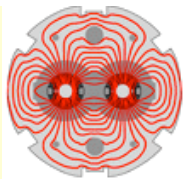


LARP

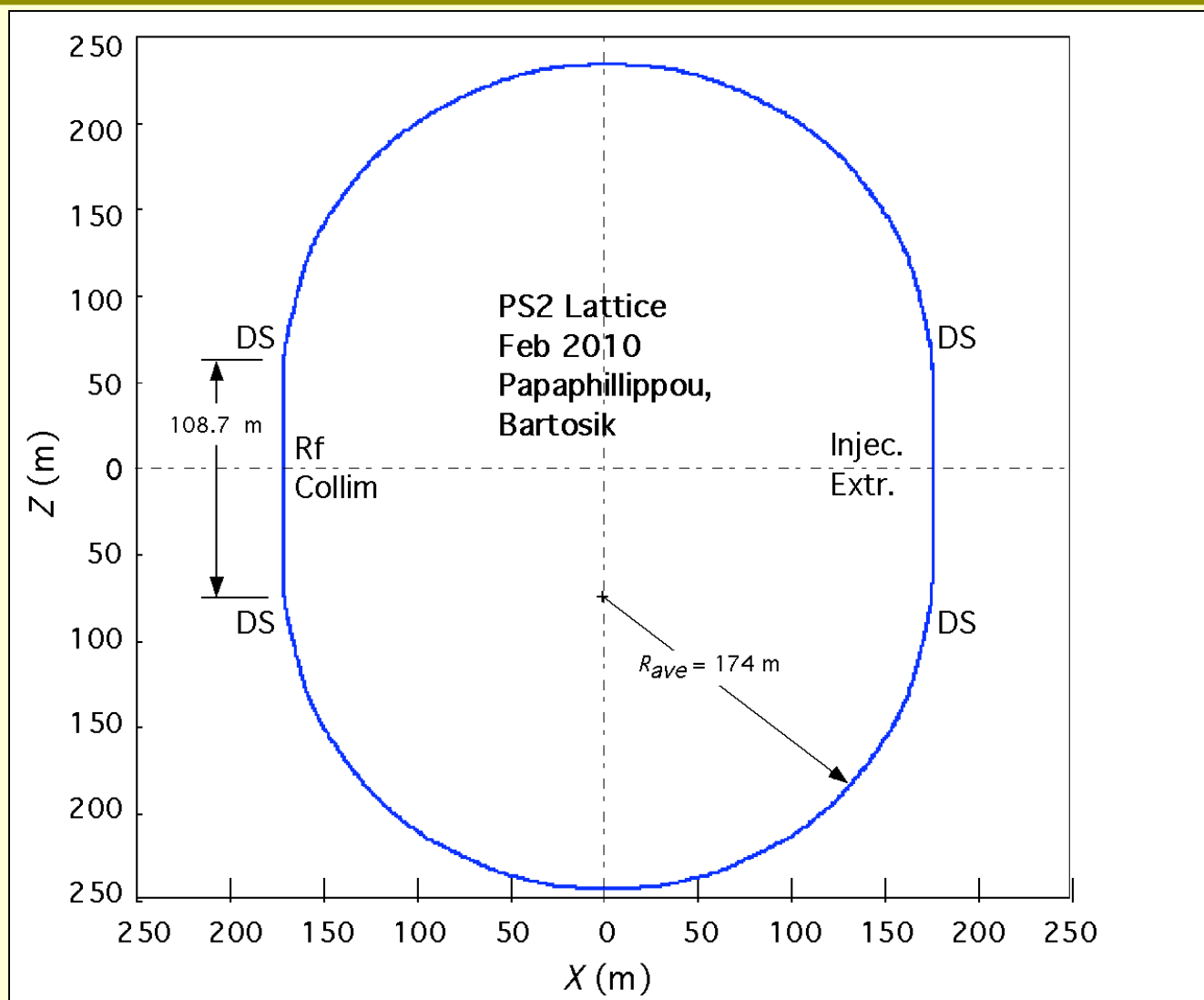
LARP PS2 Summary

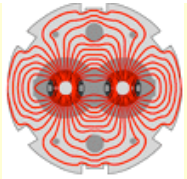
U. Wienands



LARP

PS2 Ref. Lattice Layout

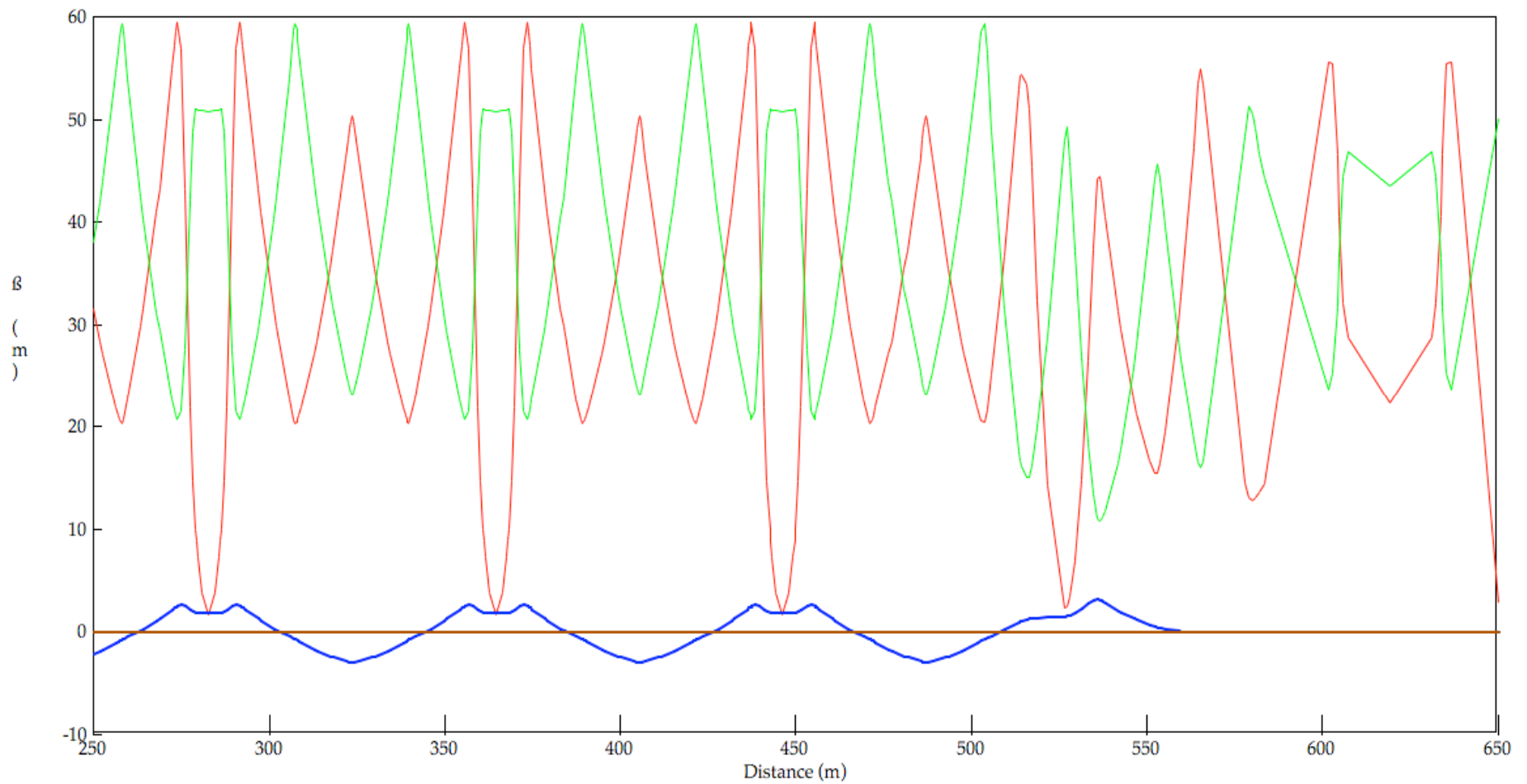
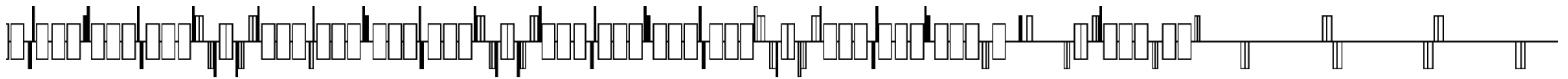




LARP

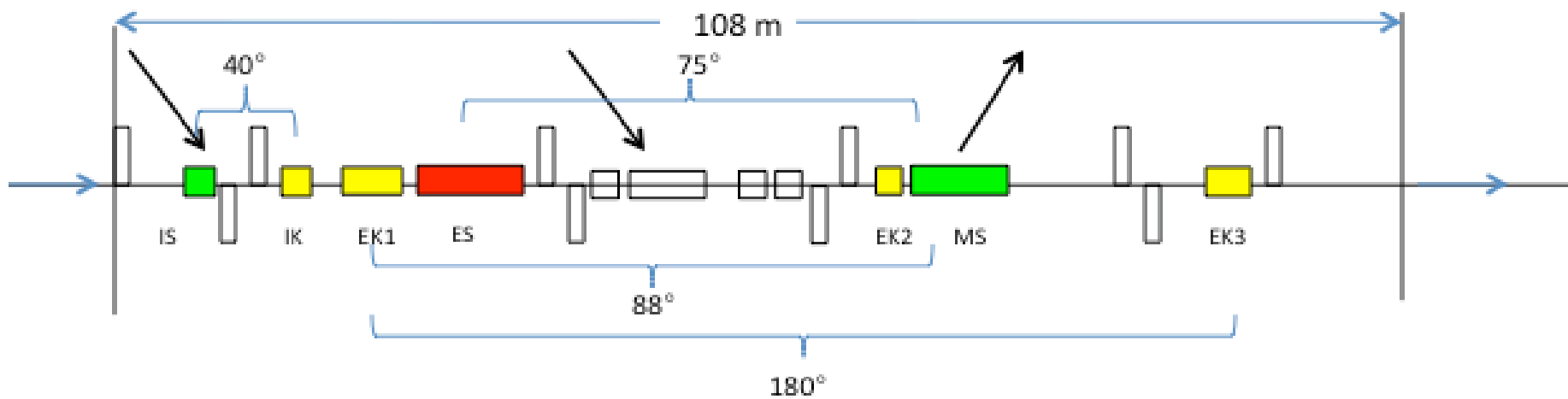
Lattice Functions

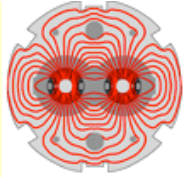
PS2 Lattice
Feb 2010
Papaphillippou,
Bartosik



LSS schematically

Element	Magnetic length [m]	Strength [mrad]
IS	0.8	60
IK	0.9	6.8
EK1	3.1	1.2
ES	3.8	0.8
EK2	-	-
MS	7.5	53.1
EK3	1.7	0.65





LARP

PS2 Design Report

- Iterating outline of Report
 - Collective-Effects section has LARP but also some CERN contributions
 - e-cloud work (Furman, Venturini, Rumolo)
 - Impedance (Bane & Stupakov, Mahner (beam pipe))
 - may include beam-lifetime in section (mostly done by Mahner)

PS2 CDR – Draft proposal

Table of Contents

- I) Introduction
- II) Optics, beam dynamics and operation aspects
- III) Technical Systems
- IV) Site aspects, buildings and technical infrastructure

- I) Introduction

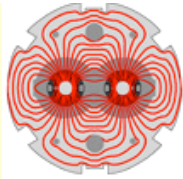
Layout and Performance (Michael)

Basic design considerations

Parameters (intensities, emittances, longitudinal aspects, etc)

Versatility

Geometrical considerations (length, position, implementation in complex)



LARP

Longitudinal dynamics (Steven)

Beam stability and collective effects (Uli)

Space charge simulations

- Simulation parameters (LHC beam)
- Variation of lattice parameters with intensity
- Working point scan

Impedances and instabilities

- Instability thresholds
 - Microwave instability
 - TMCI
 - Coherent multibunch instability
- High-frequency broadband impedance
- Narrowband resonances

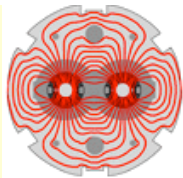
Electron cloud effects (and vacuum system requirements => vacuum section?)

Damping system specifications

- Longitudinal instability
 - instability threshold
 - feedback parameters
- transverse instability
 - instability threshold
 - feedback parameters

Beam loss management and radiation protection aspects (Thomas? tbd)

Collimation



LARP

III) Technical Systems

RF system (Erk)

- Main RF system
- Additional RF systems
- Damper systems

Magnet systems (Gijs)

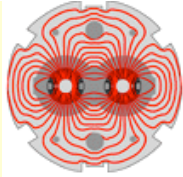
- Main dipole magnet
- Main quadrupole magnets
- Corrector magnets
- Non-linear magnets

Beam transfer systems (Brennan)

- H-injection system
- Bumpers, Kickers + PFN **Impedance?**
- Septa

Vacuum system (Edgar)

- Dipole vacuum chamber
- Quadrupole vacuum chambers
- Chamber coating
- Vacuum system layout



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Collimators and dumps (Vassilis?, Yacine?, tbd) **Impedance?**

Beam instrumentation (BI, Rhodri)

Orbit measurement system ← **Type? Impedance?**

Other systems and instruments

Power converters (PO)

Controls (CO)

IV) Site aspects, buildings and technical infrastructure

Site and buildings (Michael)

PS2 location

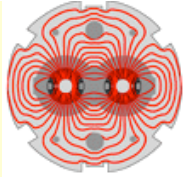
General layout of tunnels and surface buildings

Civil engineering aspects

Electricity distribution system (EN, tbd)

General considerations and requirements

Electrical distribution network



LARP

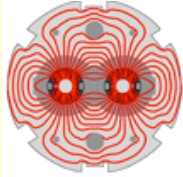
PS2 Task Budget (WBS 1.4.1.7)

Effort (FTE) (LARP only, expect actual effort \approx twice this)

	FY10					
	PersonYear tot	SLAC	LBNL	FNAL	BNL	Travel & M&S
Space-charge tracking, collim	0.6	0	0.50	0.13		\$ 15
Instability	0.5	0.5	0.0	0		\$ 5
e-cloud	0.7	0.25	0.5			\$ 15
Feedbacks	0.1	0.125	0.0			\$ 5
IPM & Phase-space diagnostic	0.5	0			0.5	\$ 8
Total FY10	2.5	0.875	1.0	0.13	0.5	\$ 48

Budget (LARP only, from T.M.)

By Lab:	k\$	By Task:	k\$
LBNL	262	Sp-Ch sim.	173
FNAL	39	Instabilities	130
BNL	133	e-Cloud	199
SLAC	237	feedback	40
Total:	671	IPM:	133
		Total	675



LARP

\$ & c

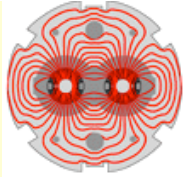
- Assigned Budget:

By Lab:	k\$
LBNL	262
FNAL	39
BNL	133
SLAC	237
Total:	671

By Task:	k\$
Sp-Ch sim.	173
Instabilities	130
e-Cloud	199
feedback	40
IPM:	133
Total	675

- Actuals (March 31, 2010):

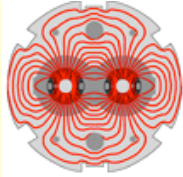
YTD Total Expenses				
BNL	FNAL	LBNL	SLAC	Total
0.0	0.0	162.2	74.4	236.5



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Budget vs Actuals

- BNL no spending reflects IPM not going forward
- FNAL Space-Charge effort did not materialize
- LBNL & SLAC are on track
 - LBNL slightly high, SLAC slightly low
 - reflection of level of effort
- Good reason to believe we'll come in at budget.



LARP

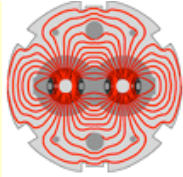
Timetable (post-Chamonix)

- CDR to be complete by end of CY2010
 - some detailed technical work (@CERN) will not be done
 - focus on physics design
 - keep vac. chamber coating development and rf design effort (CERN)
 - Scope of LARP effort 2010 has not changed
- Bulk of acc. physics work done late summer
 - should not present a problem
- Writing, iteration of content
 - allow for some time to fix up inconsistencies as they emerge.
- Will ask for some support through Q1 of FY11
 - about 1/4 of what we had this year to finish up PS2 work
 - New injector possibilities: next slide



Injector upgrade work we are potentially interested in (not exhaustive)

- Space-Charge studies
 - There is clear interest by LBNL and CERN to continue the collaboration and extend our studies to PSB and PS upgrades
 - Should probably include simulation of the painting process.
- SPS MD and upgrades
 - A lot of attention will be paid to the SPS performance bottlenecks. LARP, esp. with its LTV and fellowship programs, can have impact in
 - SPS MD participation and instability analysis
 - significant unaccounted-for impedance believed to exist (xverse)
 - e-Cloud mitigation (already ongoing)
 - chamber coating: mutual interest CERN SPS \leftrightarrow FNAL Main Injector??
 - feedback systems: kicker??
 - Beam collimation (?)
 - ...a bit time critical due to looming 2012 shutdown.



LARP

Summary

- While disappointing, the change in direction for CERN injectors does not invalidate LARP contribution.
 - Scope close to original
 - Design Report to be complete by end of CY2010
 - 3 iPAC papers being prepared
- Our PS2 involvement has opened the door for further injector involvement.