Volume: (4.5 x 4.5 x 0.5) mm³

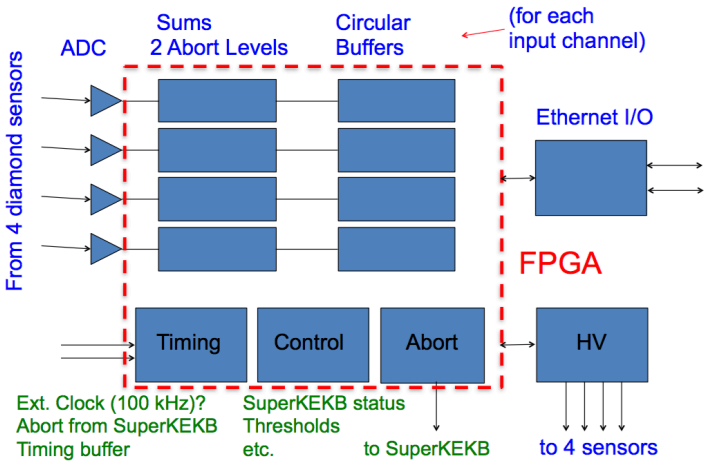
INFN Trieste:

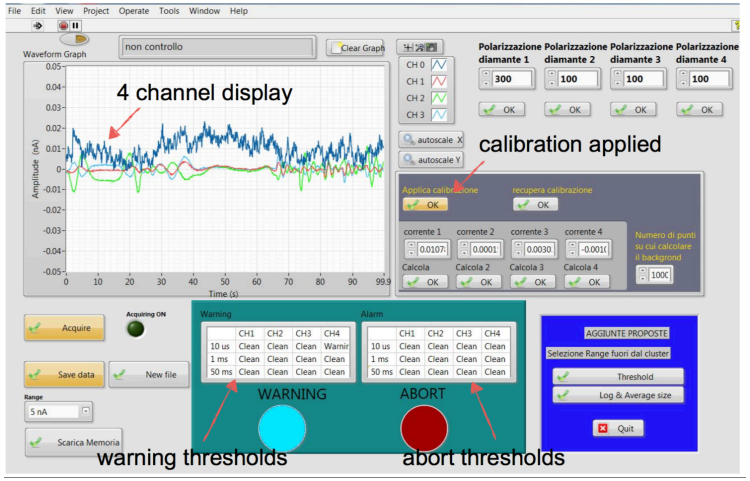
4 diamonds installed

Readout electronics (4 channels)

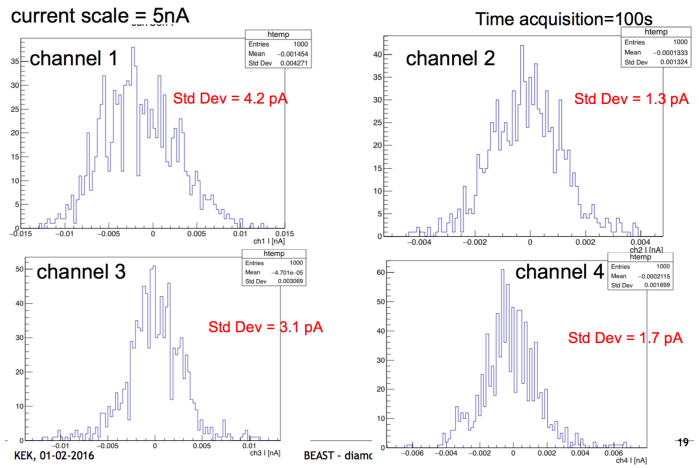
LabView stand-alone program monitoring output, currents sampled at 10 Hz

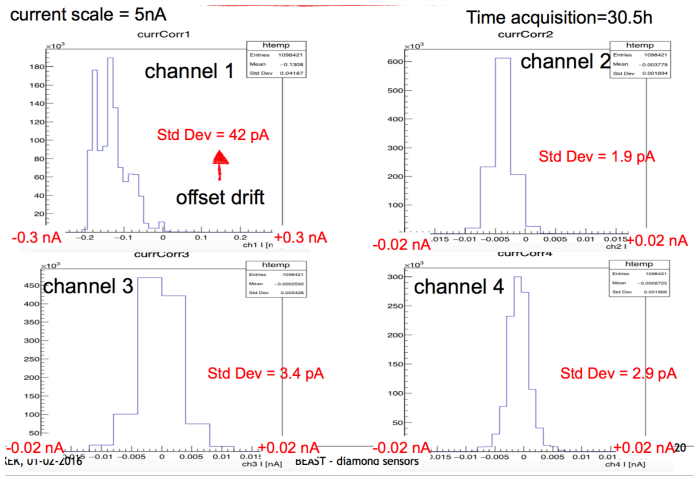
5 nA range selected





Noise measurements and calibrations





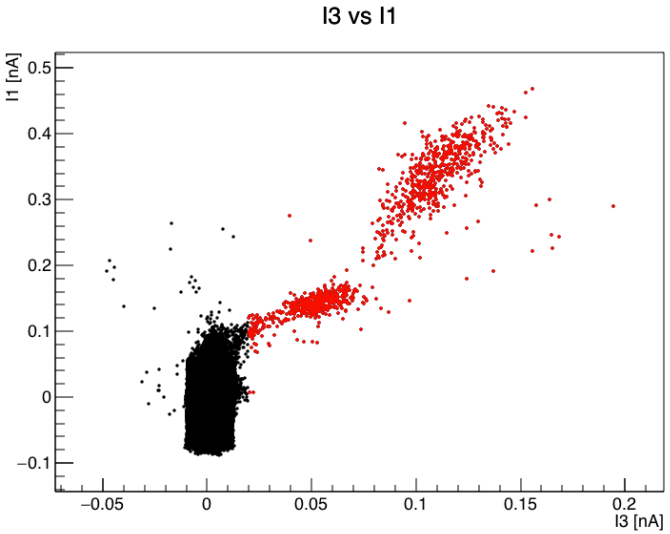
For the 5 nA range (specially prepared for initial low currents, down to few pA):

Short-term (100 s) noise OK: 1-4 pA
Long-term (30 h) noise:
pedestal drift in ch.1 (40 pA)
ch.2, 3, 4 are OK: 2-3 pA

Calibration procedure: see back-up slides

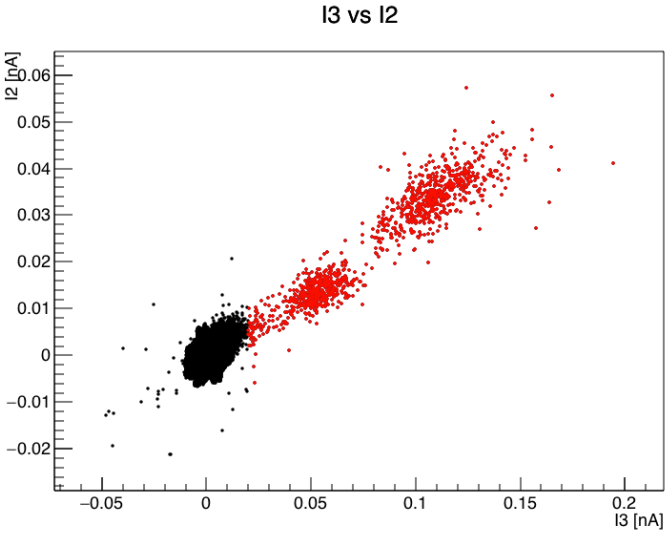
CH	sensor label	position	HV(V)	G_{PC}	sigma (noise) 5nA range	RMS(dose rate)[mrad/s]	sigma (noise) 10uA range	RMS(do rate) [mrad/s
1	DM7	BW_L	300	8.5	0.004	0.02	0.64	2.8
2	DC3	BW_R	100	8.5	0.001	0.006	0.13	0.6
3	DM5	FW_L	100	4.5	0.003	0.03	0.13	1.1
4	DM4	FW_R	100	16.5	0.002	0.004	0.11	0.3

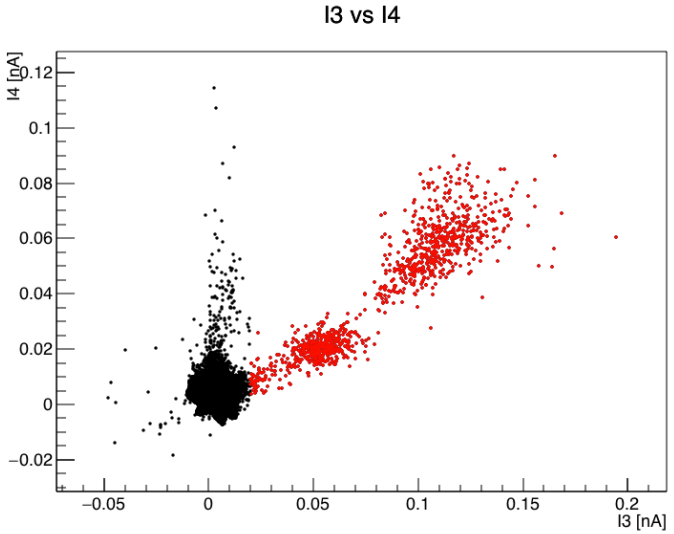
First signals and correlations



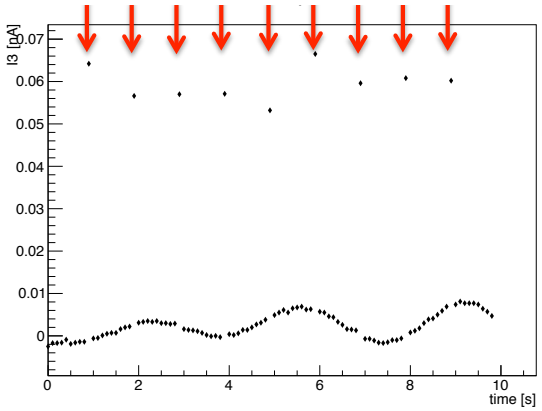
Data: a few minutes of stable injection at two values of injected beam currents (2016/02/09, 12:50)

Read-out electronics: 5 nA range
Correlation plots:
Ch.1 up to 0.4 nA; Ch.2 up to 50 pA
Ch.3 up to 150 pA; Ch.4 up to 90 pA



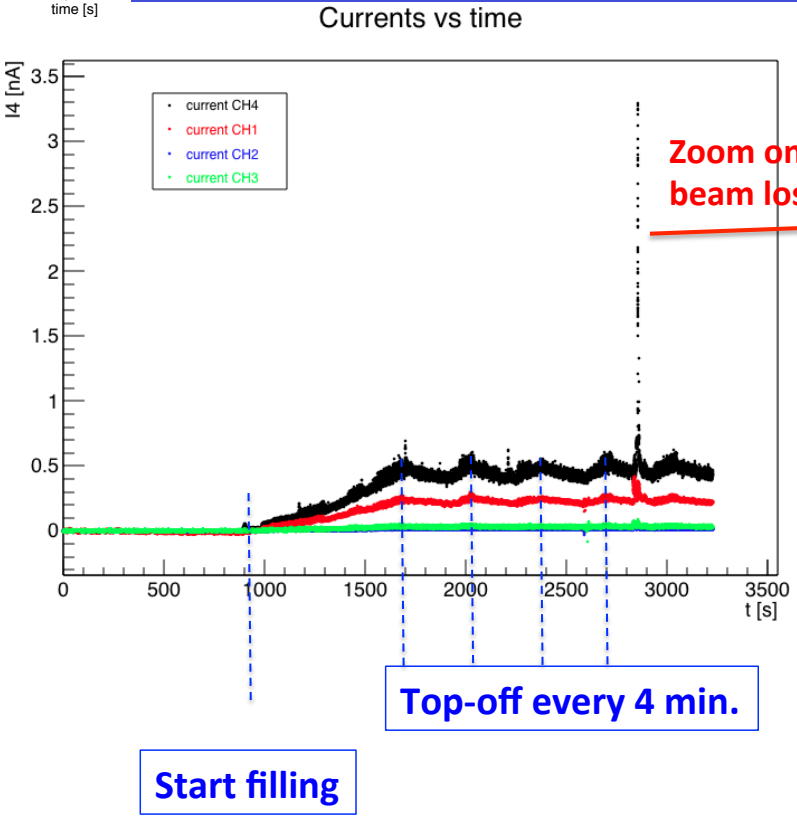


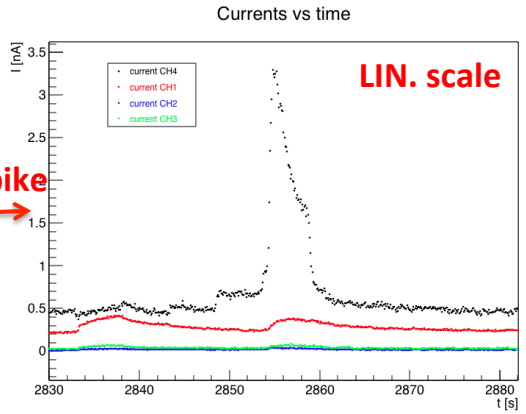
Time correlations

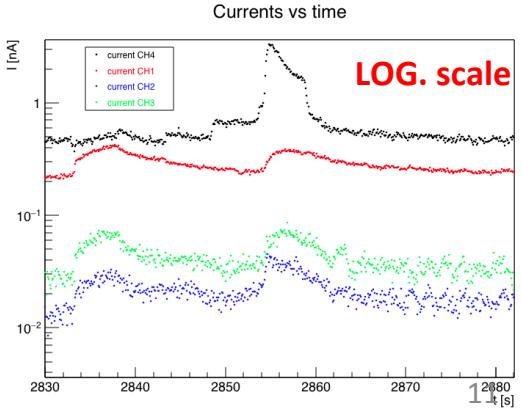


- Example: Ch.3 current sampled at 10 Hz by the readout electronics
- Current from ch.3 > 20 pA Correlated with injection at 1Hz
- Time separation Δt: 1 s Corresponding to 10 x 0.1s

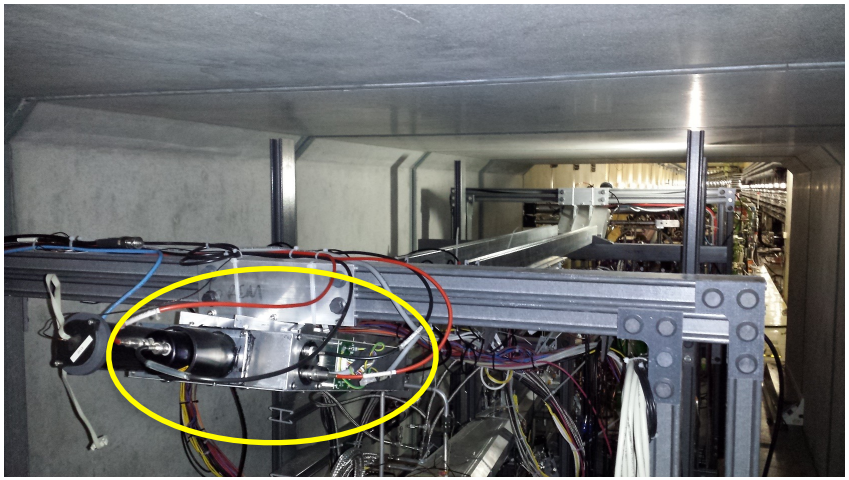
Diamond currents during scrubbing

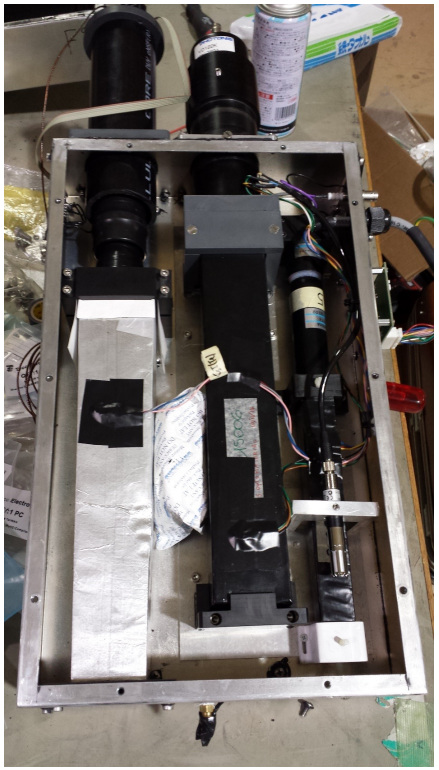






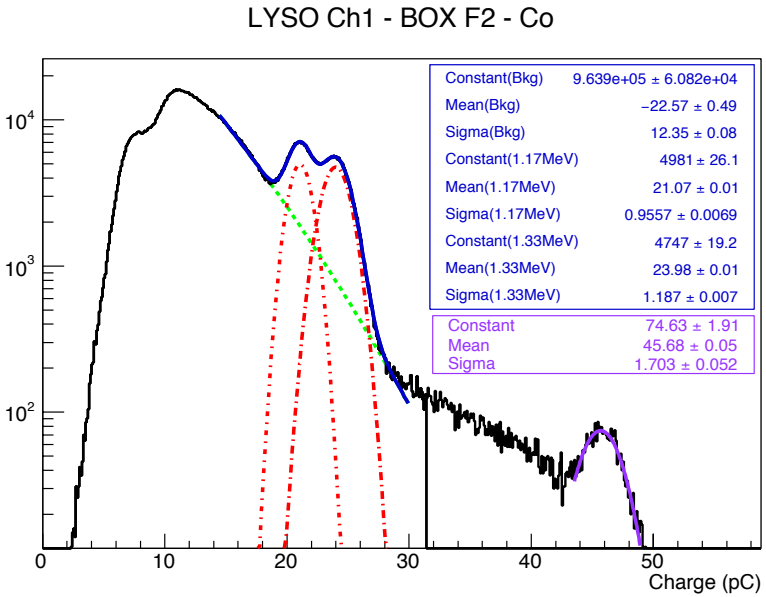
Crystals of the beast





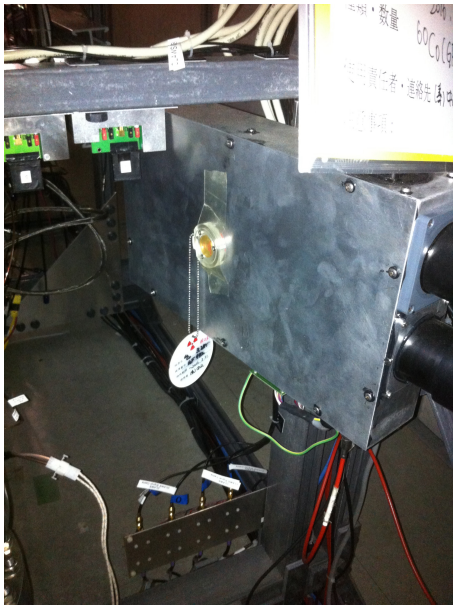
- 6 box contenente ciascuna
  - 1 cristallo di CsI
  - 1 cristallo di CsI(Tl)
  - 1 cristallo di LYSO
- tutti letti con fototubi

Calibrazione dei cristalli

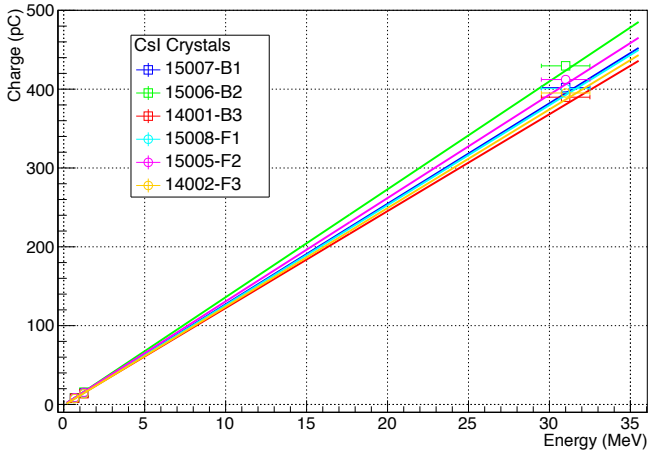


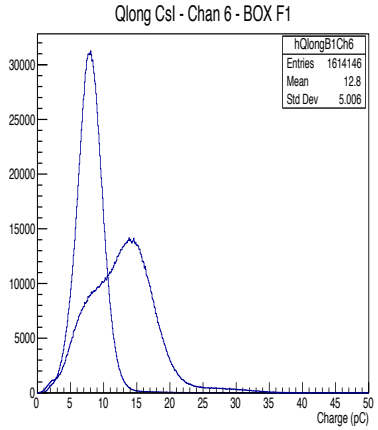
^{137}Cs source
- 0.66MeV γ

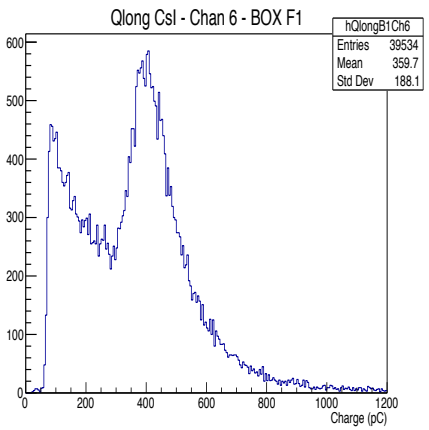
^{60}Co source
- 1.17MeV γ
- 1.33MeV γ
- 2.5MeV both γ collected



Cosmic rays
- ~30 MeV deposit





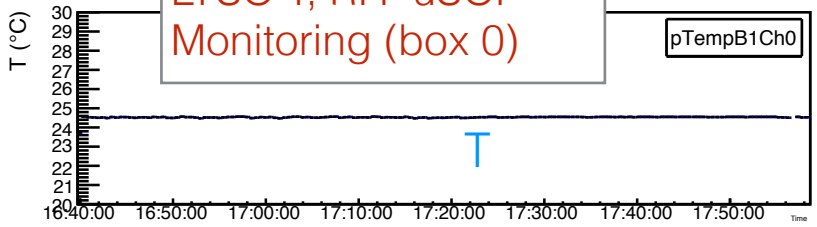


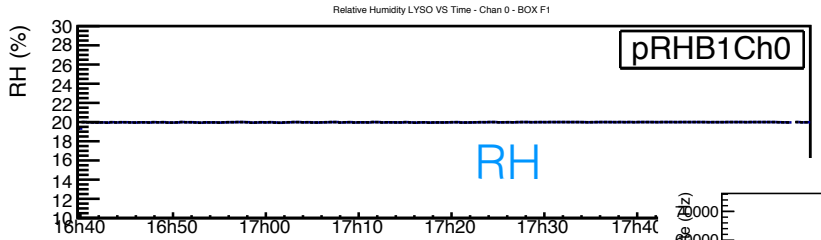
February 9th, 2016

BEAST Data

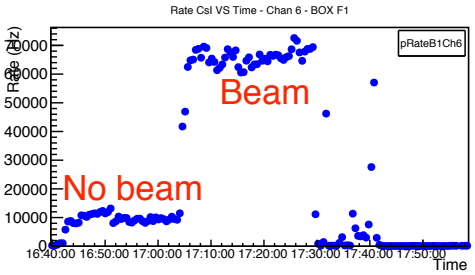
Preliminary!

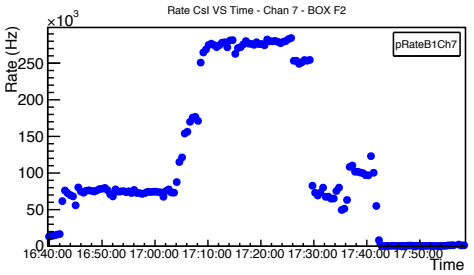
LYSO T, RH uSOP Monitoring (box 0)

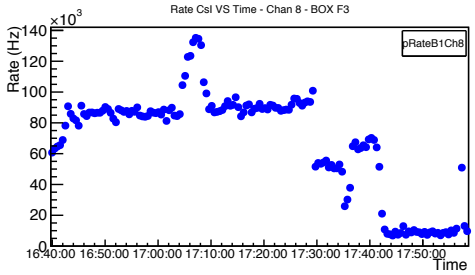


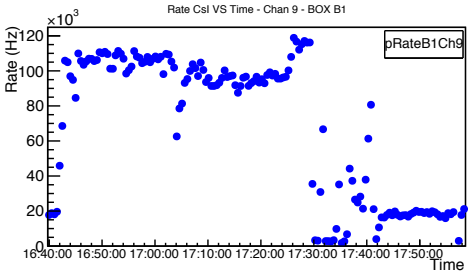


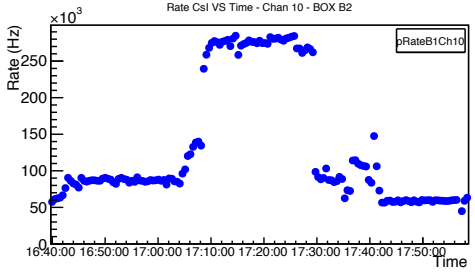
Counts vs. time

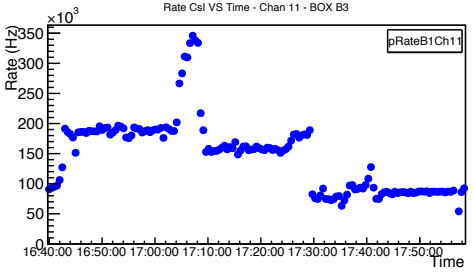








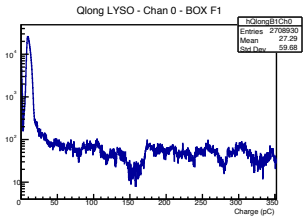


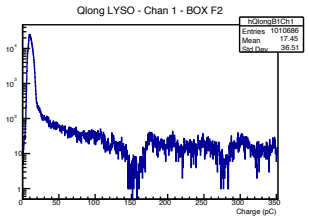


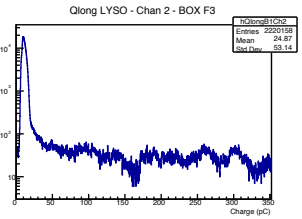
Forward Boxes

Amplitude spectra

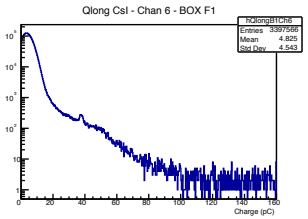
LYS

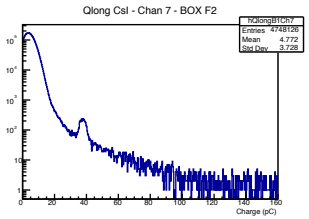


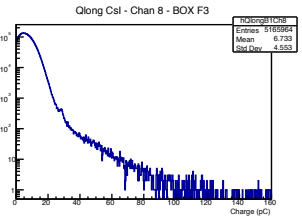




CsI







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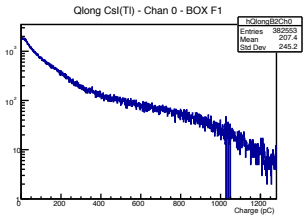
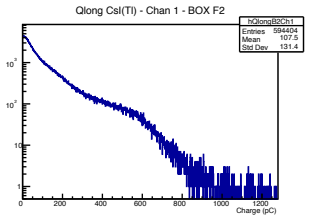
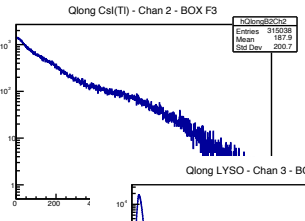
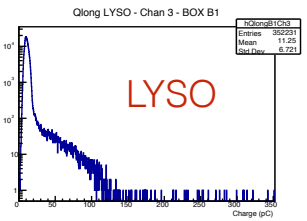


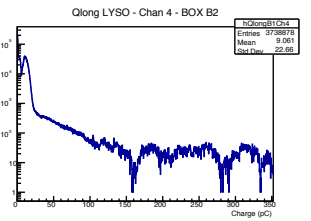


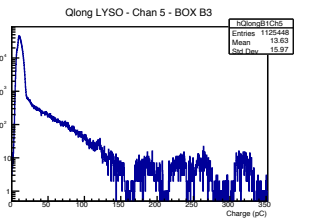


Backward Boxes

LYSO







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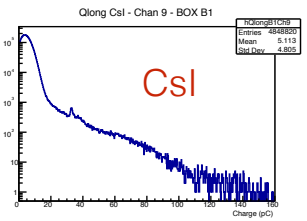
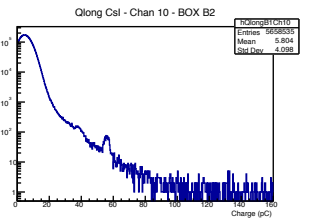
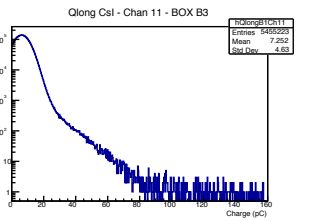
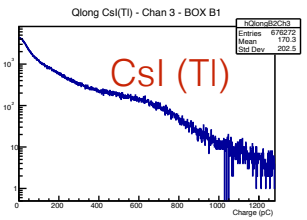
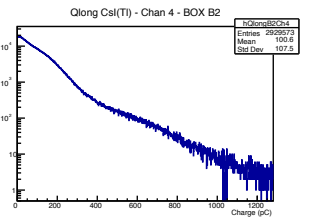


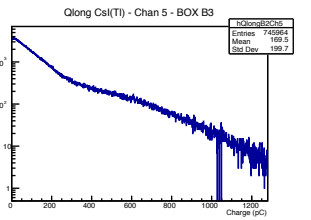




CsI (Tl)







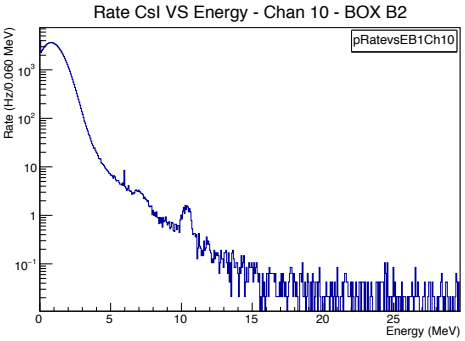
BEAST Data

Preliminary!

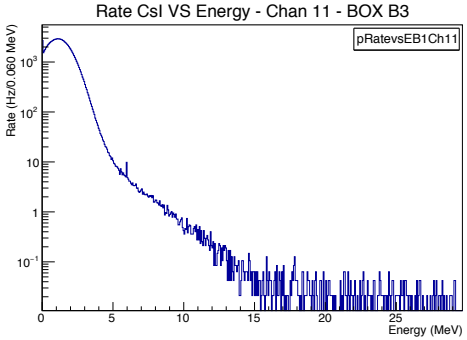
Energy spectra (CsI)

BEAST Data

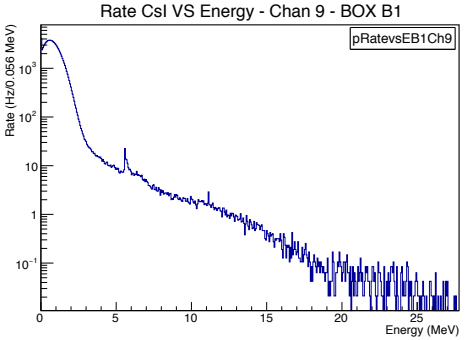
Preliminary!



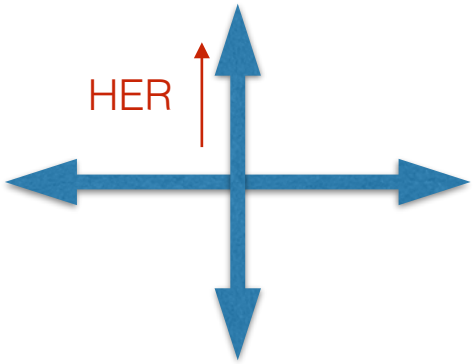
Backward (N)

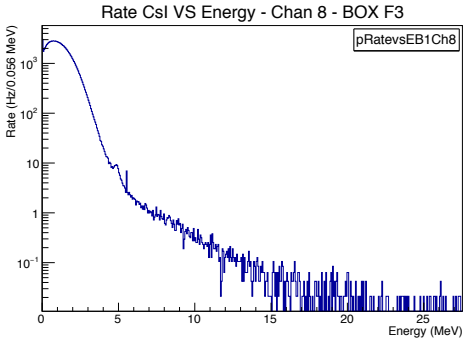


Inside ring (W)
(Belle2 side)

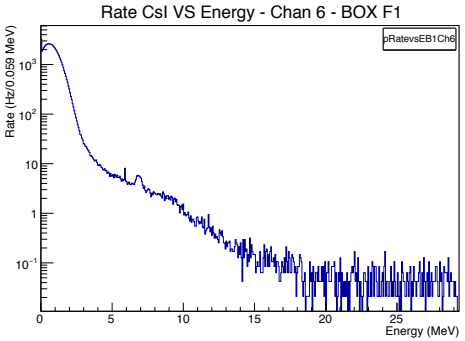


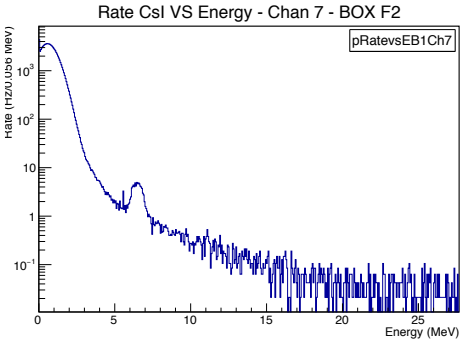
outside ring (E)





Forward (S)





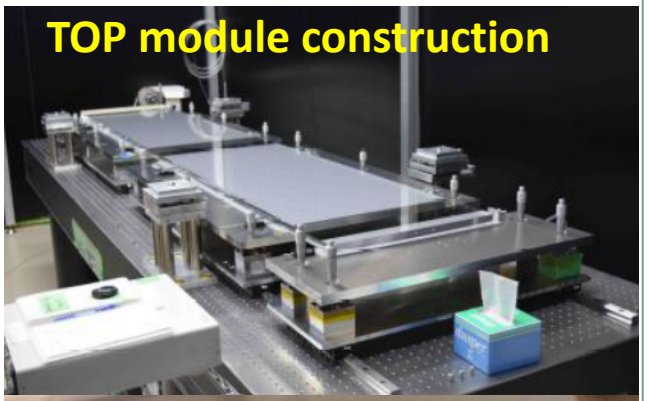
February 9th, 2016

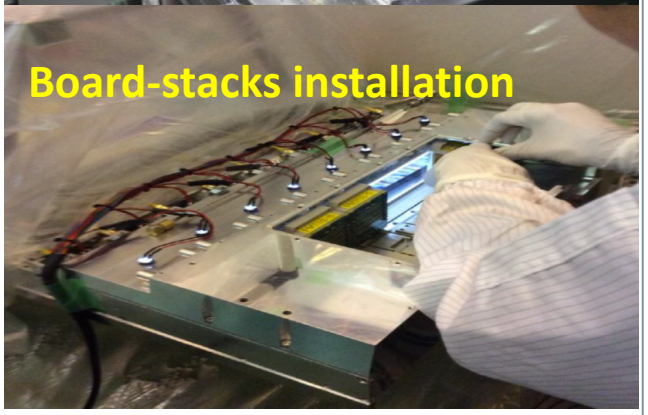
TOP detector update

Tot 17 Moduli (#1 backup #2 - #17 da installare)

Produzione e test quarzi

È stato completato il controllo di qualità dei quarzi per il modulo #16
Le ultime due barre di quarzo (modulo #17)
sono state prodotte e spedite.





Costruzione moduli (quarzo+bar box):

Devono ancora essere completati 2 moduli:

Modulo #16 (è in corso l'incollaggio dei quarzi)
Modulo #17 (sarà finito entro 15 Aprile)

Installazione elettronica:

L'elettronica è stata installata nei moduli #1 - #10

Sistema di calibrazione
Laser e fibre "single mode" sono installati
Bundle fibre "multi mode" e microlenti sono installati nei moduli #1 - #15

Test Moduli:

I moduli #3 e #4 sono stati testati ed inviati in Tsukuba hall.
Sono attualmente sotto test al CRT della Fuji hall i moduli #8 e #9

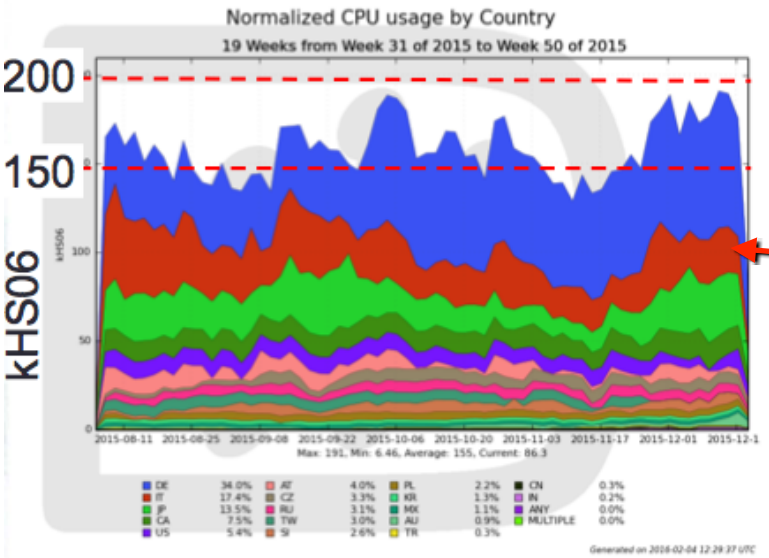
Installazione dei moduli in Belle II

Il modulo #3 è stato installato all'interno del rivelatore Belle II.

La seguente tabella mostra il serrato programma di test (box verdi) ed installazione (box marroni) di tutti i moduli.

	February				March				April					May	
	2/1-2/7	2/8-2/14	2/15-2/21	2/22-2/28	3/1-3/6	3/7-3/13	3/14-3/20	3/21-3/27	3/28-4/3	4/4-4/10	4/11-4/17	4/18-4/24	4/25-5/1	5/2-5/8	5/9-5/15
Module 01					CDC-TOP Test										
Module 02												KLM/ECL/TOP Cosmic Running			
Module 03			DAQ Integration and KLM/ECL/TOP Cosmic Running												
Module 04									KLM/ECL/TOP Cosmic Running						
Module 05												KLM/ECL/TOP Cosmic Running			
Module 06									KLM/ECL/TOP Cosmic Running						
Module 07									KLM/ECL/TOP Cosmic Running						
Module 08									KLM/ECL/TOP Cosmic Running						
Module 09									KLM/ECL/TOP Cosmic Running						
Module 10													KLM/ECL/TOP Cosmic Running		
Module 11													KLM/ECL/TOP Cosmic Running		
Module 12												KLM/ECL/TOP Cosmic Running			
Module 13												KLM/ECL/TOP Cosmic Running			
Module 14															
Module 15															
Module 16	Module Assembly				PMT Installation										
Module 17					Module Assembly					PMT Installation					

5th MC Campaign & contributo italiano



CPU usage trend through MC5

Including test phase:

- 10 months of continuum production
- 10 ab^{-1} equivalent of generic MC produced
- Italian share 17.4%

- Cronica mancanza di manpower nel computing dell'esperimento
- Contributo Italiano:
  - Risorse pledged (CNAF, Cosenza, Frascati, Legnaro, Napoli, Pisa, Torino)
  - Stima delle risorse di calcolo, storage e networking (Napoli, Torino)
  - Data transfer challenges (CNAF, Napoli)
  - Studi di accesso ai dati con protocollo HTML (Napoli)
- Responsabilita':
  - Chair del Computing Steering Group (F. Bianchi)
  - Co-responsabile Networking per l'Europa (S. Pardi)

Data Transfer Challenge

V. Bansal (PNNL) leads this rehearsal

Done — Phase I

- Transfers:
  - KEK → PNNL
  - KEK → EU
  - PNNL → KEK

Done — Today's talk — Phase II (LHCONE)

- Transfers:
  - PNNL → EU
  - EU → PNNL
  - EU → EU

Upcoming — Phase III

- BEAST & Cosmic data rehearsal
- SINET5 tests

- **Asia (KEK):** Go Iwai, Takanori Hara, Soh Suzuki, Ikuo Ueda
- **US (PNNL):** Vikas Bansal, David Cowley, Kevin Fox, Malachi Schram, Dan Spanner
- **EU:**
  - **CNAF** - Daniele Cesini, Stefano Zani
  - **DESY** - Andreas Gellrich, Michael Steder
  - **KIT** - Bruno Hoeft, Andreas Petzold
  - **NAPOLI** - Silvio Pardi
  - **SIGNET** - Marko Bracko, Dejan Lesjak

Source →	KEK	PNNL	DESY	KIT	CNAF	NAPOLI	SIGNET
KEK		4.6 Gbps	-	-	-	-	-
PNNL	4 Gbps		6.6 Gbps	6 Gbps	9 Gbps	8 Gbps	-
DESY	3 Gbps	6.6 Gbps		8 Gbps	8 Gbps	8* Gbps	3 Gbps
KIT	3.5 Gbps	> 4* Gbps	6-8 Gbps		6-8 Gbps	6 Gbps	3 Gbps
CNAF	-	8 Gbps	10 Gbps	6 Gbps		8* Gbps	3 Gbps
NAPOLI	3* Gbps	3* Gbps	3* Gbps	3 Gbps	3* Gbps		3* Gbps
SIGNET	0.8 Gbps	0.6* Gbps	5 Gbps	2-5 Gbps	5 Gbps	2* Gbps	

Columns show **upload** bandwidth

Rows show **download** bandwidth

LHCONE Network

from 2016 April : SINET5 (100Gbps Japan-US, 20Gbps Japan-EU)
from 2016 Summer (w/ new KEKCC) : KEKCC can start utilizing LHCONE

Evoluzione attività BelleII - sommario

- ECL
  - Gli studi sull'upgrade del forward endcap ECL con i cristalli di CsI puro hanno condotto a importanti risultati, ma ancora degli elementi fondamentali (e.g. studi di full MC su canali di fisica, ma non solo, vedi talk di Claudia) non sono completi e devono essere terminati per avere un quadro completo
  - Ci sono inoltre nuove idee per possibili alternative, basate su miglioramenti dell'elettronica e/o dei sensori sui cristalli di CsI(Tl)
  - Una eventuale decisione di upgrade del calorimetro potrà comunque essere presa dalla collaborazione dopo lo studio dei fondi macchina, non prima del 2018.
    - ➡ nel caso la decisione sarà di effettuare l'upgrade, riformuleremo una proposta di una nostra partecipazione all'upgrade per la discussione in Commissione
  - Nel breve periodo lavoriamo per completare gli studi ormai quasi conclusi su WLs, filtri, valutazione dei fondi con sorgenti radioattive e del loro impatto sulla fisica con full Monte Carlo. Siamo inoltre nella posizione di contribuire rapidamente anche ai primi studi su nuove possibili soluzioni per il readout dei cristalli di CsI(Tl) proposte nella task force sull'upgrade
  - Valutiamo di portare a termine questa attività entro giugno 2016
  - Le attività sul software di ricostruzione ECL continueranno in tutte le sezioni che attualmente se ne occupano (NA,PG,LNF)

Evoluzione attività BelleII - sommario

- KLM
  - conclusa la loro attività hardware in ECL, i gruppi di LNF e RM3 propongono di intraprendere la costruzione delle schede di readout degli RPC del barrel KLM
  - Gli impegni sul BKLM sono perfettamente compatibili, anche a lungo termine, con le attività ECL, considerato anche l'impegno da parte US a supportare lo sviluppo e la maintenance del firmware delle schede in questa nuova attività
- SVD
  - Visti i notevoli progressi compiuti dal gruppo di IPMU dopo il BPAC di ottobre 2015, al momento non si ritiene necessario approntare una seconda linea di produzione del layer 6 a Pisa

Riassunto nuove richieste 2016 - II

- Readout KLM (vedi presentazione):
  - pre-produzione (tre) schede: 7**kE**
  - produzione e test 250 schede di lettura: circa **300kE** con possibilità di suddividere tra 2016 e 2017
  - integrazione missioni per contatti con gruppi US (e.g.: test di prototipi a Indiana U.): ~**2mu**
- SVD (vedi presentazione):
  - integrazione di missioni per risolvere problemi di schedule a IPMU ~**4mu**
  - patch panel power supply +**5kE** (specifiche meglio definite, nuova offerta CAEN)
  - mock-up per il pipe mounting a Pisa: **+10kE** consumi
  - basi per riporre gli assemblies in attesa di spedizione **~5kE**
- Monitor (vedi backup):
  - radiazione e beam abort: **+17kE** (cavi e connettori, PC e switch, montaggi…)
    - *33kE* elettronica di readout chiesti per il 2016, **15kE** rimandati al 2017
  - temperatura: **+2kE** (NTC)
    - *35kE* (interrogatore FOS, già chiesto e rimandato al 2017)
  - umidità: **+8kE** (spare+sensori aggiuntivi + duplicazione BEAST2-commissioning)
  - interlock: **+4kE** (PLC aggiuntiva per duplicazione BEAST2-commissioning + …)

Riassunto nuove richieste 2016 - II

- uSOP:
  - a settembre avevamo chiesto **10kE** SJ (non assegnati) per la costruzione dei cavi dei moduli uSOP (lunghezza circa 40m) dagli endcap alla counting room
  - effettivamente i cavi appaiono quasi tutti in buone condizioni e non sembra necessario rifarli. È però necessario smontarli, testarli "on the floor", e rimontarli invertendoli
    - ✓ non è ancora chiaro se KEK si prenderà carico dell'operazione come inizialmente sembrava possibile. Chiediamo di assegnare **10kE SJ** al fatto che sia necessario intervenire noi (nel caso la soluzione da noi preferita sarebbe di pagare manodopera locale)
- Missioni Computing:
  - a settembre avevamo avuto su Torino:
    - ✓ **5kE** per responsabilità
    - ✓ **12kE + 10kE SJ** per partecipazione al workshop computing software a PNNL
  - visto il costo del viaggio e il numero di partecipanti (almeno 7) chiediamo lo **sblocco del SJ di 10kE**
  - inoltre FB dovrà fare un ulteriore viaggio a PNNL in occasione della Review del DOE
- Missioni responsabilità:
  - rappresentante italiano nello Speakers Committee (I. Peruzzi): 3 gettone per partecipazione a 3 B2GM, non richiesto a settembre

BACKUP

Dettaglio richieste per completamento monitor di radiazione, temperatura, umidità

1) monitoring radiazione e beam abort (diamanti)

1.1 cavi e connettori/adattatori nelle Docks

richiesta 2016: **13** assegnazione: **13**. Richiesta aggiuntiva: **4** (cavi e connettori di riserva, rivestimento sensori con isolante sottile)

1.2 elettronica (HV, readout e beam abort)

richiesta 2016 (solo componenti): **33** assegnazione 2016: **18** (mancanti **15**) Richiesta aggiuntiva: **5** (contingenza, parziali rifacimenti, montaggi in outsourcing, etc)

1.3 2 x PC da rack per controlli monitoring (1 radiazione e 1 ambientale), switch ethernet, accessori informatici vari
Richiesta (nuova): **8 KE**

2) monitoring temperatura, NTC

- richiesta 2016 (interfacce CANbus, connettori, meccanica): **1.5 kE** assegnazione: **1.5**

Richiesta aggiuntiva: 2 KE (cassetto spare, parziale duplicazione per BEAST/assemblaggio simultanei)

3) monitoring temperatura, FOS

- richiesta 2016 (fibre aggiuntive + lettore FOS spare): 7.5 + 35 kE
- assegnazione 2016: 7.5 kE, lettore rinviato

=> completamento: 35 KE

(il lettore richiesto è necessario, duplicazione BEAST2-commissioning VXD)

4) monitoring umidità

- richiesta 2016 (3 sensori Vaisala, pompa): **8 kE**; assegnazione 2016: **8 kE**

=> Nuova richiesta: 10 KE

(aggiunta: misuratori pressione, flussometri e attuatori nel set-up finale
interamente automatizzato; 1 Vaisala spare; meccanica per duplicazione BEAST2-commissioning)

5) hardware interlock VXD (SVD+PXD)

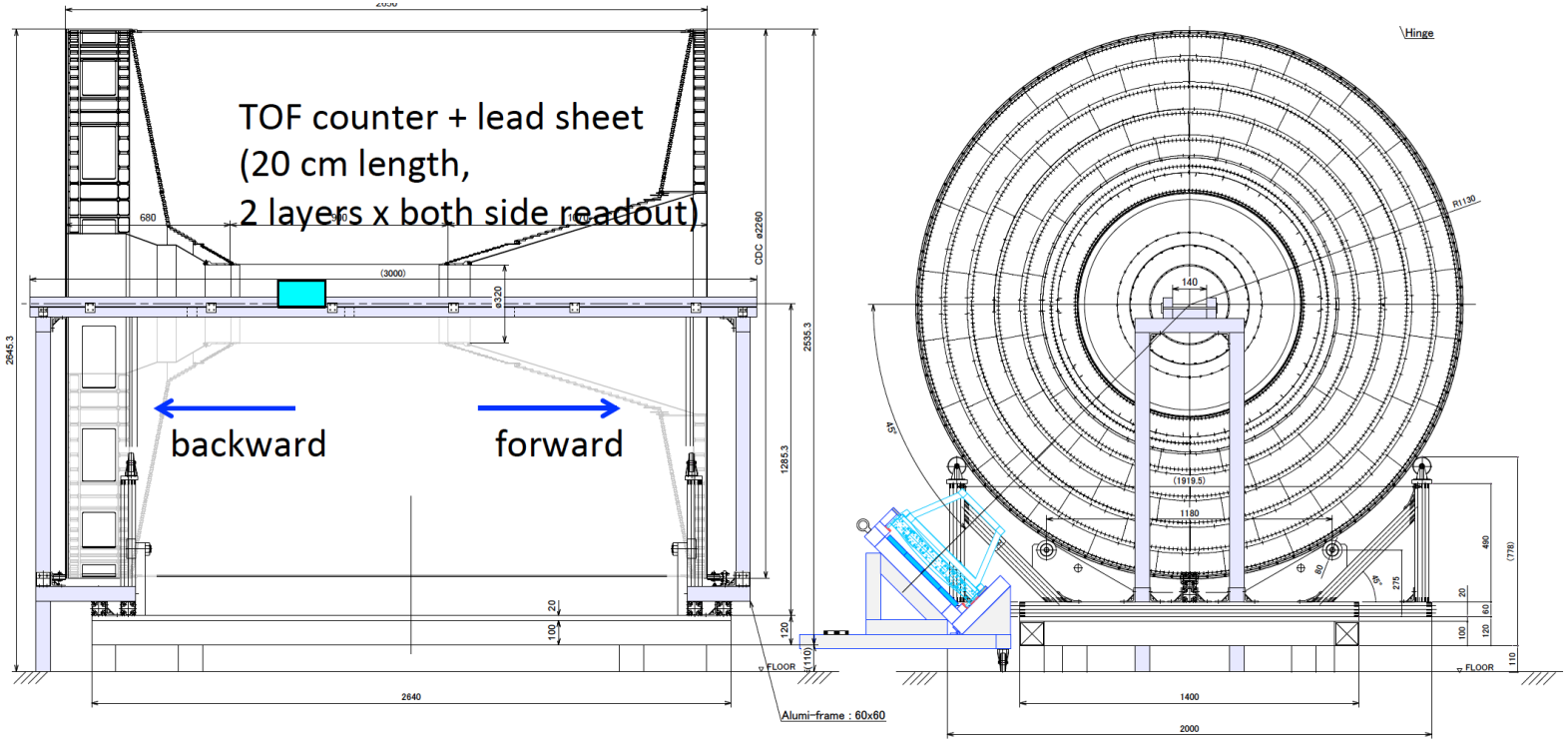
- richiesta 2016 (moduli PLC): 1.5 kE, assegnazione 2016: 1.5 kE

=> aggiuntivo: 4 KE

(1 PLC aggiuntiva per duplicazione BEAST2-commissioning e per sviluppi in lab; cablaggi, patch panels etc)

CDC-TOP cosmic ray test:

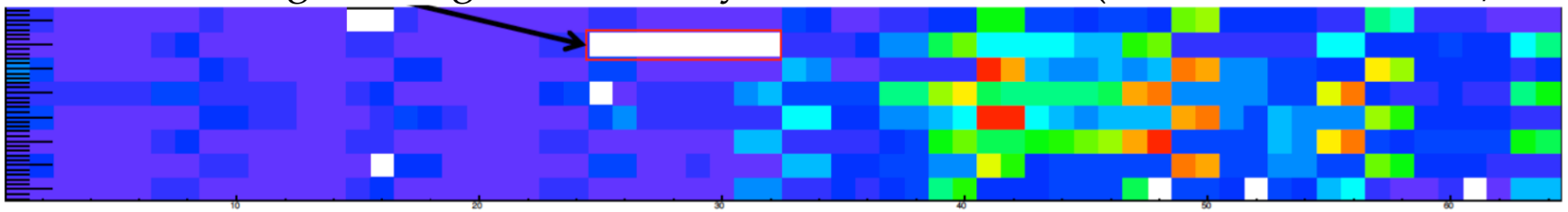
La preparazione test CDC-TOP è in corso.
È stato inviato in Tsukuba hall per tale test il modulo #1.
È stato scelto il modulo di backup in modo da non avere interferenze con il piano di installazione.



Module 04 laser data

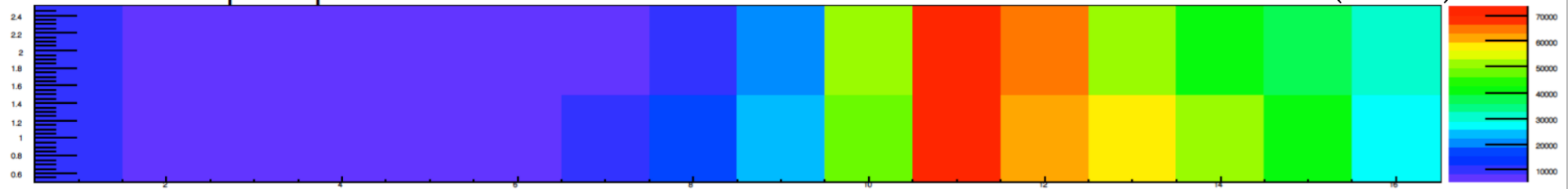
vista 512 canali
(64 ASICs x 8 canali / ASIC)
(32 PMT x 16 canali / PMT)

ASIC not get configured correctly

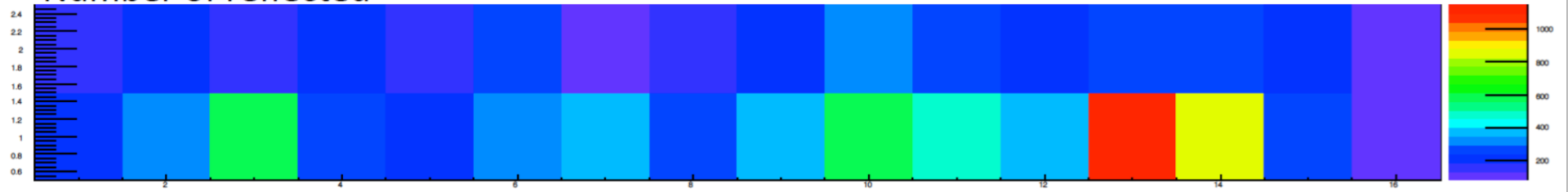


Number of prompt

Vista 32 PMT (16 x 2)



Number of reflected



Collaborative Tools

Y. Sakai

- Originally, it has been taken care by KEK (including cost), but not satisfactory
- DESY will take care of Collaborative Tools (endorsed by EB)
- FB agree that the cost is paid by M&O fund
- For FY2016, it can be managed by reduction of Cryogenics/electricity due to schedule change
- For FY2017, it will be included in M&O proposal

➢ Next Step: report new plan to SC

If agreed → ask approval of FOP

DESY Proposal

Proposal to Handle Cost

- Additional person power at the level of 1-2 FTE is estimated to be needed to install and maintain Belle II Collaborative Tools and Services at DESY
- DESY-IT will hire 1 FTE dedicated to this task
- Proposal for reimbursement of costs
  - first 2 years 70 k€/yr (incl. VAT)
  - after 2 years
    - re-evaluate person power that is really required for maintenance
    - for now assume 0.5 FTE i.e. 35 k€/yr
      - by then this will be of same order of magnitude as DESY M&O contribution
      - => save VAT if treated as „in kind“ contribution for M&O

January 28th, 2016

Dear Professor Thomas E. Browder,
Belle II spokesperson

I appreciate your continued support to Belle II experiment.

I have heard from Dr. Masanori Yamauchi, Director General of High Energy Accelerator Research Organization (KEK), about the updated schedule based on the governmental budget draft of FY2016 that there is a significant concern in the planned execution of the project including the influence to the funding agency in each country, and a question is posed by collaborating institutions of Belle II experiment on the support hereafter to this experiment by the Japanese government.

Our policy to support this experiment has been unchanged. As is mentioned in "The basic concept to promote large-scale project in academic field – Roadmap 2014 –" authorized by the Ministry of Education, Culture, Sports, Science and Technology (MEXT), it is an essential policy for us to promote large-scale projects collaborating with international partners such as B-factory, for the continuous development and contribution to the world science community.

Accordingly, MEXT has worked very hard to increase budget for large-scale projects of KEK in FY2016 budget draft in spite of very severe Japanese Government budget situation. As for the future, MEXT will make best efforts to ensure sustainability in operation of KEK projects such as Belle II experiment, by means of taking any other measures as well as financial support in cooperation with KEK and of communicating closely with international collaborators.

I would very much appreciate it if you fully understand current situation and MEXT's commitment mentioned above, and help us to make other collaborators understand as well.

Sincerely,

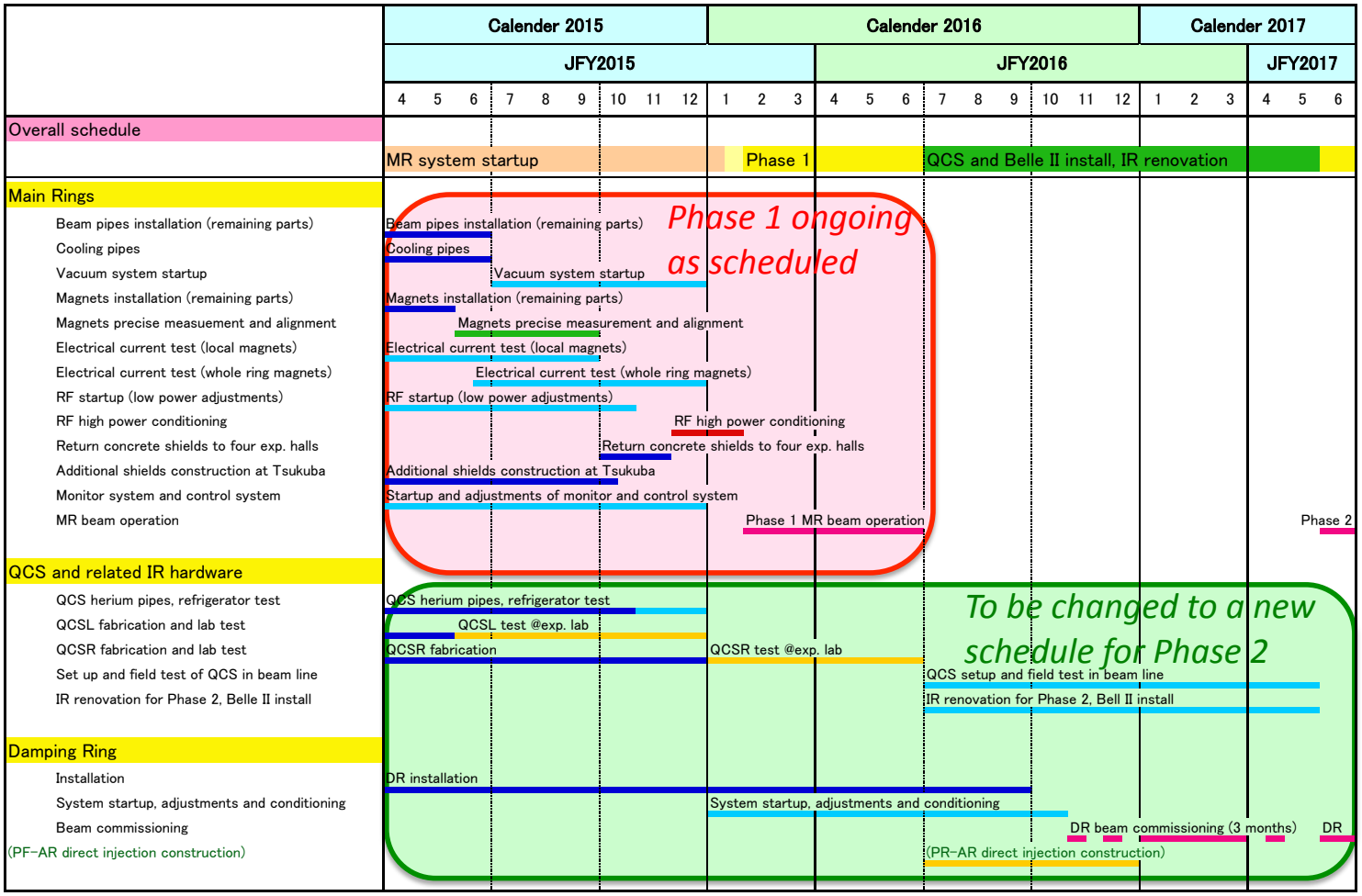
Sadahiro Hagiwara

Sadahiro HAGIWARA

Director
Office for Particle and Nuclear Research Promotion
Research Promotion Bureau
Ministry of Education, Culture, Sports,
Science and Technology (MEXT)
Japan

3-2-2 Kasumigaseki, Chiyoda-ku, Tokyo 100-8959, Japan TEL:+81-3-5253-4111 +81-50-3772-4111

Schedule of JFY2015-16



K. AKAI, SuperKEKB status, schedule and plans, Feb. 1, 2016 @B2GM 3

SuperKEKB phase 1

Rough commissioning procedure (Phase1)

- The first week (Feb. 1st ~ Feb. 7th)
  - Tuning of BT (Beam Transport Lines: e-/e+)
- The next two weeks (Feb. 8th ~ Feb. 21st)
  - Commissioning of LER (e+ ring)
  - Startup of each hardware component and test
  - Beam storage -> vacuum scrubbing -> (target) 100mA
  - Circumference check with wigglers
- The next two weeks (Feb. 22nd ~ Mar. 5th)
  - Commissioning of HER (e- ring)
  - Startup of each hardware component and test
  - Beam storage -> vacuum scrubbing -> (target) 100mA
  - In parallel with LER vacuum scrubbing and possible studies at LER
- After these periods
  - Continue vacuum scrubbing
  - Background study with BEAST (May 16,17,18, May 23,24,25 day and swing shifts)
  - Continue Optics study
  - Other study and tuning

Y. Funakoshi

K. AKAI, SuperKEKB status, schedule and plans, Feb. 1, 2016 @B2GM 14