Introduzione

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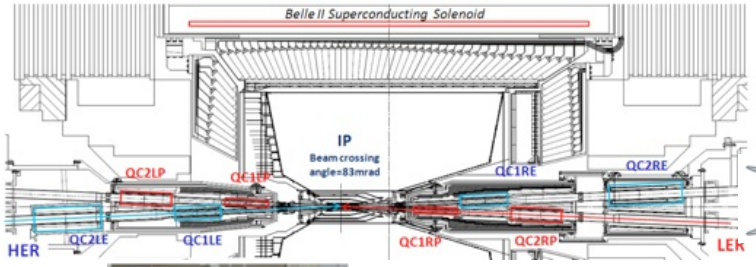
INFN e Università di Pisa
Riunione Referee - Belle-II,
11 Settembre 2014

Sommario

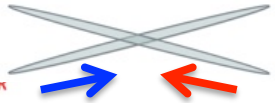
- Situazione generale SuperKEKB e Belle-II
- Ruolo e dimensioni del gruppo italiano
- Sommario richieste 2015
- Update sul piano complessivo di finanziamento
- Maintenance and Operation Funds

SuperKEKB Status

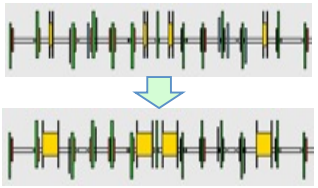
- SuperKEKB construction is progressing as planned
  - Construction is fully funded in JFY2014 (remaining 2 Oku-yen foreseen in JFY2015 for QCS contract)
  - Construction for Phase 1 beam commissioning be completed in JFY 2014 (by March 31, 2015)
- However, several funding issues exist for operation
  - Severe budget cut in JFY 2014 operation money for KEK with respect to request
  - Additional fine in JFY 2014 caused by an "inappropriate handling of procurement accounting" → paused linac construction, hoping to resume with supplemental budget
  - Proposed JFY 2015 budget insufficient for proper startup and operation
- Strong and wide international action and pressure to counter the budget reduction
  - Letters from physicists, funding agencies. Involve also embassies and political level

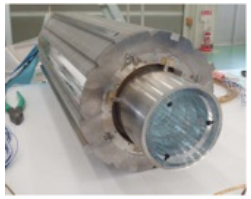


Colliding bunches



Redesign the lattice to squeeze the emittance (replace short dipoles with longer ones, increase wiggler cycles)





New superconducting final focusing magnets near the IP

e^+ 3.6A

e^- 2.6A

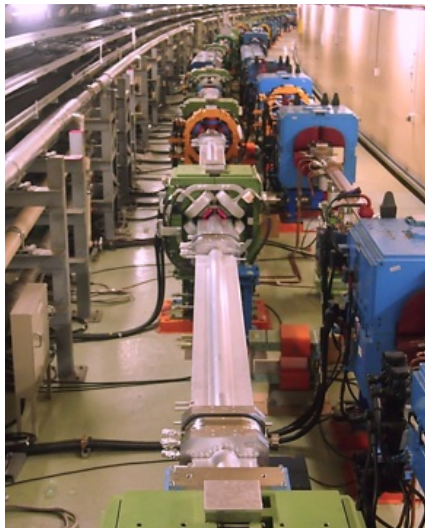
KEKB to SuperKEKB

- Nano-Beam scheme
  extremely small β_y^*
  low emittance
- Beam current double

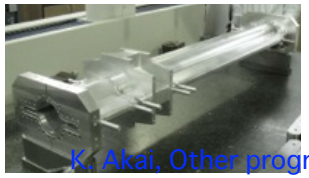
$$L = \frac{\gamma_\pm}{2er_e}\left(1+\frac{\sigma_y^*}{\sigma_x^*}\right)\left(\frac{I_\pm \xi_{\pm y}}{\beta_y^*}\right)\left(\frac{R_L}{R_y}\right)$$

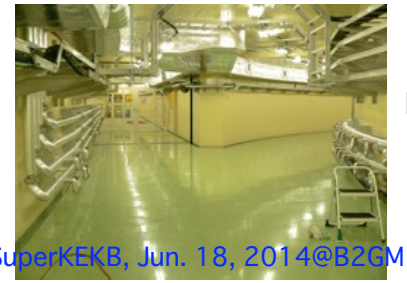
40 times higher luminosity
2.1×10^{34} --> 8×10^{35} $cm^{-2}s^{-1}$

New HER wiggler section



Replace beam pipes with TiN-coated beam pipes with antechambers





DR tunnel

Injector Linac upgrade

New e+ Damping Ring

Reinforce RF systems for higher beam currents

Commissioning phases

- Phase 1
  - No QCS, No Belle II solenoid
  - Basic machine tuning
  - Low emittance tuning
  - Vacuum scrubbing
    - Belle II people request enough vacuum scrubbing in this stage (before Belle II roll in).
    - At least one month at beam currents of 0.5~1A /ring.
  - DR commissioning starts before Phase 2.
- Phase 2
  - with QCS and Belle II (w/o Vertex detectors)
  - Low beta optics tuning
  - Small x-y coupling optics tuning
  - Beam collision tuning
  - Belle II background study
  - Target luminosity at this stage is 1 x 10^{34} $cm^{-2}s^{-1}$
- Phase 3
  - Physics run (Vertex detectors installed)
  - Increase beam currents
  - Beam tuning continued to increase luminosity

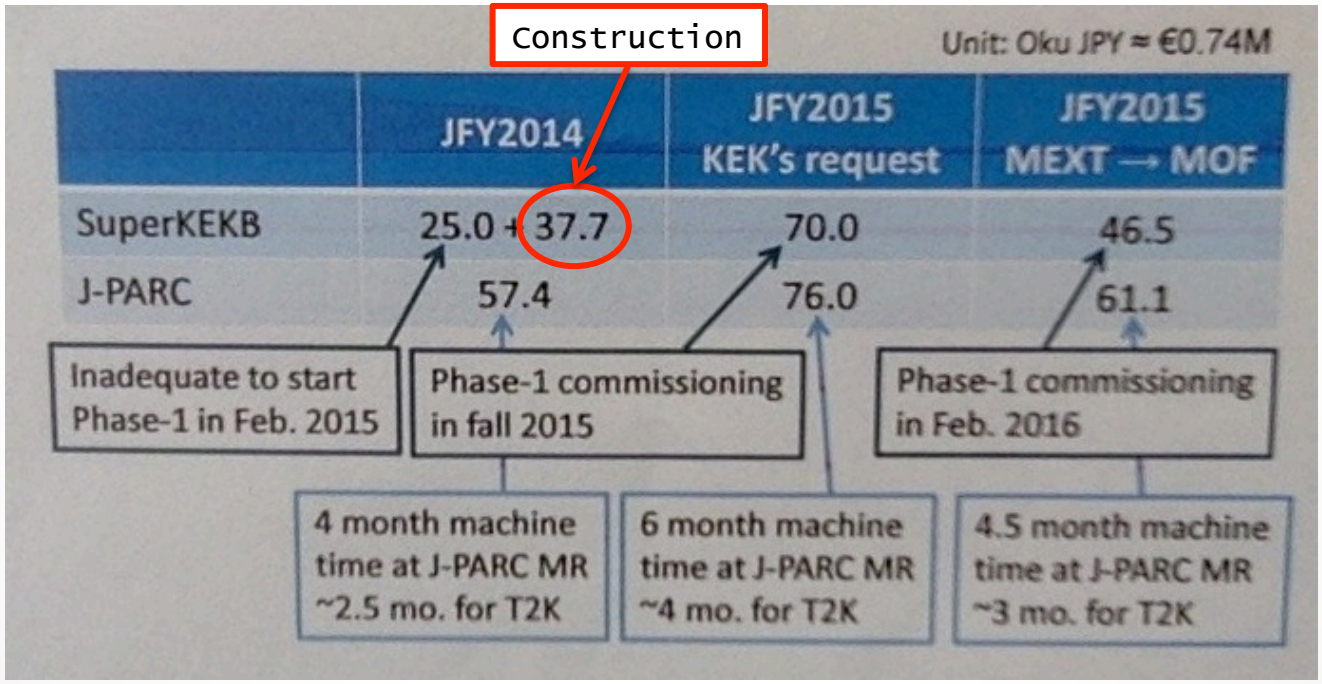
K. Akai, Other progresses and schedule of SuperKEKB, Jun. 18, 2014@B2GM

Budget issues

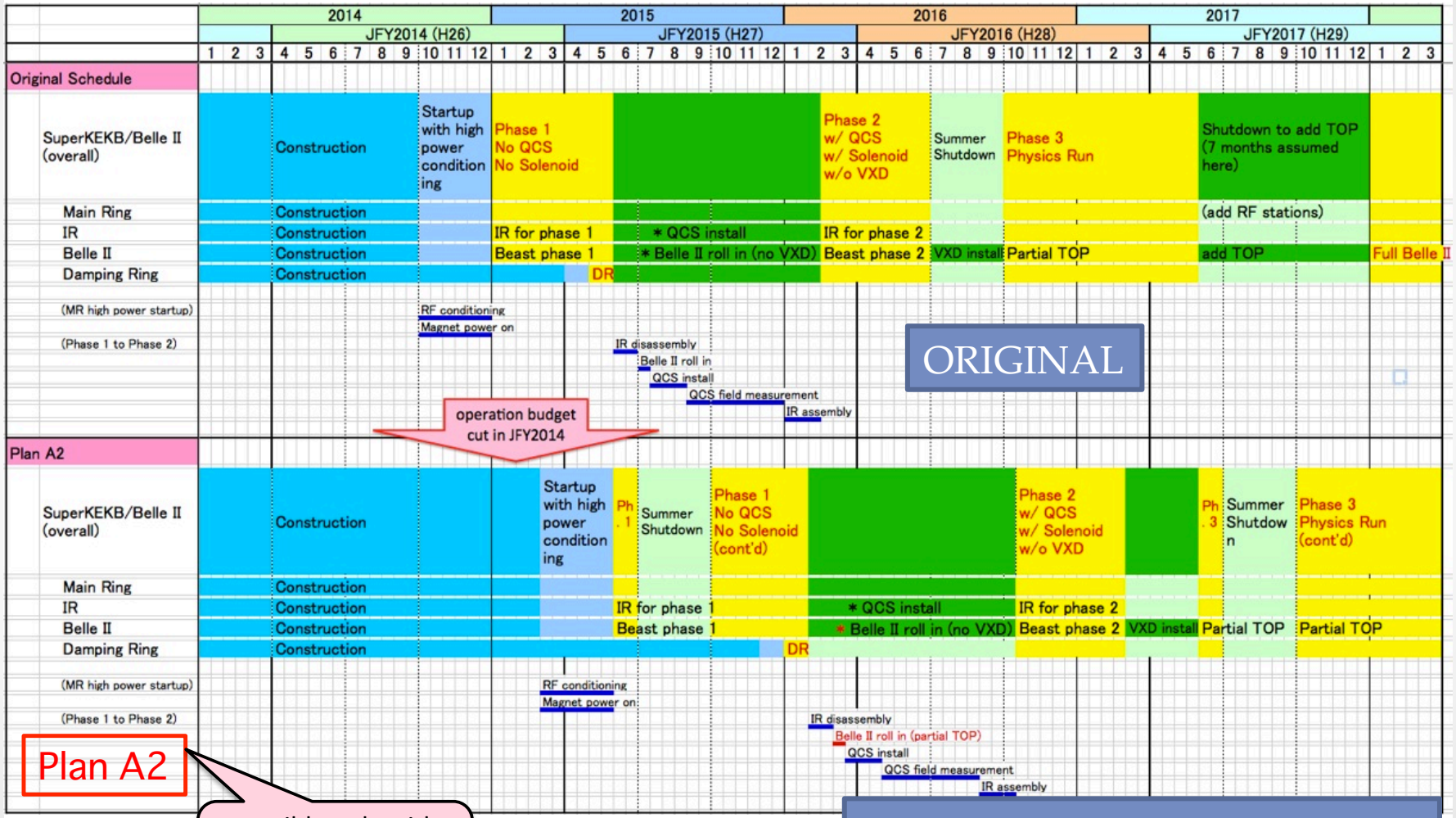
- MEXT (Ministry of Education, Culture, Sports, Science and Technology) proposes budget to MOF (Ministry of Finance) who then defines the final budget
  - MEXT interacts with KEK management to define the request
- Hard money (construction) is distinct from Soft money (operation)
  - Construction money is "easier" to get
  - A big step in operation money is required to start SuperKEKB operation
- Other big science projects are starting and absorb the construction money

Budget numbers

	JFY2013	JFY2014	decrease
B Factory	77.8	62.7	↓ 19%
J-PARC	66.2	57.4	↓ 13%
Light sources	27.2	23.6	↓ 13%



Schedule Impact



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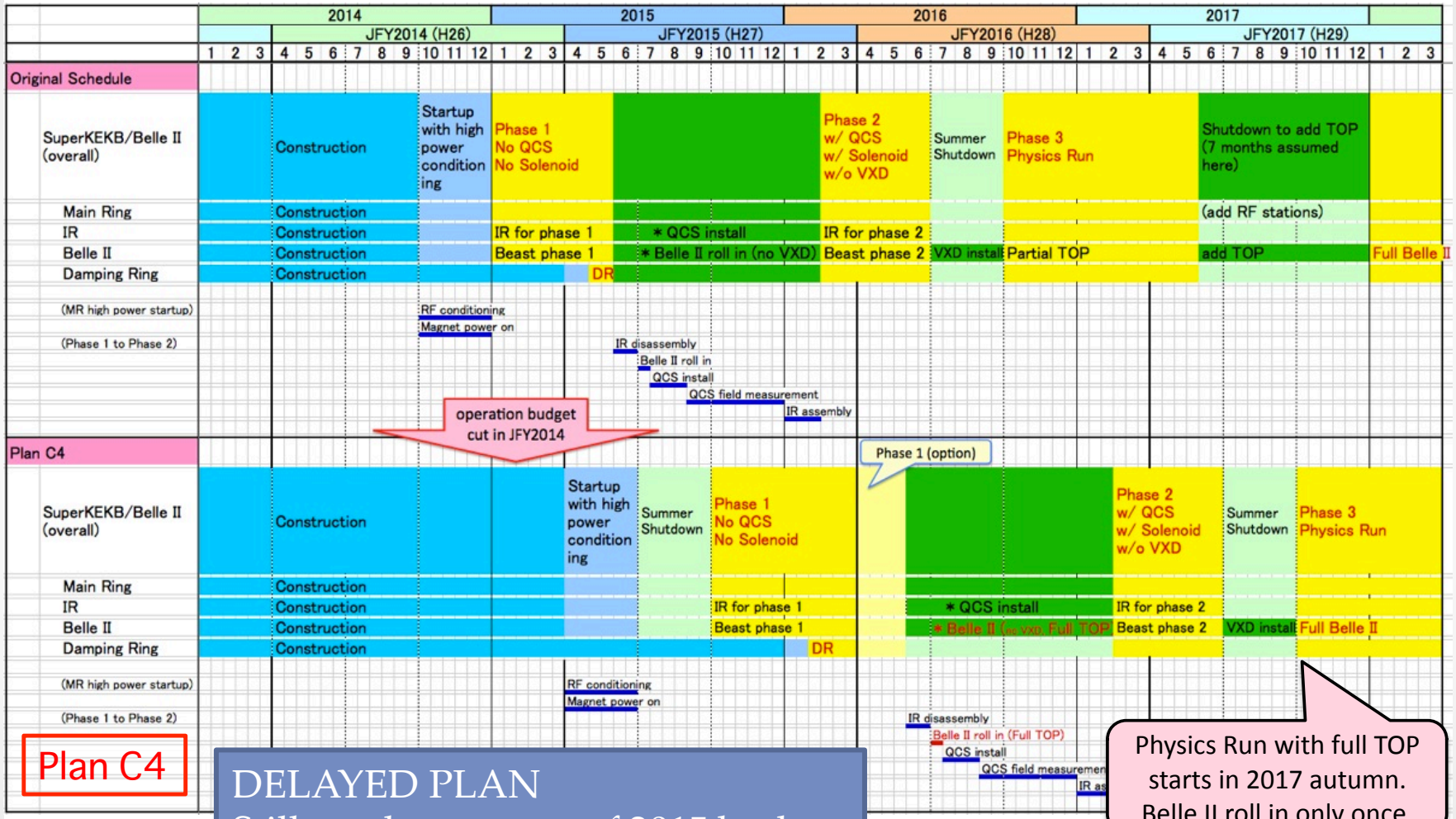

K. Akai, Other progresses and schedule of SuperKEKB, Jun. 18, 2014@B2GM

Perspectives

- Recovery of 2015 budget essential to guarantee timely start of operation → physics start in 2017.
  - Fierce competition with LHCb
- Even worse if the operation money shortage persists
  - Undermines entire concept of factory operation and jeopardizes the physics program

… on the other hand …

- Very strong commitment of the laboratory
- Very strong international collaboration and pressure
- Expect more information before the end of the year

→ Room for optimism

→ Plan on detector installation assuming budget recovery

Belle-II Status

- Belle-II upgrade is progressing as planned
  - DCH Stringing completed
  - Forward EKLM installation completed
  - TOP passed DOE CD2/3 review → funded and ready for assembly
  - All detectors progressing well, but some on critical path: PXD, SVD, PID
- Belle-II funding mostly secured
  - Initial detector fully funded
  - ECL endcap upgrade for high luminosity running not yet funded
    - Canadian planned application not successful
  - Computing employs grid paradigm
    - Distributed resources part of global negotiation

Past and Upcoming Reviews

- February 2014, BPAC review of Belle II
  - http://kds.kek.jp/conferenceTimeTable.py?confId=14637
- March 19-20, CD2-3 review Review of 15 million dollar US Belle II (iTOP, KLM, BEAST II) project was successful. Verification by DOE ESAAB panel in April. All quartz can now be purchased.
- 9-10 November 2014, BPAC SVD production readiness review.
- 11 November 2014, BPAC TOP review
- Early 2015, DOE review of US contributions to Belle II computing.
- February 2015, BPAC review of Belle II

Gruppo Italiano

- Ormai assestato e attivo.
- FTE/Phys = 57%, in crescita

2014

Sede	N Fis	N Tec	N Tot	FTE Fis	FTE Tec	FTE Tot
TOTALI	**43**	**6**	**49**	**22.3**	**3.5**	**24.8**

2015

Sede	N Fis	N Tec	N Tot	FTE Fis	FTE Tec	FTE Tot
LNF	7	0	7	3.9	0	3.9
NA	6	4	10	2.8	1.2	4
PD	5	2	7	3.1	0.3	3.4
PG	4	1	5	3	0.5	3.5
PI	8	1	9	5.9	0.2	6.1
RM1.DTZ	4	1	4	1.1	0.2	1.3
RM3	7	1	8	2.7	1.3	4
TO	4	**1**	5	2.4	0.2	2.6
TS	3	3	6	2.4	0.3	2.7
TOTALI	**48**	**14**	**61**	**27.3**	**4.2**	**31.5**

Partecipazione Italiana

- Gruppi italiani perfettamente inseriti nella collaborazione.
- Ruoli di coordinamento
  - Gruppi di fisica
  - Reconstruction
- SVD, TOP, ECL
  - Assunzione di responsabilita' specifiche

Physics Groups

Semileptonic and Missing Energy Decay WG	Anze Zupanc, Guglielmo De Nardo
Electroweak Penguin WG	Akimasa Ishikawa, XXX
Time Dependent CP Violation WG	Takeo Higuchi, XXX
Hadronic B Decay WG	Jim Libby, Pablo Goldenzweig
Y(nS) WG	Roman Mizuk, XXX
Charm and Charmonium WG	Roy Briere, Giulia Casarosa
Tau and Low Multiplicity WG	Kiyoshi Hayasaka, XXX

Reconstruction Contacts

Tracking	Eugenio Paoloni
ECL	Kenkichi Miyabayashi
Electron ID	Guglielmo De Nardo
Muon ID	Leo Piilonen
K/pi/p ID	Marko Staric
K long ID	Timofey Uglov
V0 (K_S, Photon conversions)	Kazutaka Sumisawa

2014.07.24

Belle II Organization

Executive Board
Chair : H. Aihara
aihara@phys.s.u-tokyo.ac.jp

D.M.Asner, T.Aziz, A.Bozek, P.Chang, F.Forti, T.Iijima, P.Krizan, S.Lange, P.Podesta, M.Roney, C.Schwanda, M.Sevior, E.Won, C.Z.Yuan, K.Akai

Spokesperson : Thomas E. Browder
teb@phys.hawaii.edu

Project Manager : Yoshihide Sakai
Yoshihide.Sakai@kek.jp

Financial Board
Chair : Y.Sakai
Yoshihide.Sakai@kek.jp

W.Abdullah, H.Aihara, D.Asner, R.Ayad, T.Aziz, A.Bozek, T.Browder, P.Chang, Z.Dolezal, F.Forti, P.Krizan, C.Lacasta, M.I.Martinez, H-G.Moser, C.Nieber, P.Pakhlov, A.Rekalo, M.Ronie, C.Schwanda, M.Sevior, C. P. Shen, U.Tippawan, T.Tran, N.Wermes, E.Won, M.Zeyrek

Institutional Board
Chair : Z.Dolezal
dolezal@ipnp.troja.mff.cuni.cz

Speakers Committee
Chair : A.Schwartz
alan.j.schwartz@uc.edu

T.Iijima, I. Peruzzi, Y.Sakai, C.Schwanda

Physics Coordinator : P.Urquijo
purquijo@unimelb.edu.au

- Semileptonic & Missing Energy : A. Zupanc, G. De Nardo
- Radiative & Electroweak Penguin : A. Ishikawa
- T-Dep. CP Violation : T. Higuchi, K. Sumisawa
- Hadronic B Decay & DCPV : J. Libby, P. Goldenzweig
- Y(nS) : R. Mizuk
- Charm & Carmonium : R. Briere, G. Casarosa
- Tau & Low Multiplicity : K. Hayasaka, H, Nakazawa

Technical Coordinator : Y.Ushiroda
ushiroda@post.kek.jp

Integration Leaders : I. Adachi (Outer), S. Tanaka (Inner)

- PXD : H.G. Moser, C. Kiesling
- SVD : K. Hara, C. Irmler
- CDC : S. Uno
- TOP : J. Fast
- ARICH : S. Nishida, S. Korpar
- ECL : A. Kuzmin
- EKLM : P. Pakhlov
- BKLM : L. Piilonen
- TRG : Y. Iwasaki
- DAQ : R. Itoh
- IR : H. Nakayama
- STR : J. Haba
- BKG : S. Vahsen

Liaisons :
S. Tanaka (PXD)
I. Adachi (BPID)
I. Nakamura (ECL)
K. Sumisawa (BKLM/EKLM)

Software Coordinator : T.Kuhr
Thomas.Kuhr@kit.edu

- Simulation : D. Kim
- Tracking : M. Heck, E. Paoloni
- Alignment : S.Yashchenko
- Database : M. Bracko, L. Wood

Computing Coordinator : T.Hara
takanori.hara@kek.jp

- Distributed Computing : M. Sevior
- Data Transfer / Network : M. Schram
- MC prod. manager : H. Miyake
- Monitor : K. Hayasaka

Coordinamento collaborazione italiana

- Responsabile Nazionale e membro Finance Board: Giuseppe Finocchiaro
- Membro Executive Board: FF
- Coordinatore SVD: Stefano Bettarini
- Coordinatore PID: Roberto Mussa
- Coordinatrice ECL: Claudia Cecchi
- Coordinatore Computing: Fabrizio Bianchi
- Coordinatore Physics+Software: Guglielmo De Nardo

Activities

- SVD
  - Contribution to silicon detector testing
  - Contribution to the assembly of strip detector modules
  - Contribution to overall mechanical design & assembly
  - Power supplies replacement for LV and HV
  - Environmental & Radiation Monitoring
  - Software development for Silicon-only tracking and Alignment
- PID (TOP)
  - Contribution to timing calibration system
  - Contribution to online and offline calibration software
  - Contribution for Power supplies

Activities II

- ECL
  - Contribution to Simulation and Calibration software
  - R&D on Large Area APD for reading pure CsI
  - R&D on different technologies for Backward Endcap
  - Contribution to R&D and construction of front end electronics and slow control system
  - Contribution to endcap construction. Possibility of building three complete forward endcap modules.

- COMP
  - Contribution to development of distributed computing system
  - Contribution in terms of grid-enabled resources

Fogli di calcolo

- Richieste 2015:
  - https://docs.google.com/spreadsheet/ccc?key=0AnzCAynrojavdFc4alFsWV95cTVxM2QtcTM5UGZfc0E&usp=sharing
  - Utilizzato per inserire le richieste nel DB dei preventivi

- Quadro pluriennale V2014:
  - https://docs.google.com/spreadsheet/ccc?key=0AnzCAynrojavdHVRSHUzYkFFZlhXQ3VtRktXbTRkR3c&usp=sharing
  - Utilizzato per il bilancio complessivo pluriennale

Richieste per il 2015

- Richieste di sottosistema
  - Cat A: costo core necessario per le costruzioni
    - Costruzione,
    - Attrezzature di laboratorio specifiche per le costruzioni
    - Missioni specifiche: workshop specifici, contatti, montaggi.
  - Cat C: responsabilità
  - **Cat D**: installazione e commissioning
  - Nota:
    - aggiunto sottosistema PHT= Physics tools + software
    - Aggiunto sottosistema GEN= fondi comuni e c
- Cat B: Richieste di sezione
  - Metabolismi:
    - Consumi: 1.5kE/FTE di consumi;
    - Missioni (int + est): 1.5 KE/FTE + 1 m.u./FTE.
- 1 m.u. in Giappone valutato a 6kE

Richieste totali

Sez. & Suf.	MISS				CON				ALTRICONS				SEM				TRA				PUB				LIC-SW				MAN				INV				APP				SPSERVIZI				TOTALE			
		Sj	Dot.	Ant.		Sj	Dot.	Ant.		Sj	Dot.	Ant.		Sj	Dot.	Ant.		Sj	Dot.	Ant.		Sj	Dot.	Ant.		Sj	Dot.	Ant.		Sj	Dot.	Ant.		Sj	Dot.	Ant.		Sj	Dot.	Ant.		Sj	Dot.	Ant.		Sj	Dot.	Ant.
LNF	62.0	6			16.0																																				78	6		
	0.0	0.0			0.0																																							0
NA	72.0				58.5																																				130.5			
	0.0				0.0																																							0
PD	73.0				15.0																																54.0								142			
	0.0				0.0																																0.0											0
PG	70.0	6			70.5	30												10																				55							140.5	101		
	0.0	0.0			0.0	0.0												0.0																				0.0										0
PI	126.0				57.0												12.0																								50.0				245			
	0.0				0.0												0.0																								0.0								0
RM1.DTZ	20.5				29.5																												40.0												90			
	0.0				0.0																												0.0															0
RM3	60.5				28.0																												10.0												98.5			
	0.0				0.0																												0.0															0
TO	53.5				13.0																												3.0								27.0				96.5			
	0.0				0.0																												0.0								0.0							0
TS	51.0				17.0												2.0																				107.0								177			
	0.0				0.0												0.0																				0.0											0
TOTALE	588.5	12			304.5	30											14	10															53				188	55			50				1198	107		
	600.5				334.5				0				0				24				0				0				0				53				243				50				1305			
	0		0	0	0		0	0									0		0	0													0		0	0	0		0	0	0				0		0.0	0.0
	0.0				0.0				0.0				0.0				0.0				0.0				0.0				0.0				0.0				0.0				0.0				0.0			

+80K su CNAF

Richieste Metaboliche Sezioni (tipo B)

Sede	N Fis	N Tec	N Tot	FTE Fis	FTE Tec	FTE Tot	Cons B	MIssioni (1mu + 1.5kE)/FTE
LNF	7	0	7	3.9	0	3.9	**6**	**29.5**
NA	6	4	10	2.8	1.2	4	**6**	**30**
PD	5	2	7	3.1	0.3	3.4	**5**	**25.5**
PG	4	1	5	3	0.5	3.5	**5.5**	**26.5**
PI	8	1	9	5.9	0.2	6.1	**9**	**46**
RM1.DTZ	4	1	4	1.1	0.2	1.3	**2**	**10**
RM3	7	1	8	2.7	1.3	4	**6**	**30**
TO	4	**1**	5	2.4	**0.2**	2.6	**4**	**19.5**
TS	3	3	6	2.4	0.3	2.7	**4**	**20**
TOTALI	**48**	**14**	**61**	**27.3**	**4.2**	**31.5**	**47.5**	**237**

2015 Sottosistemi

Sistema	app	app SJ	cons	cons SJ	inv	inv SJ	miss	miss SJ	trasp	trasp SJ	Total	Total SJ
COMP Total					80	0	33	0			113	0
ECL Total	0	55	177	30	50	0	130	12	0	10	357	107
GEN Total			50	0			10	0			60	0
PHT Total							32	0			32	0
PID Total	81	0	19	0	3	0	63	0			166	0
SEZ Total			47.5	0			237	0			285	0
SVD Total	107	0	61	0			84	0	14	0	266	0
Grand Total	188	55	355	30	133	0	589	12	14	10	1278	107

Nota: i 50K per MOF in GEN sono in realta' richiesti su SPSERVIZI

Milestones 2014

Milestones Concordate			
Data	**Descrizione**	**NOTE**	Completamento
30-04-2014	**SVD: Completato set-up laboratorio per inizio produzione dei sensor assembly**	Completata al 31/7/2014	100%
30-06-2014	**ECL: risultati test irraggiamento cristalli e test APD UV-enhanced. Scelta fortorivelatore**	Completata	100%
30-06-2014	**PID: Completamento del progetto del sistema di calibrazione.**	Design finale al 31/12/2014	70%
30-09-2014	**ECL: Assemblaggio 9 cristalli trapezoidali, come da produzione, con fotorivelatore scelto e test in laboratorio + cosmici**	On schedule	70%
31-12-2014	**SVD: Completamento produzione sensor assembly**	Spostata al 2015 per ritardi nei componenti	0
31-12-2014	**ECL: Scelta produttori di cristalli inizio produzione di test per avviare mass production.**		0
31-12-2014	**COMP: Partecipazione alle MC Production Campaign con share INFN del 10%**	Prima campaign share 15%	50%

Milestones proposte 2015

Milestones Proposte	
Data	**Descrizione**
30-09-2015	SVD:Completamento produzione FW/BW assemblies
31-12-2015	SVD:Installazione primi 16 sensori di radiazione (diamanti) in SVD
30-04-2015	ECL:Studio geometria a design per l'upgrade dei ECL forward
30-06-2015	ECL:Fine irraggiamento cristalli + APD
30-09-2015	ECL:Qualifica finale Optomaterials per la produzione di cristalli
31-12-2015	COMP:produzione 10% del montecarlo complessivo 2015
31-07-2015	PID:Completamento SM fiber bundle
31-12-2015	PID:Installazione, commissioning SM fiber bundle

Ipotesi Piano Finanziario Pluriennale

Poche modifiche rispetto al piano presentato nel 2013.

PIANO 2013

SISTEMA	Item	TOTALE	2013	2014	2015	2016	2017	2018
VXD	TOTALE VXD BASE	702	87	362	156	54	54	54
PID	Totale PID	498	79	181	178	44	15	15
ECL	TOTALE ECL	1,693	19	113	303	455	487	223
COMP	TOTALE COMP	838	5	20	57	51	122	582
M&O	M&O FUNDS (Estimated)	185	5	5	25	50	50	50
	TOTAL BASE CORE	**3,916**	**195**	**680**	**719**	**654**	**728**	**924**
ALL	Meeting e metab. 20 FTE Missioni	1,800	300	300	300	300	300	300
ALL	Lab e metab. 20 FTE consumi * 5	600	100	100	100	100	100	100
	GRAND TOTALE BASE	**6,316**	**595**	**1,080**	**1,119**	**1,054**	**1,128**	**1,324**

PIANO 2014

SISTEMA	Item	TOTALE	2013	2014	2015	2016	2017	2018
VXD	TOTALE VXD BASE	825	68	267	251	122	59	59
PID	Totale PID	491.5	64	111.5	120	89	85	22
ECL	TOTALE ECL	1,597	19	113	303	455	487	223
COMP	TOTALE COMP	422	5	33	85	33	105	161
PHT	TOTALE PHT	152	0	0	32	38	38	44
	SHIFT	30	0	0	0	0	10	20
M&O	M&O FUNDS (Estimated)	312	0	37	50	50	75	100
	TOTAL BASE CORE	**3,830**	**156**	**561**	**841**	**787**	**859**	**629**
ALL	Meeting e metab. 30 FTE Missio	1,700	250	250	300	300	300	300
ALL	Lab e metab. 30 FTE consumi *	500	50	50	100	100	100	100
	GRAND TOTALE BASE	**6,030**	**456**	**861**	**1,241**	**1,187**	**1,259**	**1,029**

MOF

- Decision on MOF
  - Financial Board (Experiment) → G. Finocchiaro
    - Make proposal for Maintenance and Operation Funds (July)
  - Financial Oversight Panel (Funding Agencies) → A. Zoccoli
    - Make final decision (November)
  - Scrutiny Group (nominated by FOP) → W.Bonivento
    - Scrutinize proposal and past spending

- Who pays
  - 50% of MOF are covered by KEK (+ 1 secretary
  - The other 50% (+1 secretary) are covered by member countries, proportionally to the number of PhD physicists in the collaboration
  - INFN share, roughly 11%

Preliminary Budget of FY2015 and FY2014 modifications

Numbers in kYen = 7.5E	FY2014 (approved)	FY2014 (plan)	FY2015	Full Ops.
one secretary	5,000	5,000	5,000	5,000
Video conf. (1/2)	500	*500	0	0
KLM Gas atc.(1/2)	550	550	2,725	3,750
Gas for CDC (1/2)	1,250	1,250	1,250	1,250
Electricity (1/2)	3,800	3,800	16,000	70,000
Solenoid M&O(1/2)	30,800	3,500	*30,800	45,680
SVD CO2 etc.(1/2)	250	250	250	250
BEAST2/IR op.(1/2)	250	250	250	0
CAD support staff (1/2)			? 2,268	
Total	42,400	15,100	56,275	125,930

No solenoid turn on in 2014

Carry over: 27,300 28,975

+FY2013 [* may be re-estimated]

Final one will be sent to Scrutiny Comm. In Aug.

Scrutiny Committee

Members

- Italy INFN: Walter Bonivento
- Japan KEK: Katsuo Tokushuku
- Germany DESY: Bernd Loehr
- Korea SNU: Un-ki Yang
- Russia MES: Sergey Salikhov (need official conf.)
- USA DOE: Helmut Marsiske

➢ Not started yet
➢ Audit of FY2013 M&O fund usage
➢ Examine/approve FY2014 M&O change

☐ Examine/approve exemption for FY2015 M&O
☐ Examine/approve FY2015 M&O proposal