BDS

Andrei Seryi, SLAC

DOE ART review

April 29, 2009

Plan of the talk

- BDS status and deliverables for TDP
- Organization
- ATF2 progress
- IR Integration – MDI-D
- Beam dump design; Crab cavity
- Explorations of ideas & options
- Low P parameters
- Staging & $\gamma\gamma$ study
- Plans for optics for new baseline & min machine
- Financial status
- FY10 tentative milestones

Table 3.4: TD Phase Beam Test Facilities Deliverables and Schedule.

Test Facility	Deliverable	Date
Optics and stabilisation demonstrations:		
ATF	Generation of 1 pm-rad low emittance beam	2009
ATF-2	Demonstration of compact Final Focus optics (design demagnification, resulting in a nominal 35 nm beam size at focal point).	2010
	Demonstration of prototype SC and PM final doublet magnets	2012
	Stabilisation of 35 nm beam over various time scales.	2012

3.3.5 Beam Delivery System

The main R&D focus for the BDS is the ATF-2 programme at KEK which will allow demonstrations of many of the key BDS components and design concepts, the Machine-Detector activity for optimization of the Interaction Region, and design for those BDS subsystems which are critical for system performance or which may expand the physics capabilities of the collider. Examples of R&D are:

- Development of instrumentation (e.g. laser-wires), algorithmic control software, beam-based feedback systems and emittance-preservation techniques to achieve the small beam-size goals (2010)
- Developing of IR Interface Document defining MDI specifications and responsibilities (2010) and design or optimised IR (2012)
- Development of the prototype of the Interaction Region SC Final Doublet (2012)
- Development of Interferometer system for FD stability monitoring (2012)
- Design of the beam dump system (2012)
- Tests of SC and PM Final doublet at second stage of ATF2 (2012)
- Design studies for the photon collider option (2012)
- Collimation and dump window damage tests at ATF2 (2010)
- Development and demonstration of the SCRF crab-cavity system (2010)

BDS in GDE Technical Design Phase plan

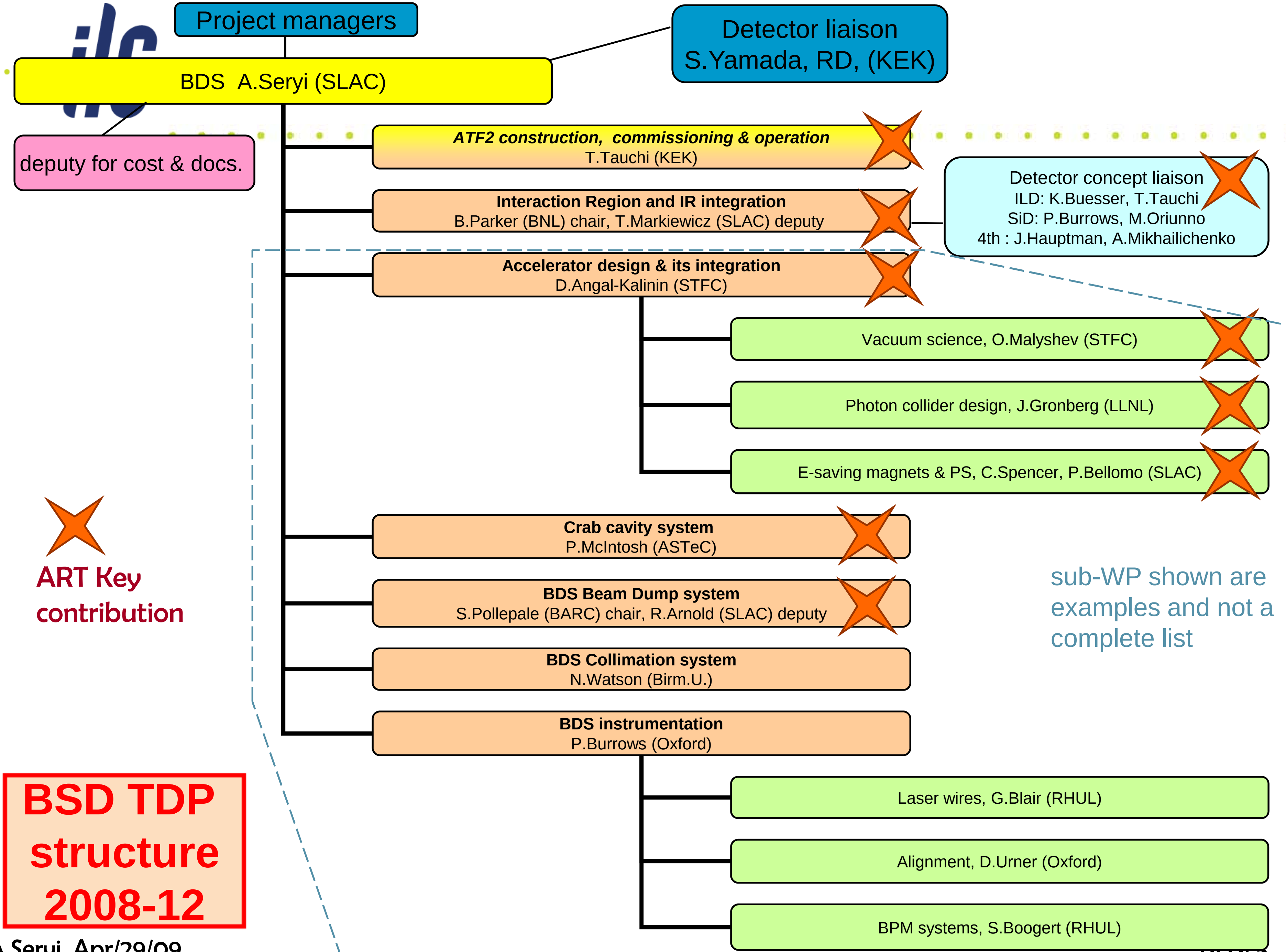
plus, design work for new baseline

ART contributions are underlined

FY09 Milestones

WBS System	Milestones (FY09 only)	Institution	Forecast	Actual
1.6 Beam Delivery	Redesigned BDS layout for minimal machine	SLAC	Q4	
	Complete ATF2 hardware	SLAC	Q1	Q1
	MDI IR interface document	SLAC/BNL	Q2	Q2
	Final focus prototype coil vertical testing	BNL	Q4	
	ATF2 FF coil winding start	BNL	Q3	

BSD TDP structure 2008-12

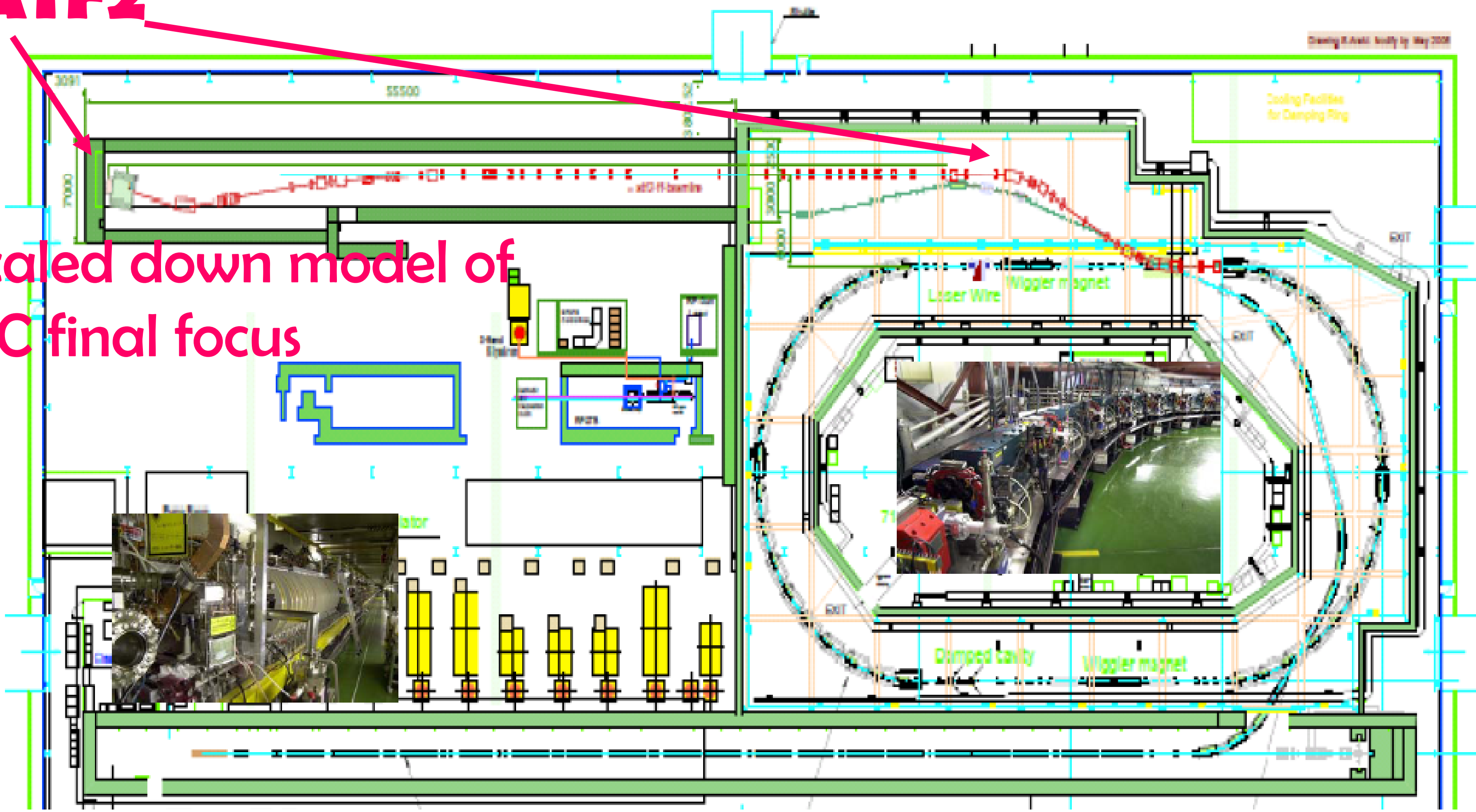


ATF
Accelerator Test Facility

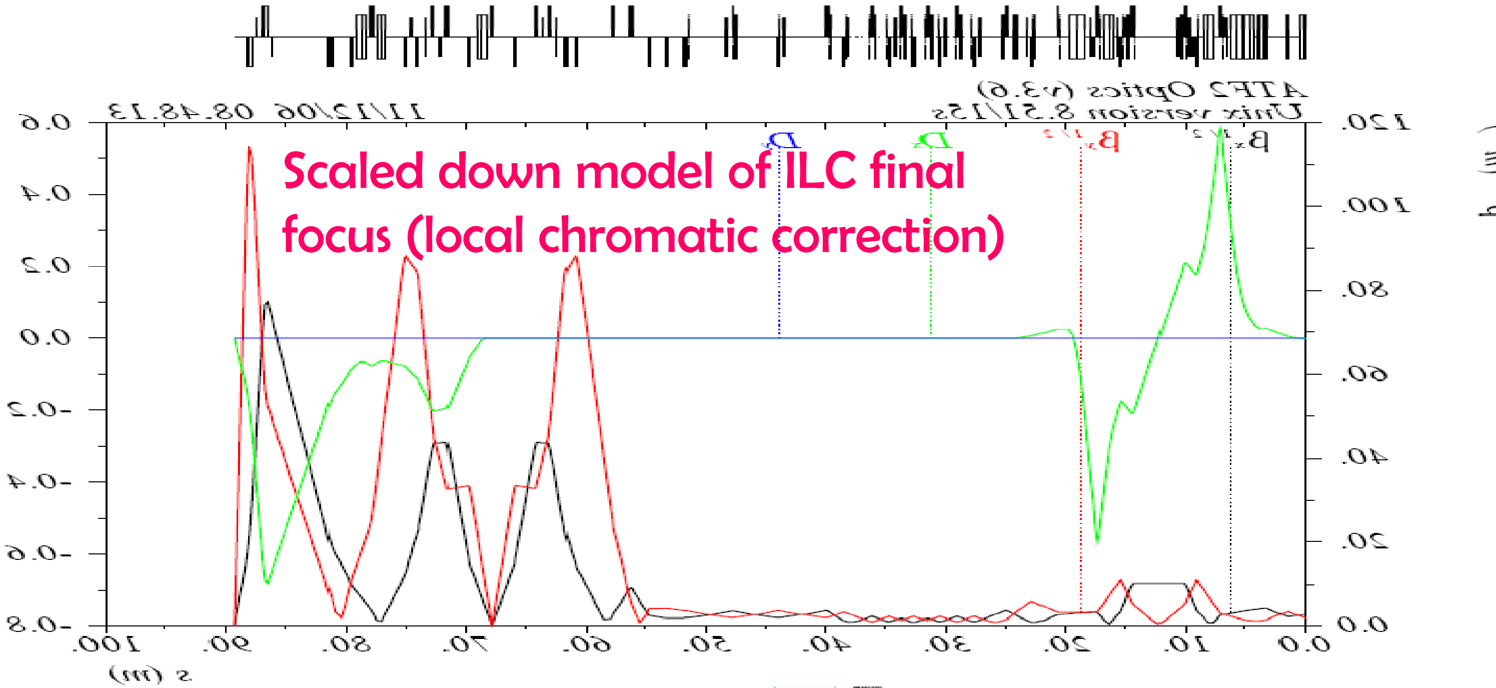
at KEK

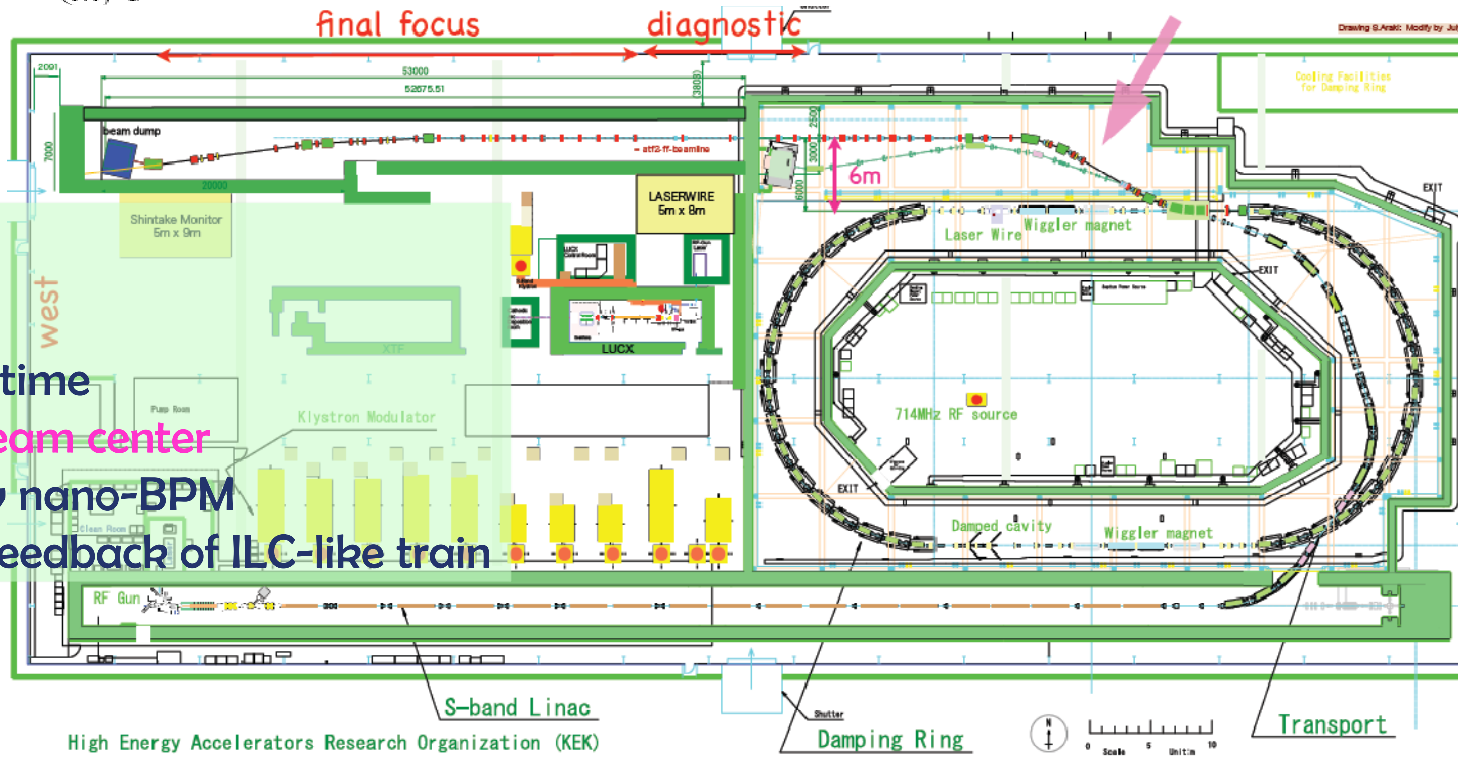
ATF2

Scaled down model of ILC final focus



ATF2 – model of ILC BDS





ATF2 goals

(A) Small beam size

Obtain σ_y ~ 35nm

Maintain for long time

(B) Stabilization of beam center

Down to < 2nm by nano-BPM

Bunch-to-bunch feedback of ILC-like train

A.Seryi, Apr/29/09

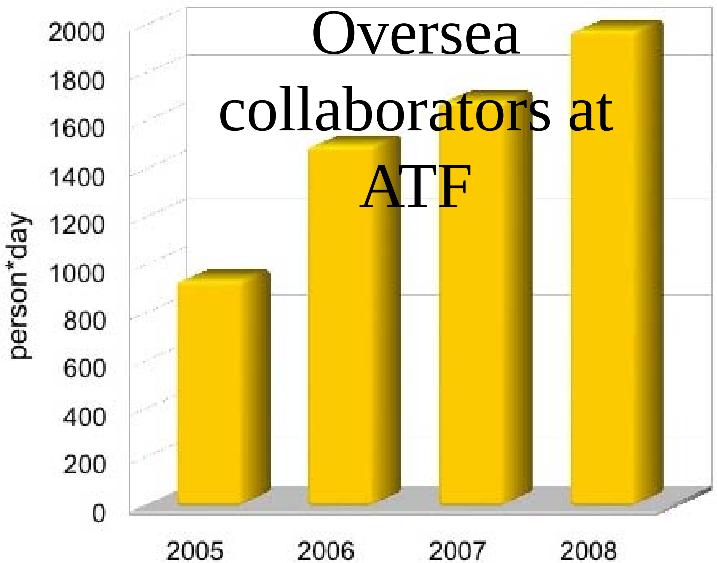
ATF International Collaboration

ATF International organization is defined by MOU signed by 20 institutions

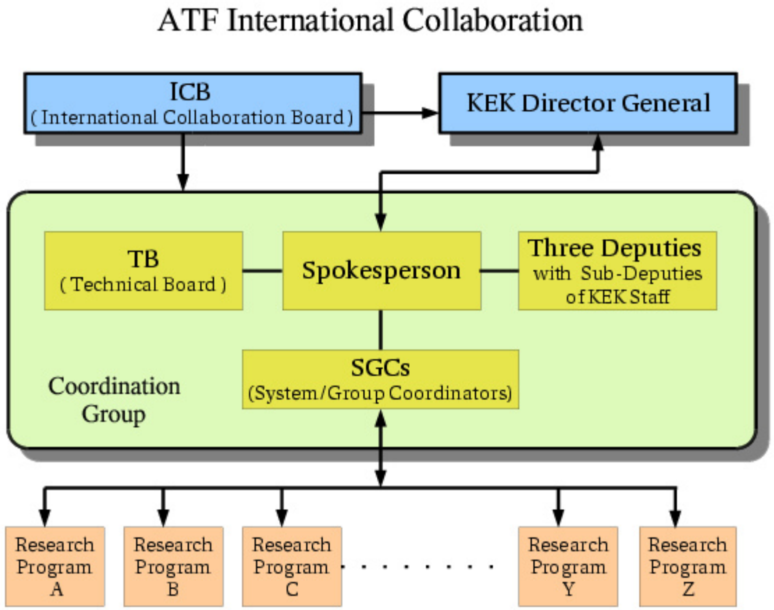
CERN
DESY
IN2P3
Tomsk Polytechnic Univ.
INFN, Frascati
University College London
Oxford Univ.
Royal Holloway Univ.

KEK
Waseda Univ.
Nagoya Univ.
Tokyo Univ.
Kyoto Univ.
Hiroshima Univ.
PAL (Korea)
IHEP (China)

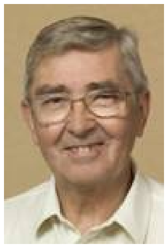
SLAC
LBNL
FNAL
Cornell Univ.



ATF2 project meeting, 15-18 December 2008, KEK



ICB: decision making body for executive matters related to the ATF collaboration (chair: Ewan Paterson, SLAC)



Spokesperson: direct and coordinate the work required at ATF/ATF2 in accordance with the ATF Annual Activity Plan, report the progress to ICB and the progress and the matters related to KEK budget to director of KEK (Junji Urakawa, KEK)

TB: assist the Spokesperson in formulating the ATF Annual Activity Plan, including the budget and beamtime allocation and assist the ICB in assessing the scientific progress (co-chairs: A.Wolski, CI, E.Elsen, DESY)

Three Spokesperson's Deputies for areas of:

- Beam operation:

Shigeru Kuroda KEK

- Hardware maintenance:

Nobuhiro Terunuma KEK

- Design, construction & commissioning of ATF2:

Andrei Seryi SLAC

with Sub-Deputies at KEK:

Toshiyuki Okugi KEK

Takashi Naito KEK

Toshiaki Tauchi KEK

Philip Bambade LAL/KEK acting, pending ICB approval

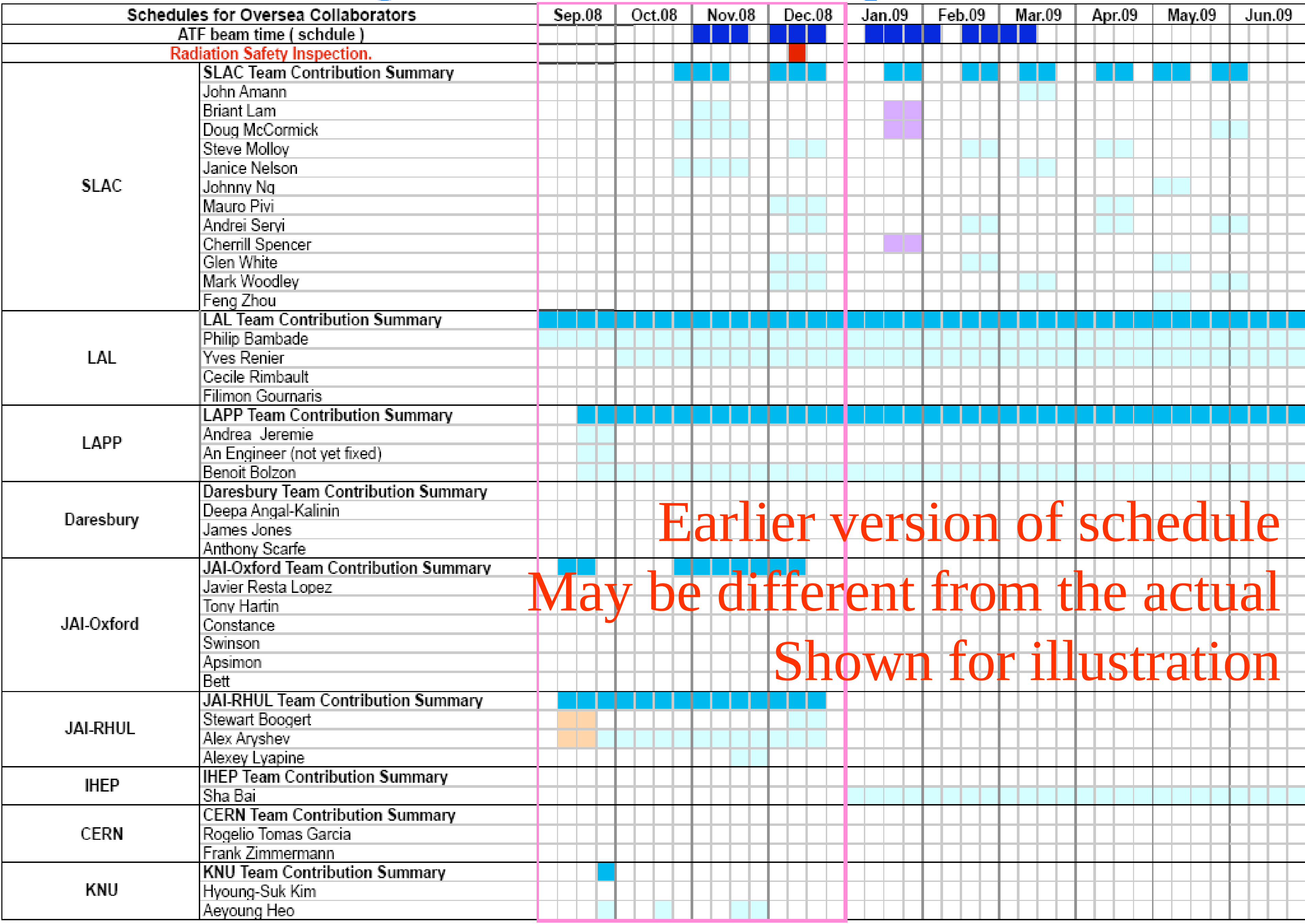
A.Seryi, Apr/29/09

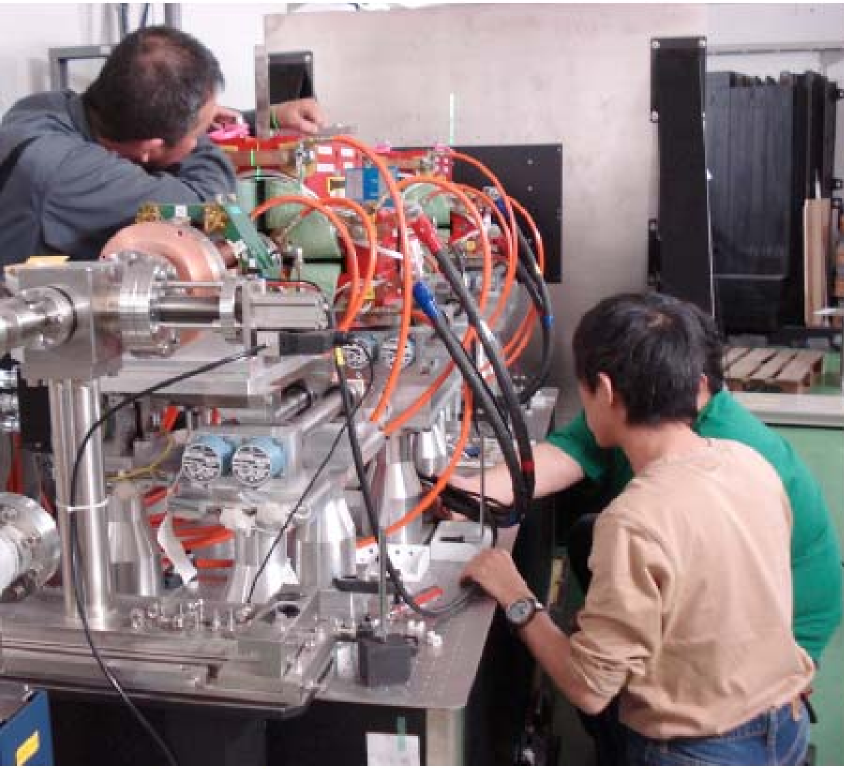
ATF2 Software Task List

ATF2 Software Tasks , Sep. 2008

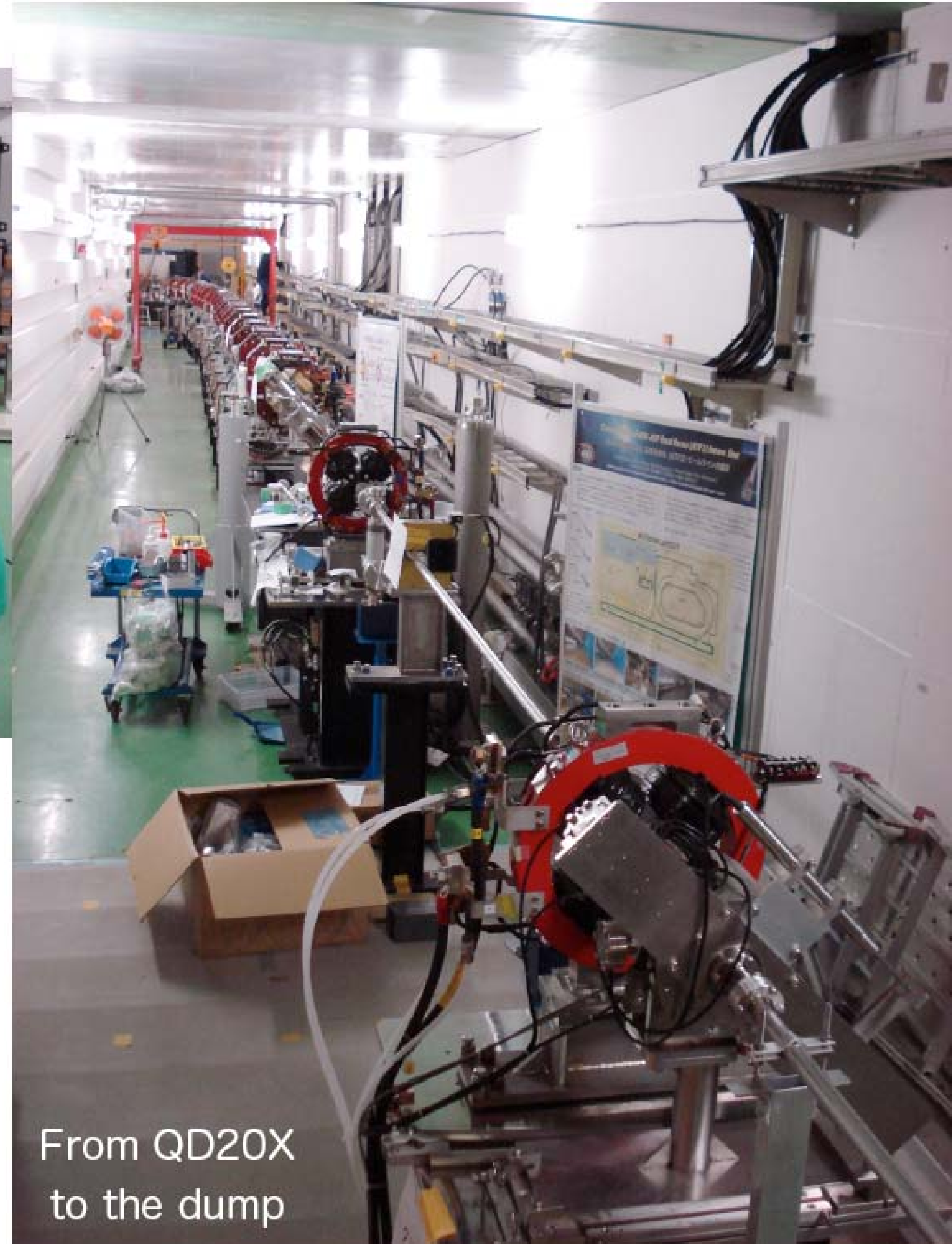
Beam Tuning Direct	Beam Tuning Direct			Hardware Direct Hardware Direct			
Project Title	Contributing Institutes	Priority	Leader	Project Title	Contributing Institutes	Priority	Leader
Coupling Mea.&Corr. in EXT	KEK,SLAC,LAL,CI	VH	C.Rimbault				
Dispersion Mea.&Corr. In EXT	KEK,SLAC,CI	VH	J.Jones				
EXT Beta-Matching	SLAC, KEK,CI,LAL	VH	K.Kubo				
EXT Orbit Corr./FB	SLAC,KEK,LAL,CI, JAI	VH	Y.Renier	EXT Orbit Corr./FB	SLAC,KEK,LAL,CI, JAI	VH	
FFS Orbit Corr./FB	SLAC,KEK,LAL,CI, JAI	VH	A.Scarfe	FFS Orbit Corr./FB	SLAC,KEK,LAL,CI, JAI	VH	
Beam Line Modeling Tools	SLAC,CI	M	S.Molloy				
IP FB(Pulse-Pulse)	LAL, JAI	H+L	Y.Renier	IP FB(Pulse-Pulse)	LAL, JAI	H+L	
FB Integration	SLAC, JAI	H	J.R.Lopez				
IP Waist&Beta adjustment	LAL(IHEP),CI	H	S.Bai				
Non-Mover-Based BBA(EXT)	KEK,LAPP	H	T.Okugi				
Mover-Based BBA(FFS)	SLAC,KEK,LAPP	H	J.Nelson				
				C&S-Band Cav.BPM IOC Dev.	JAI,UCL	VH	S.Booget
				IP Cav.BPM	KEK	M	Y.Honda
Final IP Spot-Size Tuning	SLAC,KEK,LAL,Tokyo,CERN,CI	M/H	G.White				
				Magnet Mover IOC Dev.	SLAC	M/H	J.Nelson
				EPICS Interface for WS/etc	JAI(LW?)	M/H	
				Software Interface for IP BSM	Tokyo	M/H	Y.Kamiya
Bunch-Bunch IP FB(Intra-Pulse)	JAI	M	J.R.Lopez	Bunch-Bunch IP FB(Intra-Pulse)	JAI	M	P.Burrows
FS Core Software Dev.	SLAC	M(Ongoir	G.White				
				Controls Infrastructure Dev.	JAI,SLAC,KEK	M(Ongoir	N.Terunuma
EXT Bunch-Bunch FB	JAI,Oxford	L/M	J.R.Lopez	EXT Bunch-Bunch FB	JAI,Oxford	L/M	P.Burrows
				EPICS Readout of Fiber-PLIC		L	
				PS IOC Dev.	SLAC	L	
Integrated Automated Tuning	SLAC	L	G.White				

Commissioning Team (non KEK) and "present" schedule





FD alignment after the Radiation Inspection , 11 December, 2008



From QD20X to the dump

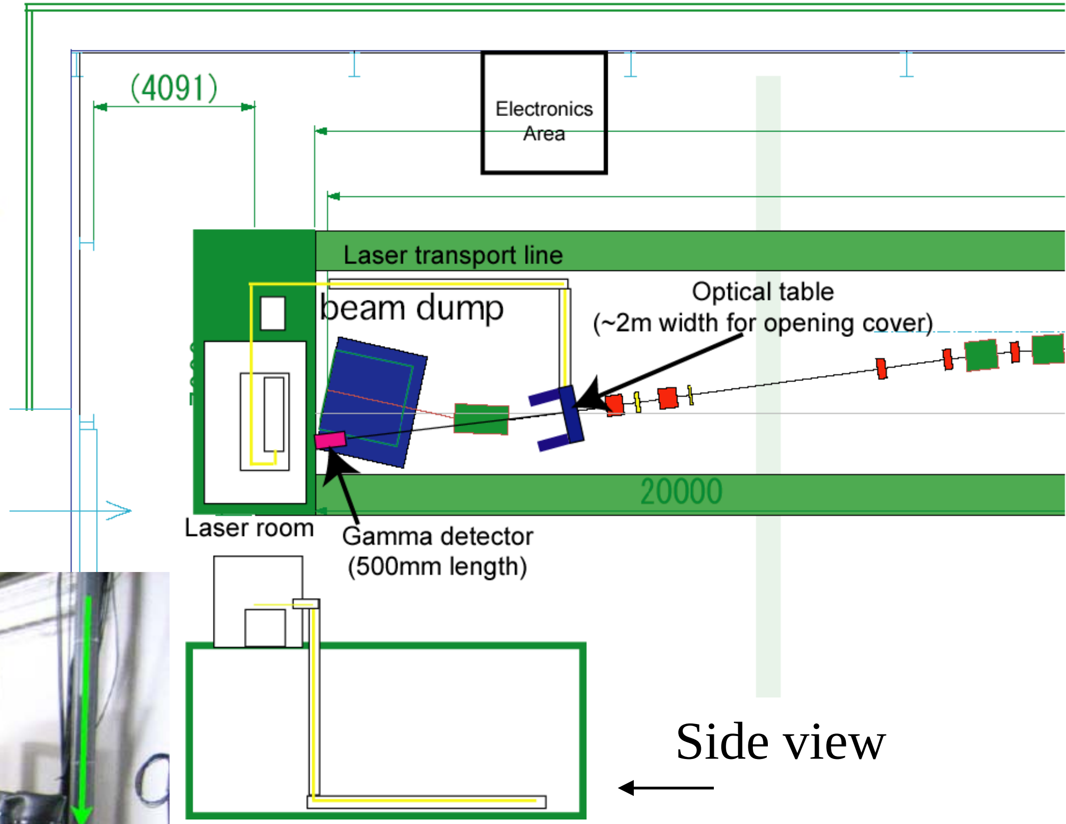
Highlights of recent runs

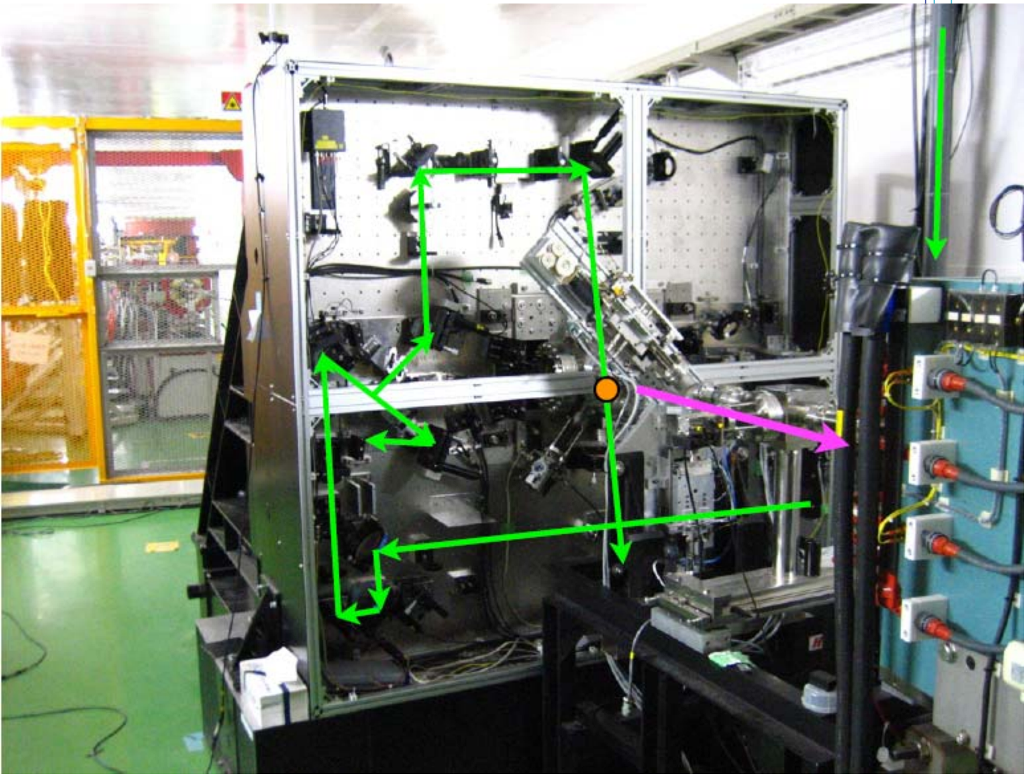
- December 2008 (pilot run)
  - large IP beta optics, semi-ballistic trajectory
  - Establish beam to beam dump, minimize losses, Radiation inspection
  - First tests of hardware and tuning software (FS)
  - BSM commissioning & background characterization
- Jan 2009
  - Continue hardware commissioning & fast kicker study
  - Replace QM7 to one with larger aperture (possible source of EXT ε growth)
- Feb-Mar 2009
  - Large (8cm beta*), all magnets ON
  - Continue hardware commissioning
  - Commission laser wire mode of BSM
  - Tuning tools (EXT disp./coupling corr., IP scans, β/η & ε determ, BBA)
- Current April 2009 run
  - Optics verification for ~1um beam (large, 1cm β^*) / IP wire scanners
  - Commission interferometer mode of BSM

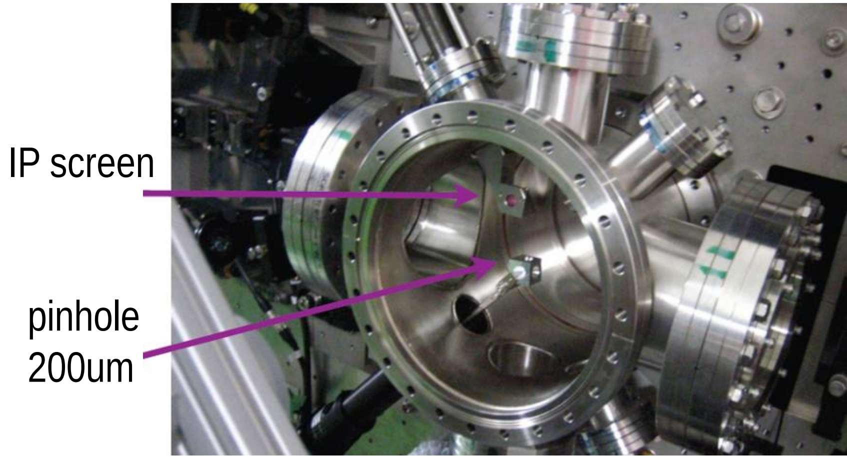
Beam Size Monitor

Tokyo Univ.

Shintake monitor Interferometer table on the ATF2 beam line

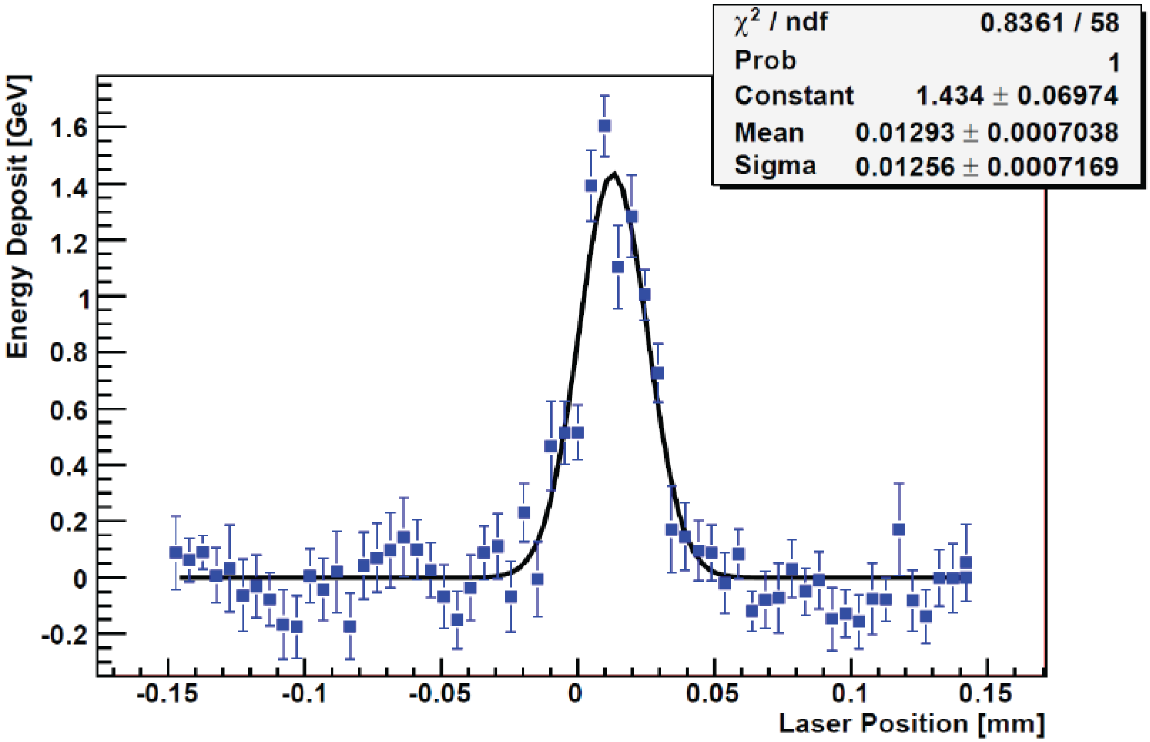






Feb-Mar run highlights

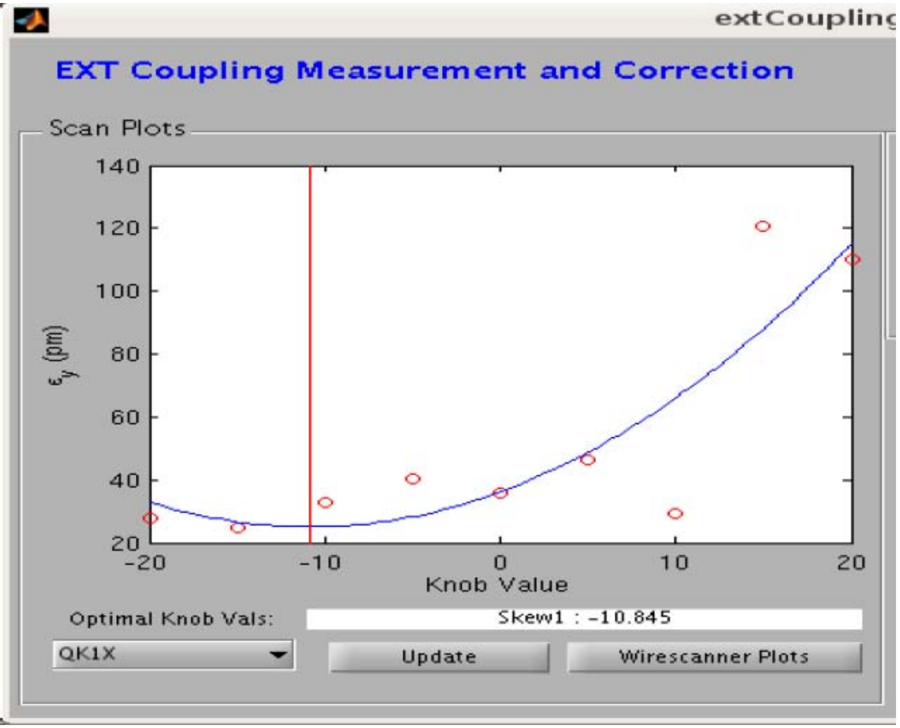
BSM Compton signal in LW mode



Convoluted size of 13microns was measured

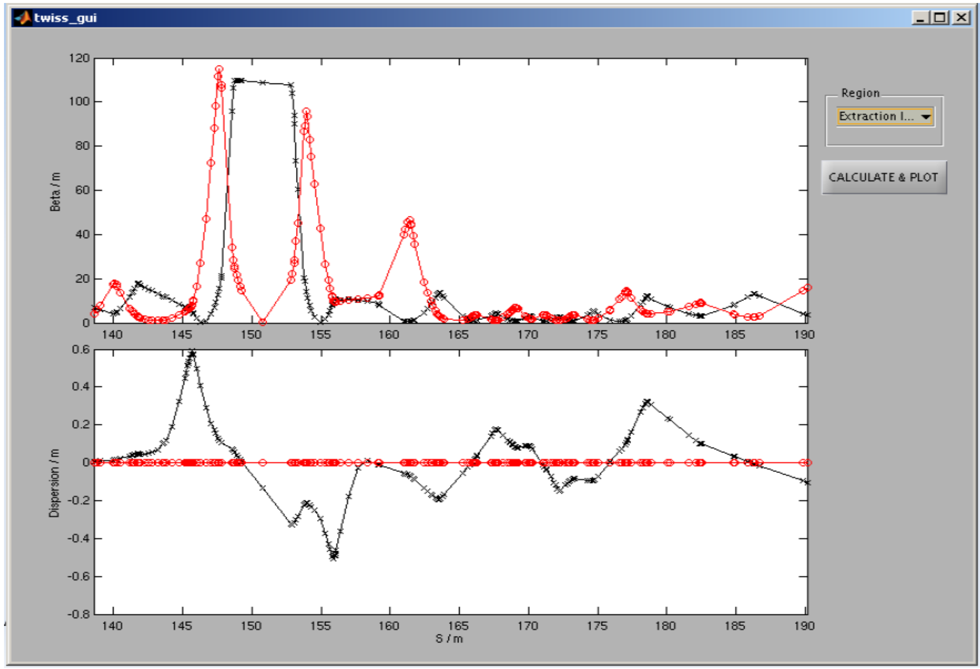
Feb-Mar & Apr run highlights

EXT coupling correction



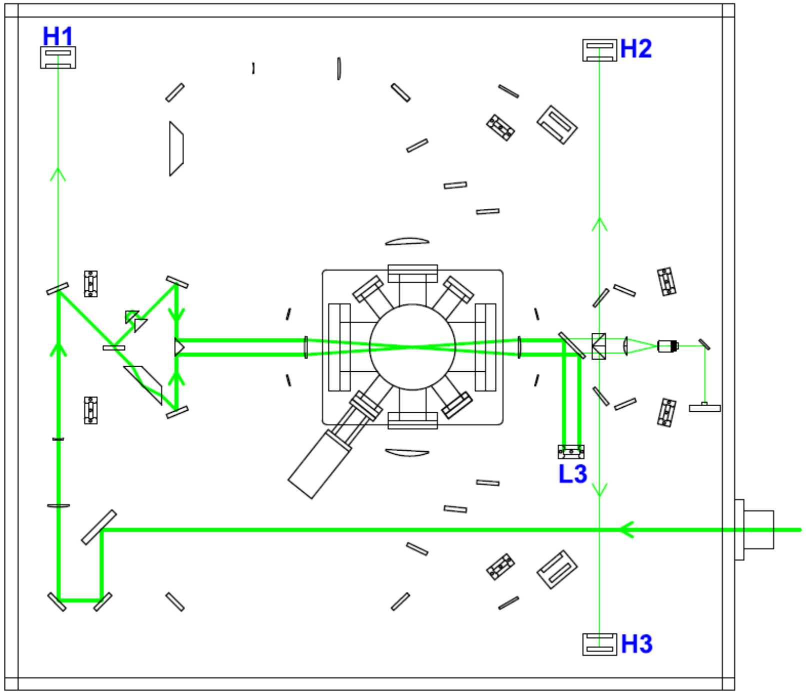
- Vertical emittance scans using 2 available skew quads
- Emittance measurement using 5 vertical wire scanners

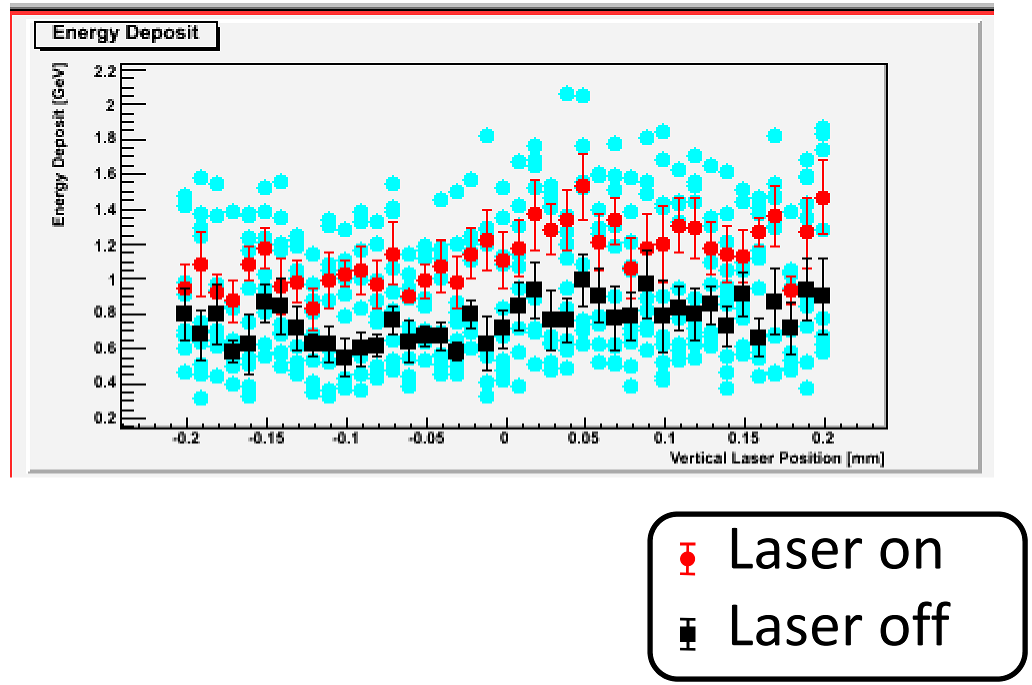
Optics tools



- Can verify and correct optics
- DR to EXT well matched, BMAGy~1.04

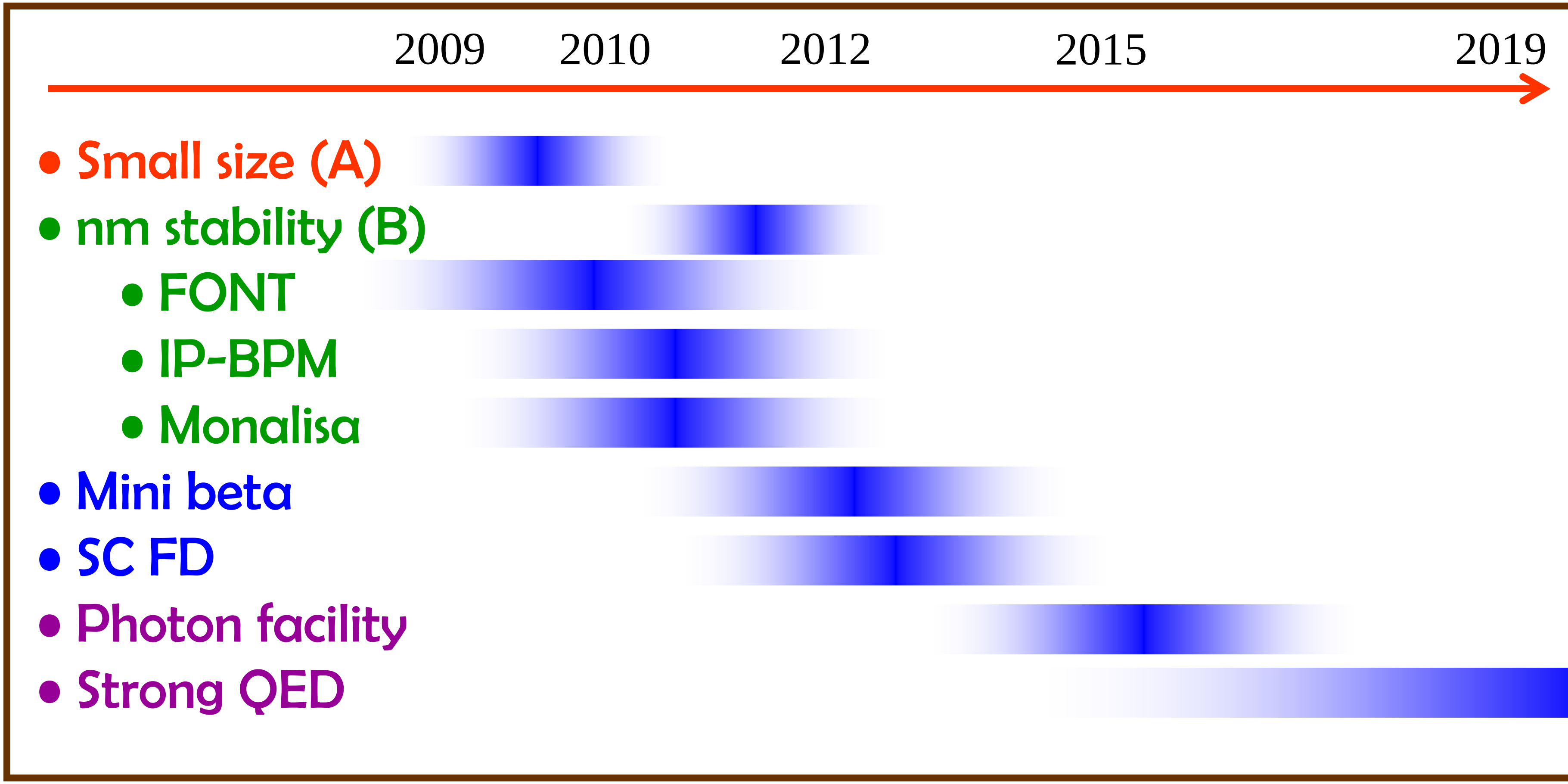
Highlights of April run





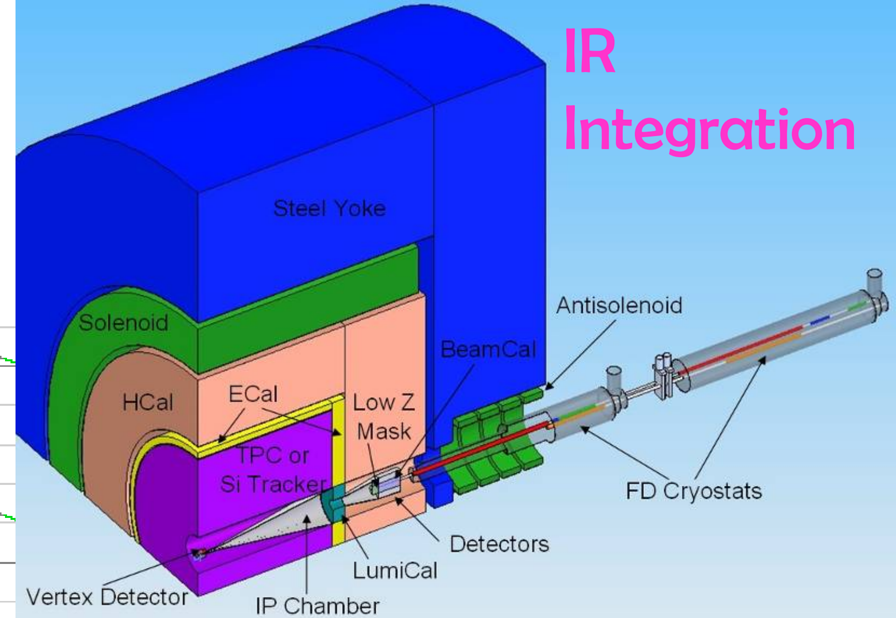
- BSM: 8 deg mode
- Can observe the signal from the start
- Continue working on laser and optics, to achieve beam size and see it by BSM

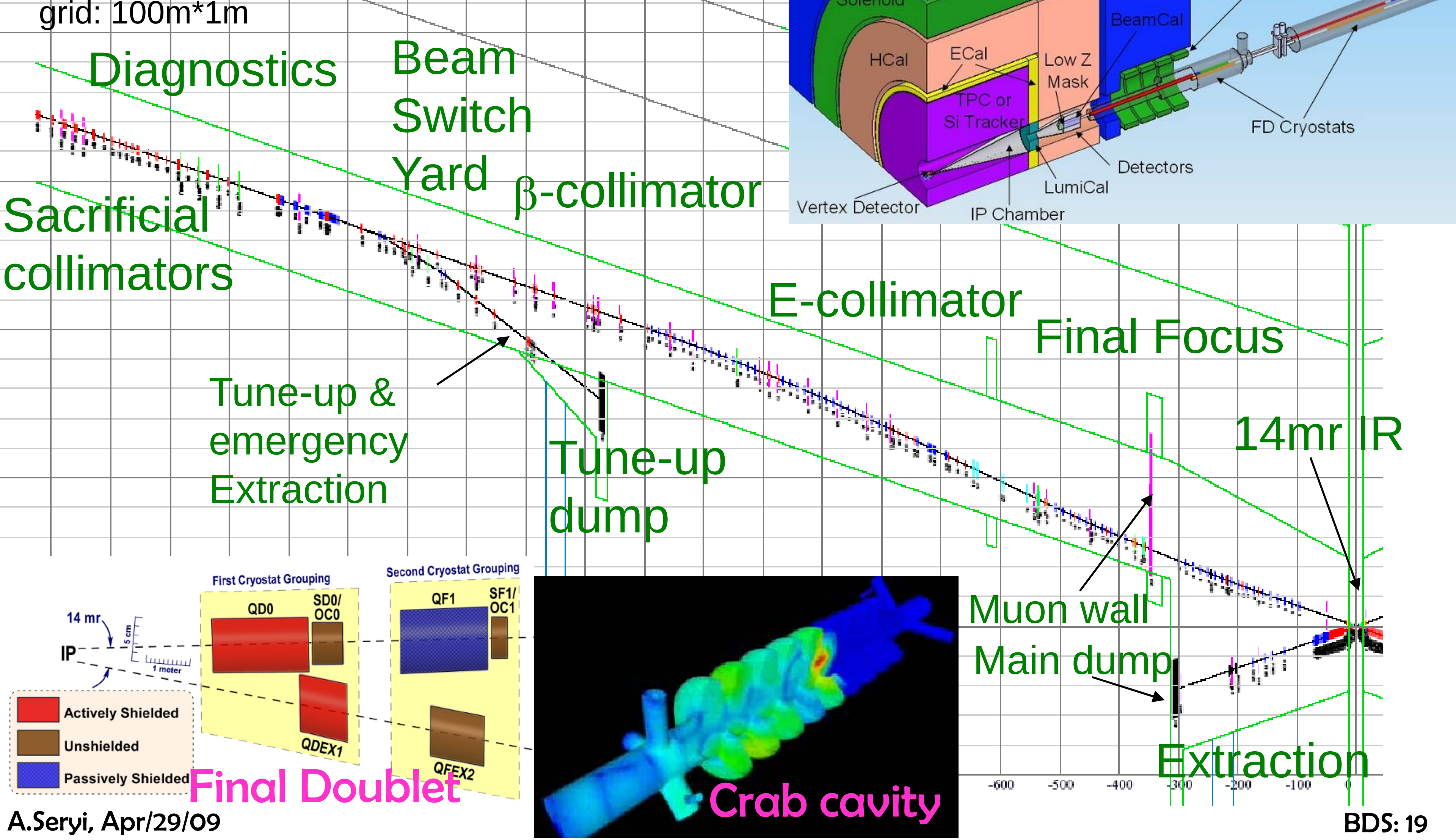
ATF2 Outlook



BDS RDR design

1TeV CM, single IR, two detectors, push-pull

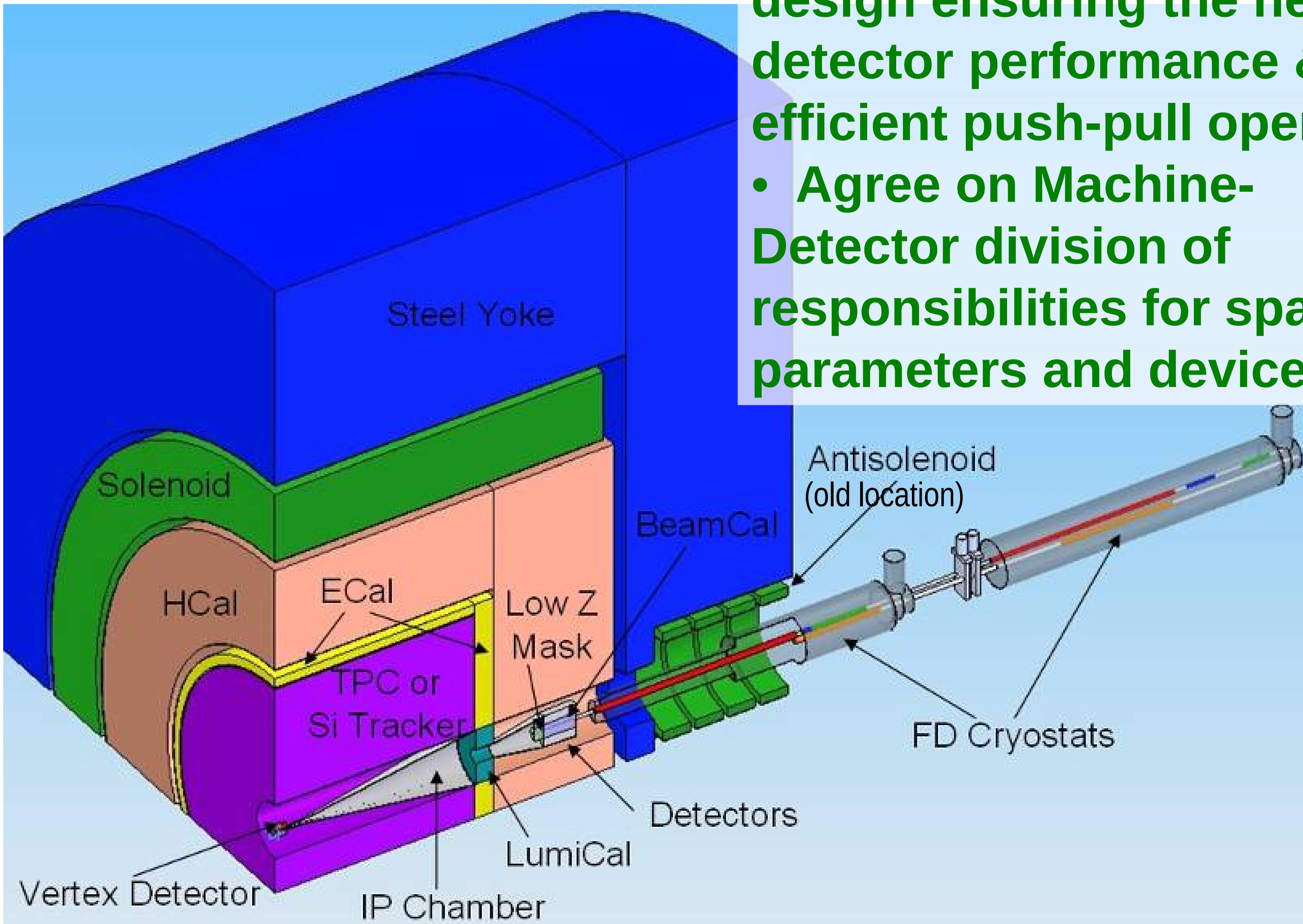




IR integration & MDI

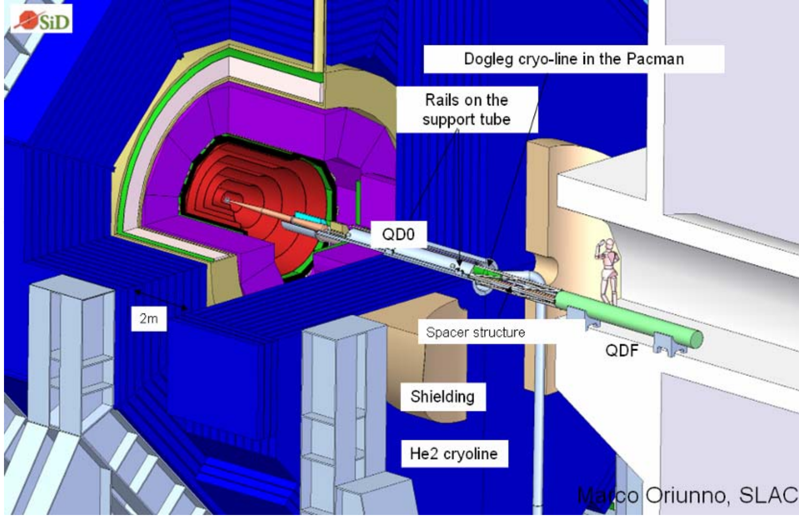
Challenges:

- **Optimize IR and detector design ensuring the needed detector performance & efficient push-pull operation**
- **Agree on Machine-Detector division of responsibilities for space, parameters and devices**

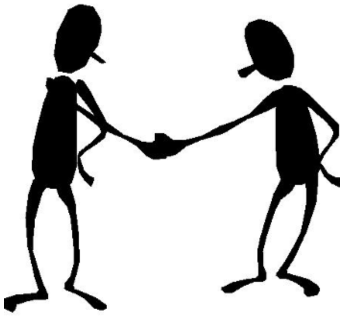


IR integration

PLAN AS SHOWN IN EARLY 2008 (Sendai):



- Machine – Detector work on Interface issues and integration design is a critical area and a focus of efforts
- IR integration timescale
  - EPAC08 & Warsaw-08
    - Interface document, draft
  - LCWS 2008
    - Interface doc., updated draft
  - LOI, April 2009
    - Interface document, completed
  - Apr.2009 to ~2012
    - design according to Interface doc.



ILC-Note-2009-050
March 2009
Version 4, 2009-03-19

Functional Requirements on the Design of the Detectors and the Interaction Region of an e^+e^- Linear Collider with a Push-Pull Arrangement of Detectors

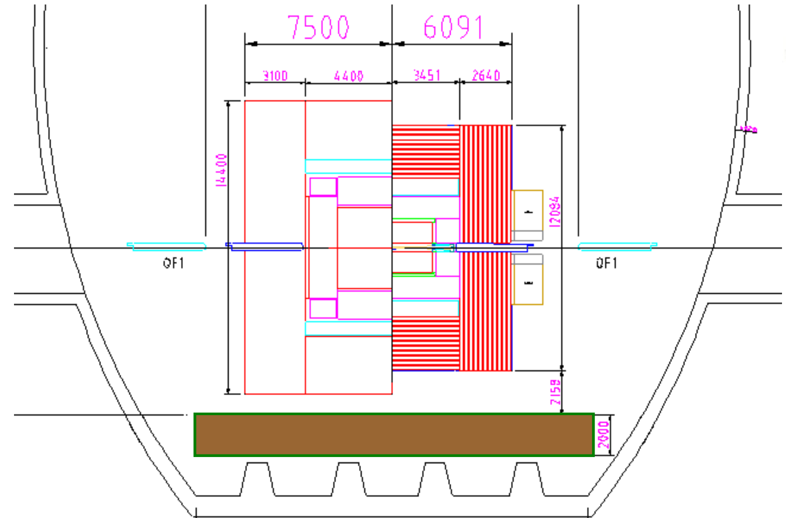
B.Parker (BNL), A.Mikhailichenko (Cornell Univ.), K.Buesser (DESY), J.Hauptman (Iowa State Univ.), T.Tauchi (KEK), P.Burrows (Oxford Univ.), T.Markiewicz, M.Oriunno, A.Seryi (SLAC)

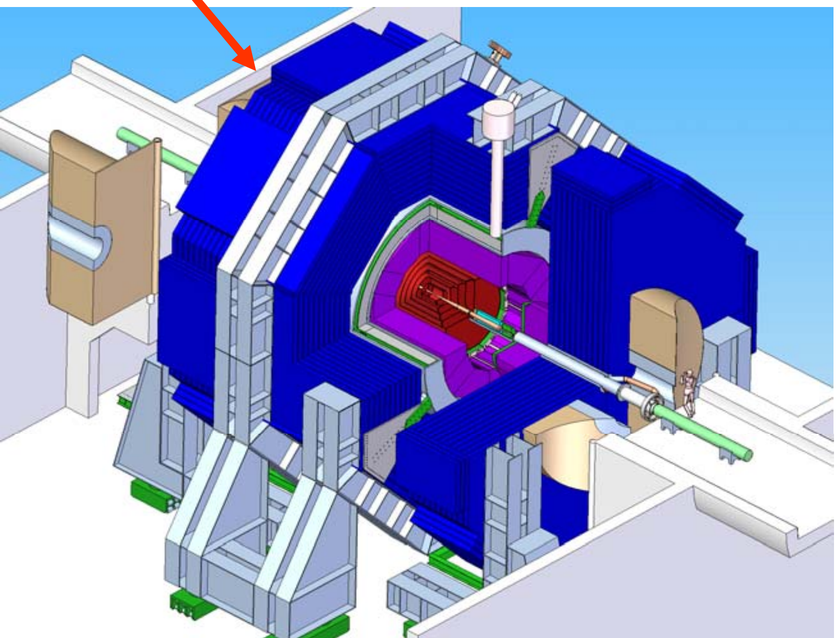
Abstract
The Interaction Region of the International Linear Collider [1] is based on two experimental detectors working in a push-pull mode. A time efficient implementation of this model sets specific requirements and challenges for many detector and machine systems, in particular the IR magnets, the cryogenics and the alignment system, the beamline shielding, the detector design and the overall integration. This paper

http://ilcdoc.linearcollider.org/record/21354?ln=en

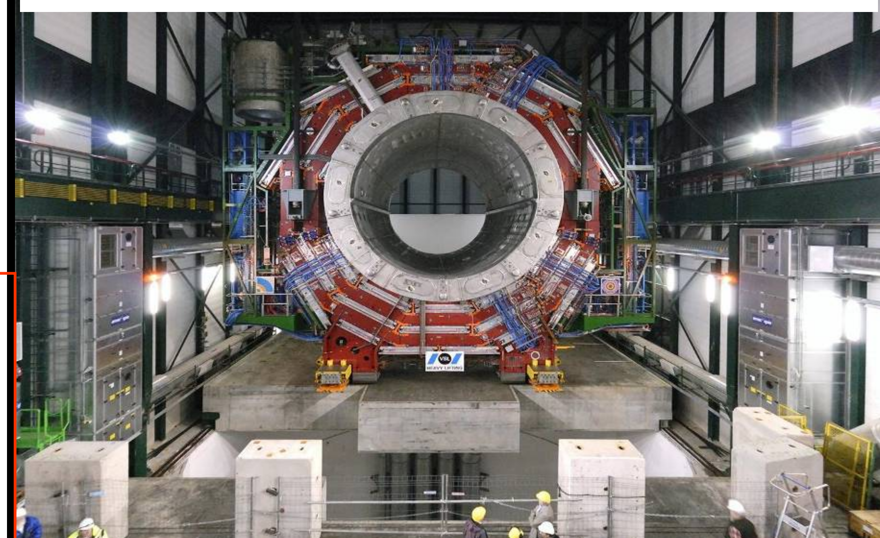
MDI issues to keep working on

Detector motion system with or without an intermediate platform



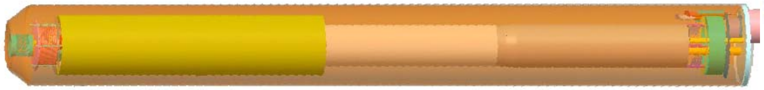


CMS platform – proof of principle for ILC

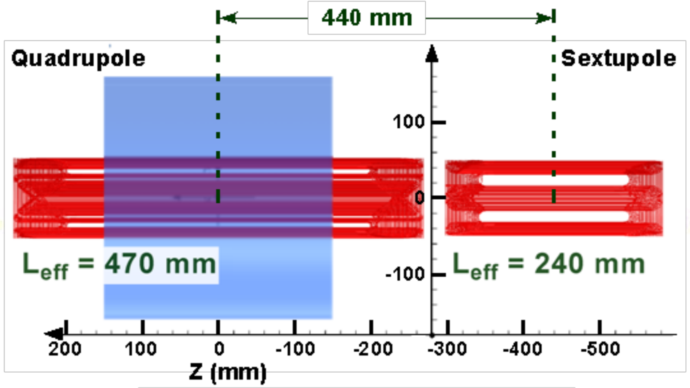


Planning for further design work aiming to bring different push-pull solutions to a compatible and cost effective design

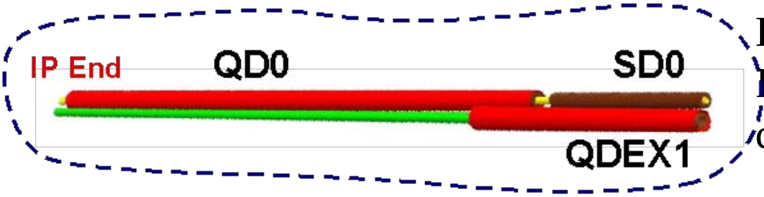
SC FD modified plans and ATF2 tests



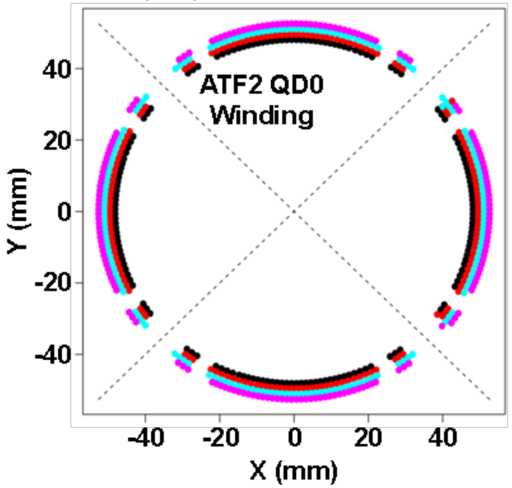
QD0 Cryostat Design for L* = 4.5 m.



Brett Parket, et al., BNL



Earlier plan was to prototype ILC-like QD0 magnet with cryostat & study its stability

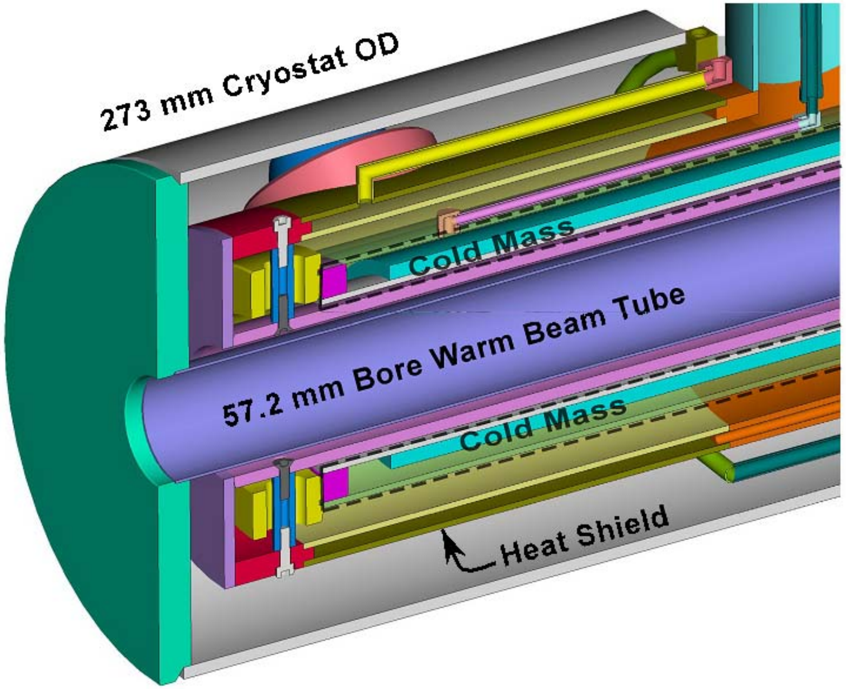


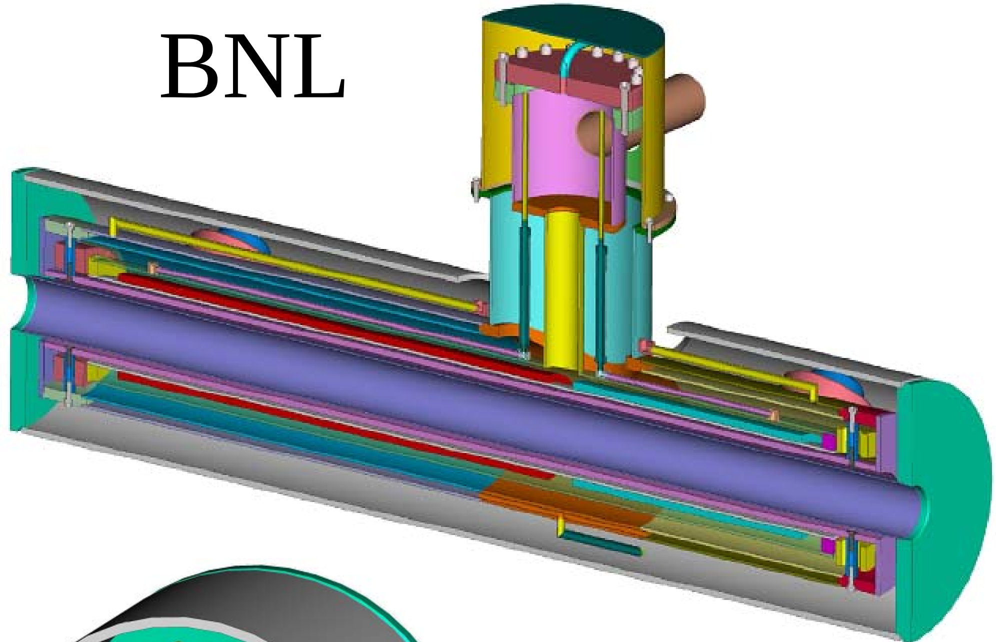
- In TDP, plans for SC FD prototype at BNL were adjusted
  - delay efforts on ILC-like FD prototype; for near-term only make long cold mass and perform its field tests (cryostat later)
  - enhance efforts on ILC-technology-like SC Final Doublet for ATF2 upgrade

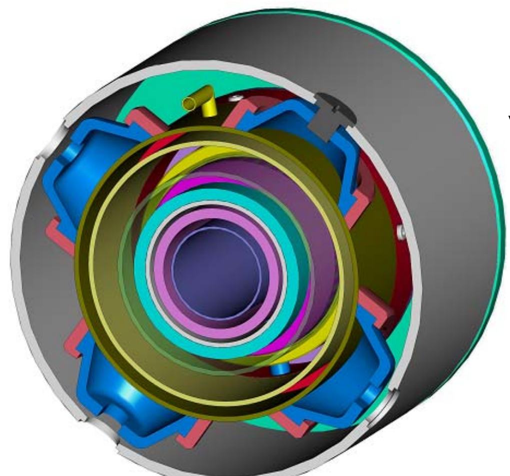
- Only produce one quadrupole/sextupole magnet combination (in common cryostat).
- No self-shielding or anti-solenoid (simple).
- KEK Cryogenic system (major challenge).
- 50 mm aperture but with a warm bore (i.e. optimize to limit cold mass heat leak).
- Minimum degrees of freedom (correctors).
- Found it easy to match corrector coils and main coil magnetic lengths.

SC FD for ATF2

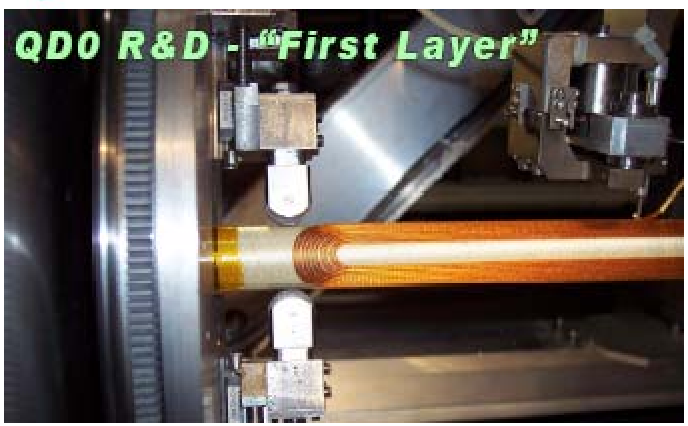
BNL





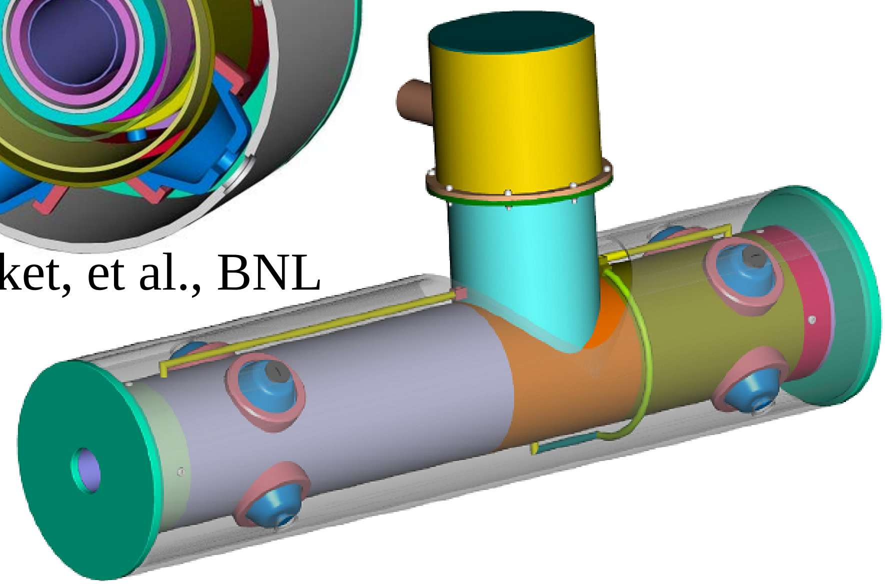


View Inside Cryostat of Support Structure



Long coil winding

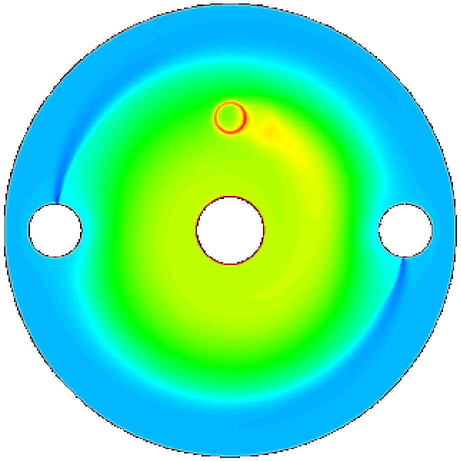
Brett Parket, et al., BNL



Cross Section View at Support Location

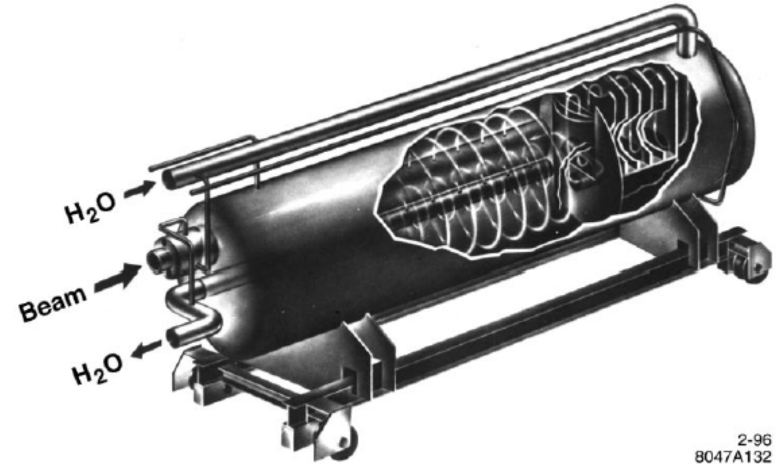
18MW Beam dump

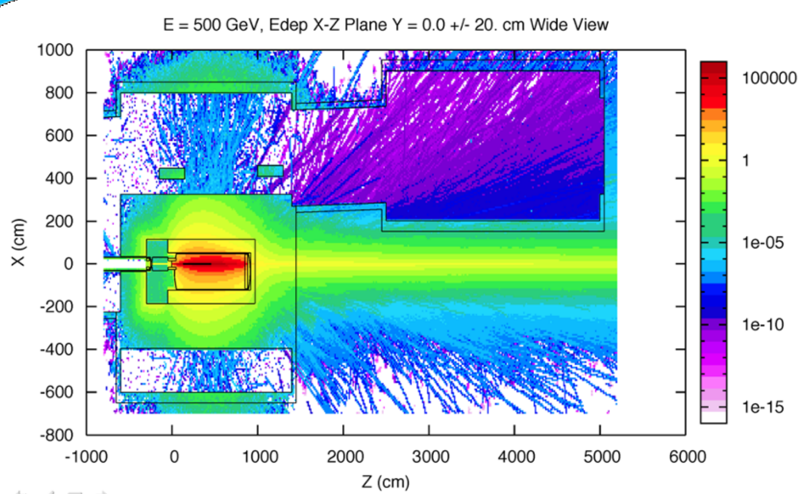
BARC, India, & SLAC, collaboration

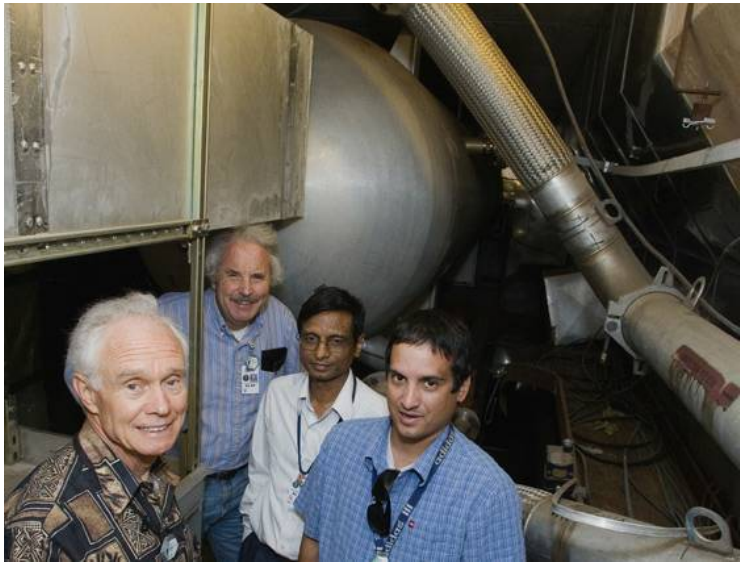


Beam dump with double header (Satyamurthy Polepalle et al, BARC-SLAC)

Maximum Temperature – 147^{0}C
Maximum delta T – 28^{0}C





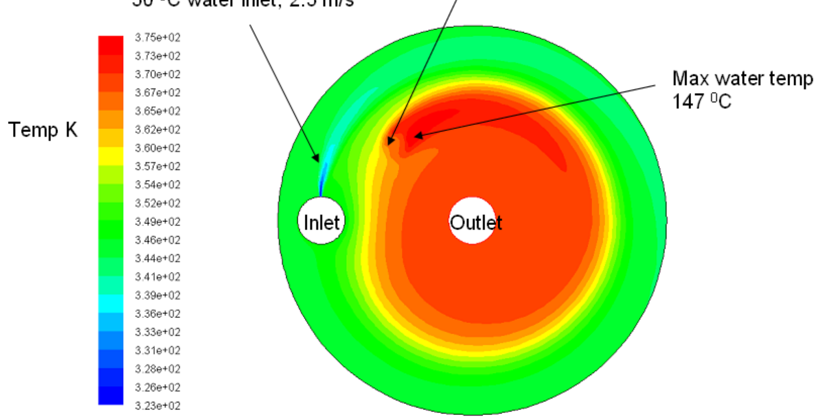


Dieter Walz, Ray Arnold, Satyamurthy Polepalle (BARC, India), John Amann, at SLAC beam dump area (February 2008)

Planning for the next working meeting of the task force at SLAC in ~May 2009, to continue the work on beam dump design

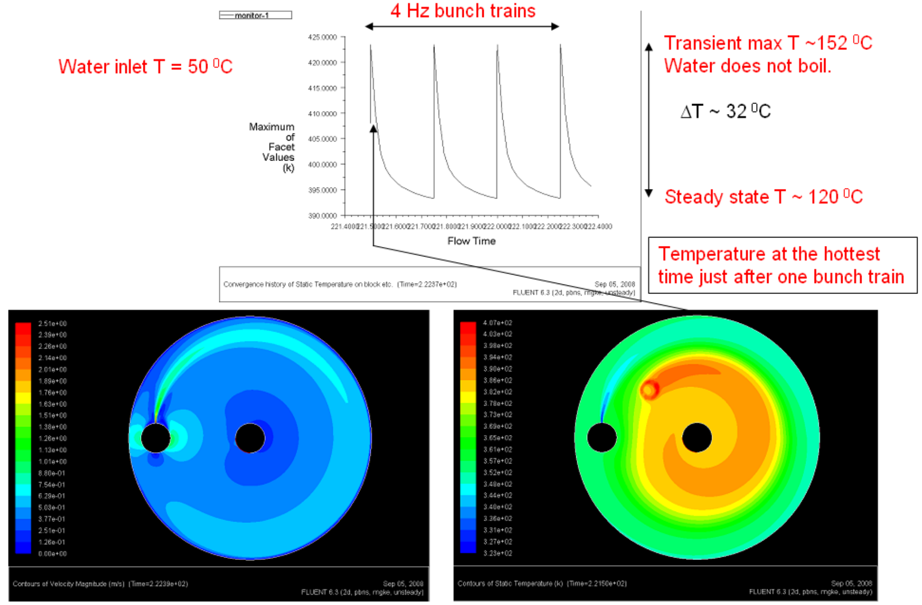
Space Distribution of Steady State Water Temperature

Use 2-D FLUENT models to study water velocity, header size, beam spot location, sweep radius.



Temperature contours for CASE 5b (At location of Z=1.82 m for 2.50 m/s nozzle velocity without blocking outlet)

Time Dependence of Water Temperature

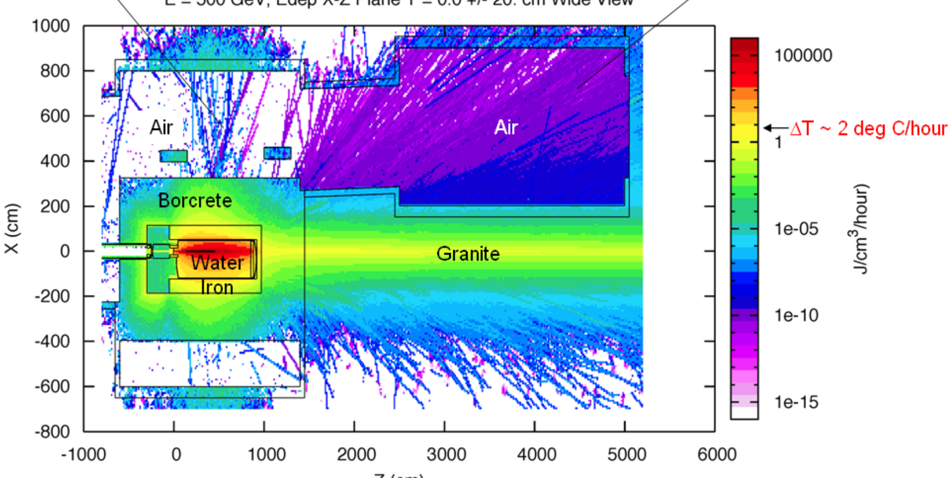


Velocity distribution at 222.3 seconds

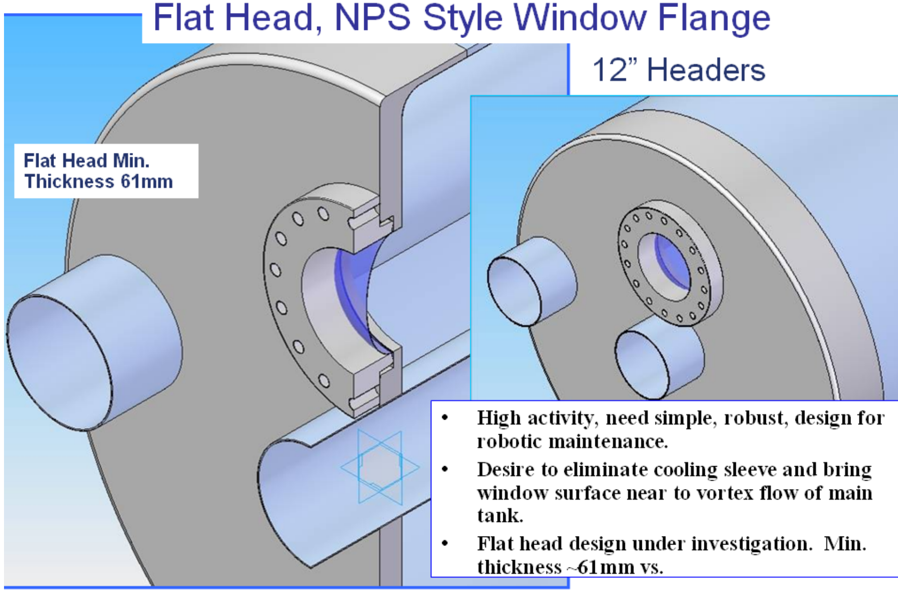
Temperature Distrubution at 221.5 seconds

Prompt Energy Deposition - J/cm^3/hour - Geometry V2

Even the rocks get hot!

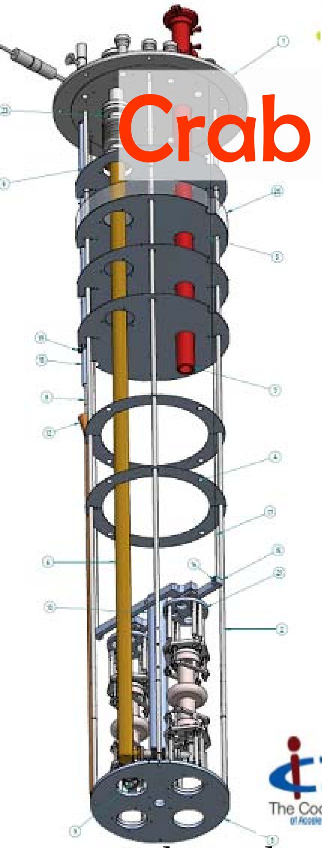


Variation of Baseline Design
Flat Head, NPS Style Window Flange

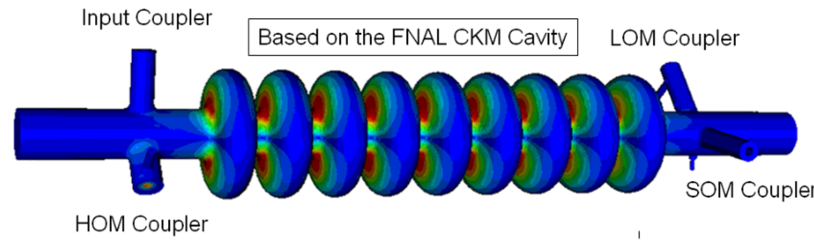


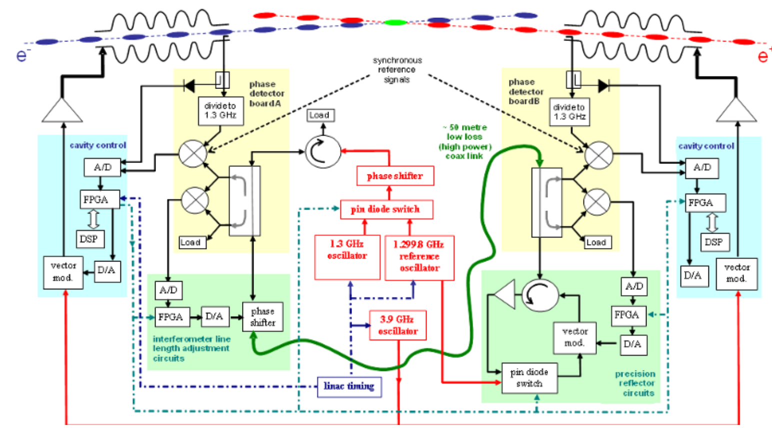
- High activity, need simple, robust, design for robotic maintenance.
- Desire to eliminate cooling sleeve and bring window surface near to vortex flow of main tank.
- Flat head design under investigation. Min. thickness ~61mm vs.

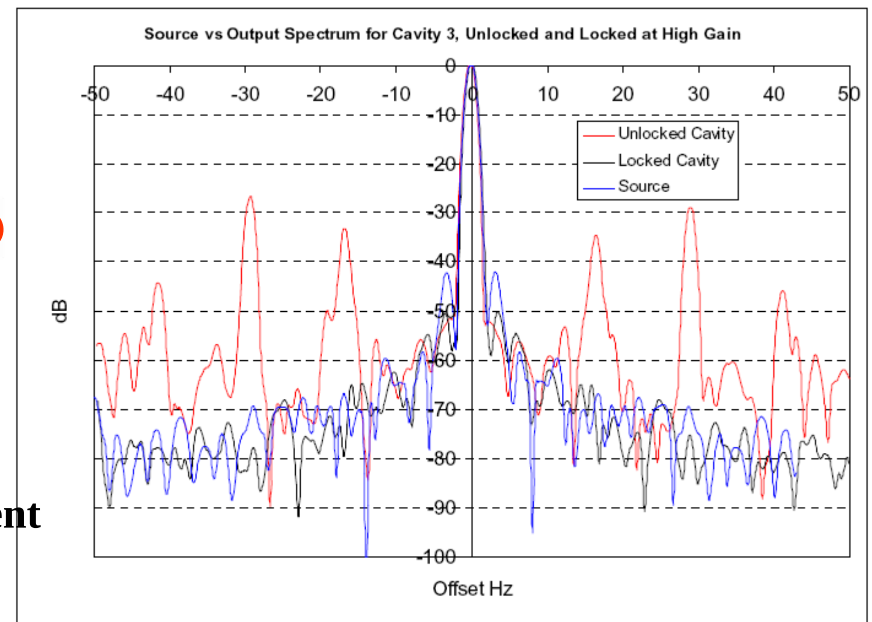
Crab cavity



Cavities limited in gradient to 1 MV/m (~40kV/cell) – shielding implications.







The Cockcroft Institute of Accelerator Science and Technology

ASTeC

SLAC ACD

Independent phase lock achieved for both cavities:

– **Unlocked => 10º r.m.s.**

– **Locked => 0.135º r.m.s.**

• Performance limited by:

– **Source noise (dominant); ADC noise; Measurement noise; – Cavity frequency drift; Microphonics**

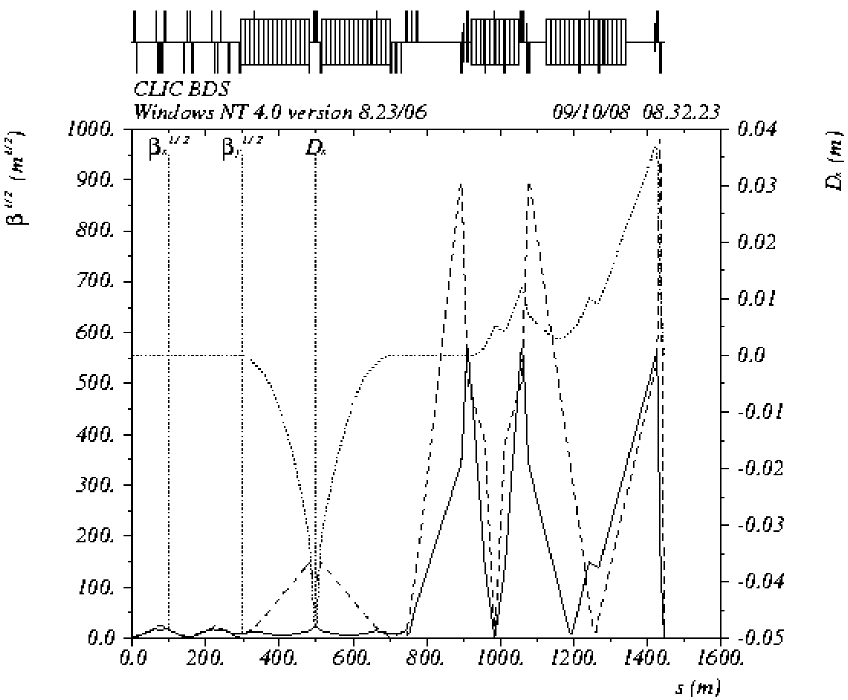
• Improvements being made; new tests being prepared

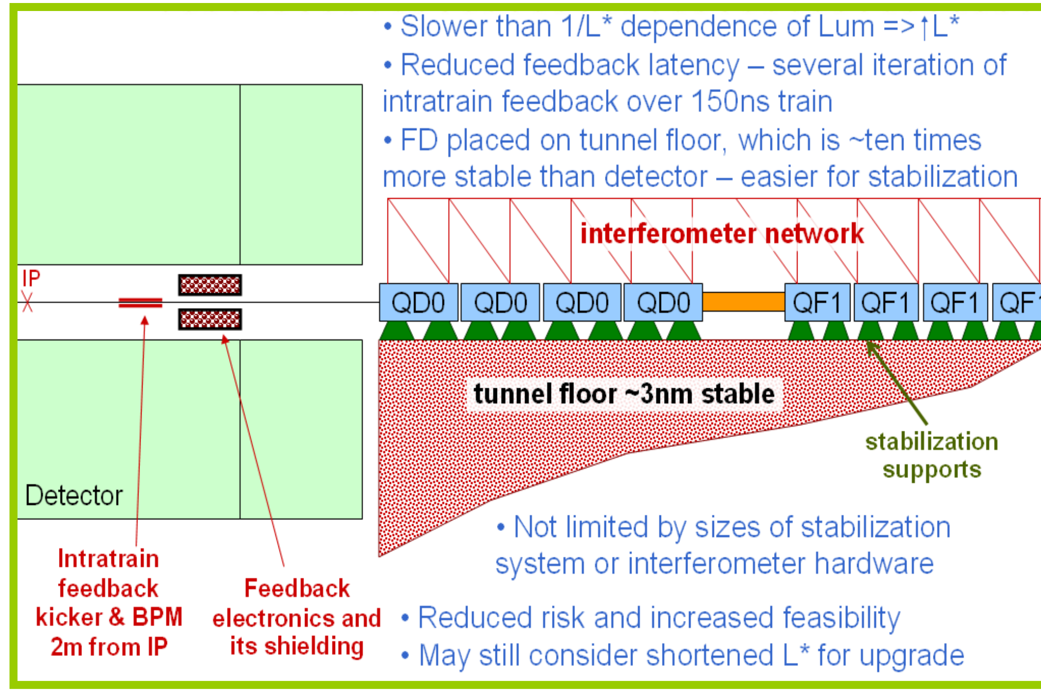
P.McIntosh at al

Exploration of ideas & tests for more performing machine

- Longer L* or smaller beta*
  - CERN/CLIC colleagues suggested to study squeezed y-beta* at ATF2 (0.025 mm instead of 0.1 mm nominal)
    - Squeezed beta* study at ATF2 is one of example of strong synergy and mutual benefits of ILC-CLIC collaboration
  - Such study may support
    - Test of high chromaticity FF, as in CLIC FF design
    - Smaller β^* for "New Low P" parameters of ILC
    - Lengthening L* for easier MDI
- Crystal collimation
  - Exploring Volume Reflection radiation in bent crystals as a phenomena to improve collimation system of linear collider

Longer L* or smaller beta*



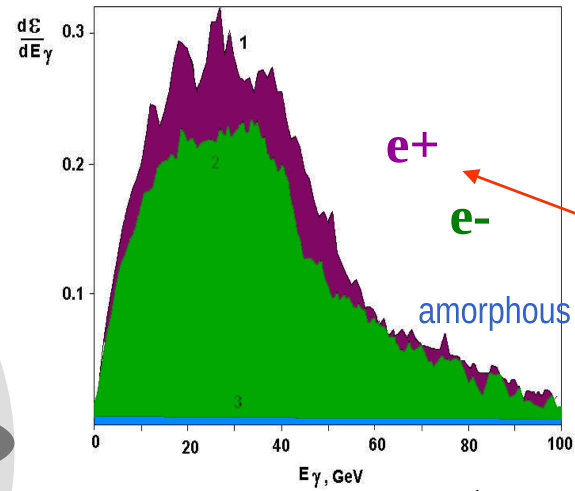


“ Doubled L* design ”, L*=8m, 3TeV CMS CLIC

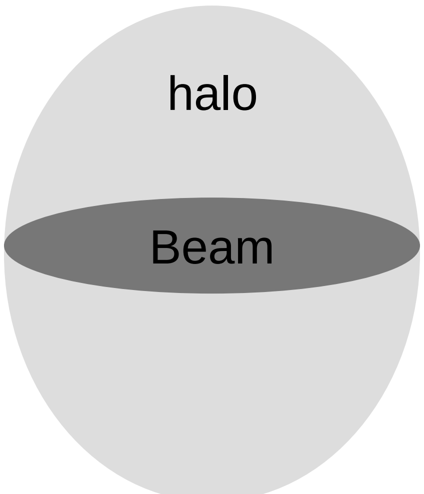
- Study prompted by the CLIC FD stability challenge (< 0.2nm)
- Double the L* and place FD on a stable floor
- Initial study show that L*=8m optics is possible (CLIC08 workshop)
  - CLIC colleagues are studying impact on field and alignment tolerances

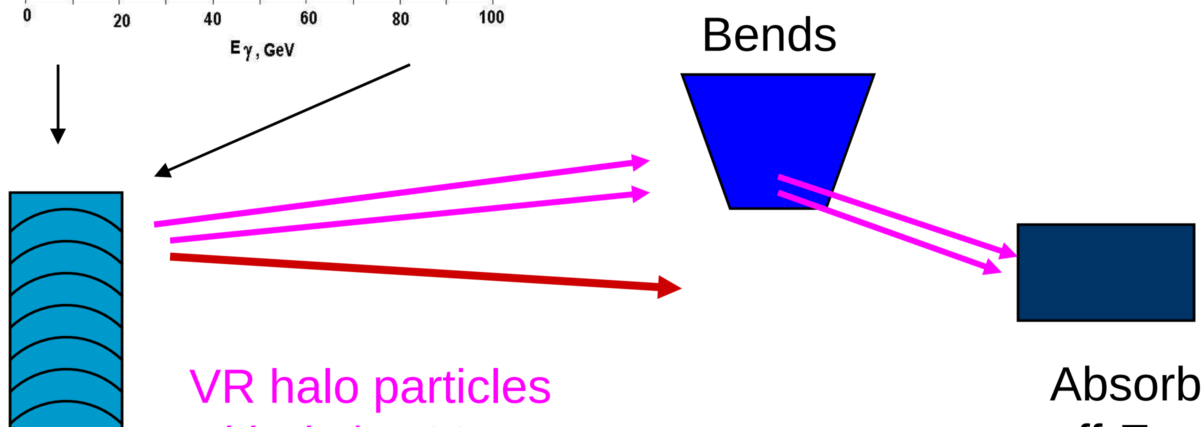
LC Collimation concept based on Volume Reflection radiation

VR radiation is very similar for both e+ & e-, and has large angular acceptance – it makes this phenomena good candidate for collimation system of linear collider



Volume reflection radiation spectrum of 200GeV e+ or e- on 0.6mm Si crystal (R_{bend}=10m) Yu. Chesnokov et al, IHEP 2007-16





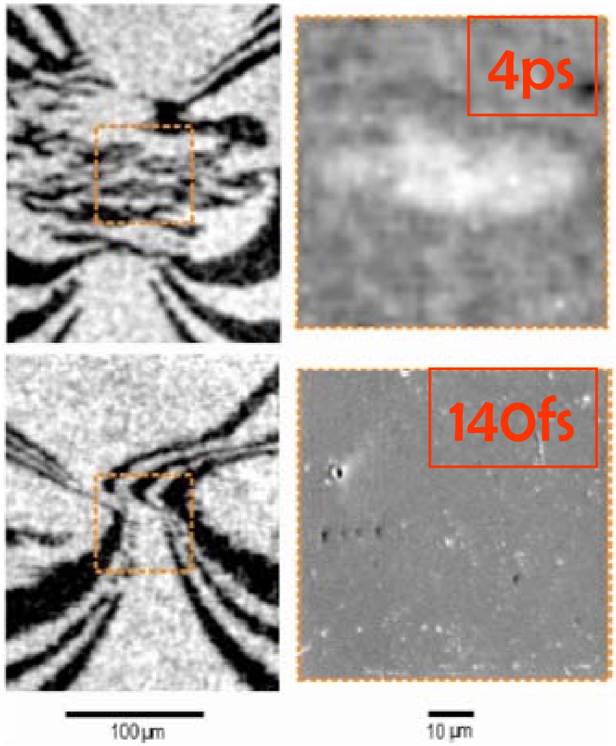
Crystal & Volume Reflection

VR halo particles with dE/E~20% loss due to VR radiation

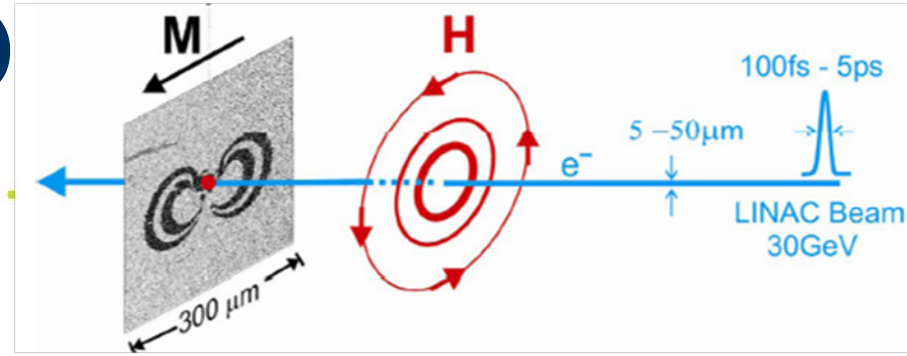
photons of VR radiation (to be absorbed in dedicated places)

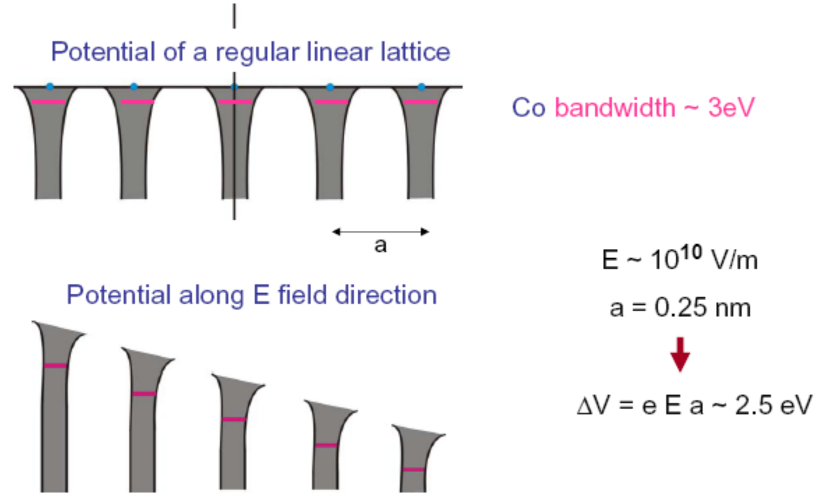
Absorb off-Energy particles & photons

Crystal (or spoiler) survivability



*New effect observed: while there was damage of a sample observed for 4ps beam, this damage disappeared for a shorter 140fs beam.





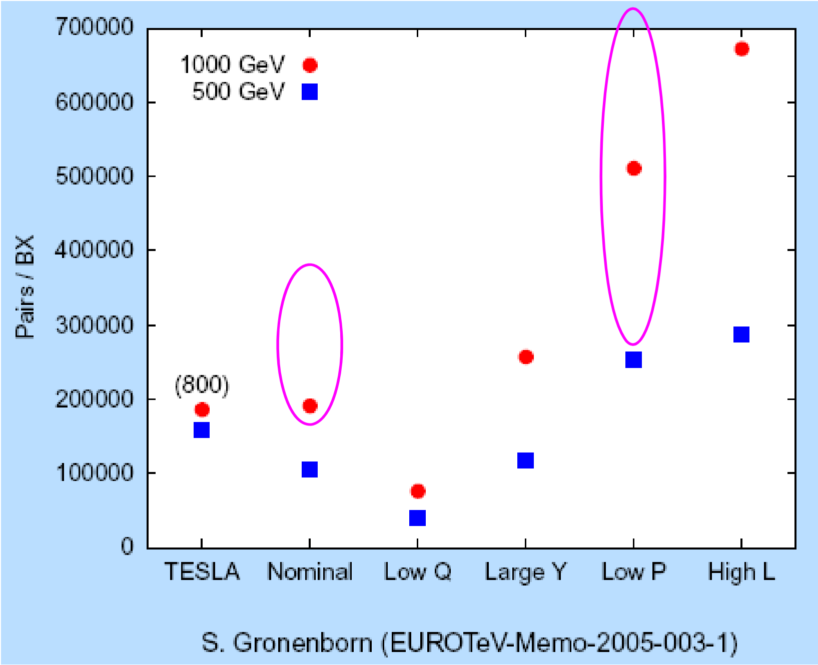
For short bunches the field gradient exceeds 2.5V over distance between atoms.
Potential wells around each atom shift, and conduction zones do not overlap any more.
=> breakup of conduction path, no current, no heat transfer and no damage.
Energy still goes into the material, but is probably dissipated via emission of terahertz photons

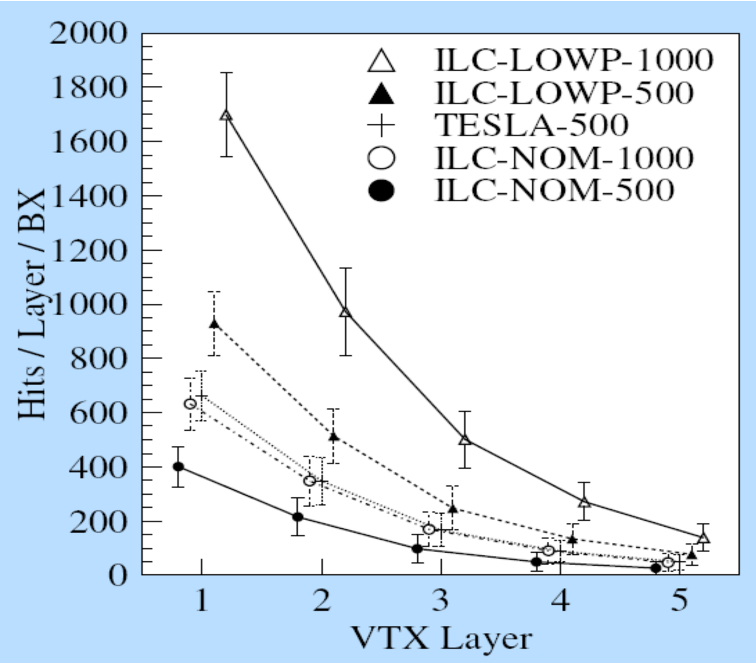
J. Stohr (SLAC), et al, “Exploring Ultrafast Excitations in Solids with Pulsed e-Beams”, presented on Feb 19, 2008 at SLAC FACET review, http://www-group.slac.stanford.edu/ppa/Reviews/facet-review-2008/Agenda.asp

This may show that approach to collimation design has been conservative

Low Power option

- Motivation: reduction of beam power => potential cost reduction; reduced cryo system; smaller diameter damping rings, etc.
- The RDR "low power" option may be a **machine** "cost saving" set but it is not a favorite set for detectors:





- Improved Low P may require tighter IP focusing, and use of "travelling focus" [V.Balakin, 1990]

New Low P parameter set

	Nom. RDR	Low P RDR	new Low P
Case ID	**1**	**2**	**3**
E CM (GeV)	500	500	500
N	2.0E+10	2.0E+10	2.0E+10
n_b	2625	1320	1320
F (Hz)	5	5	5
P_b (MW)	**10.5**	**5.3**	**5.3**
$\gamma\varepsilon_x$ (m)	1.0E-05	1.0E-05	1.0E-05
$\gamma\varepsilon_y$ (m)	4.0E-08	3.6E-08	3.6E-08
βx (m)	2.0E-02	1.1E-02	1.1E-02
βy (m)	4.0E-04	2.0E-04	2.0E-04
Travelling focus	No	No	**Yes**
Z-distribution *	Gauss	Gauss	Gauss
σ_x (m)	6.39E-07	4.74E-07	4.74E-07
σ_y (m)	5.7E-09	3.8E-09	3.8E-09
σ_z (m)	3.0E-04	2.0E-04	**3.0E-04**
Guinea-Pig δE/E	**0.023**	**0.045**	**0.036**
Guinea-Pig L ($cm^{-2}s^{-1}$)	**2.02E+34**	**1.86E+34**	**1.92E+34**
Guinea-Pig Lumi in 1%	1.50E+34	1.09E+34	1.18E+34

*for flat z distribution the full bunch length is $\sigma_z*2*3^{1/2}$

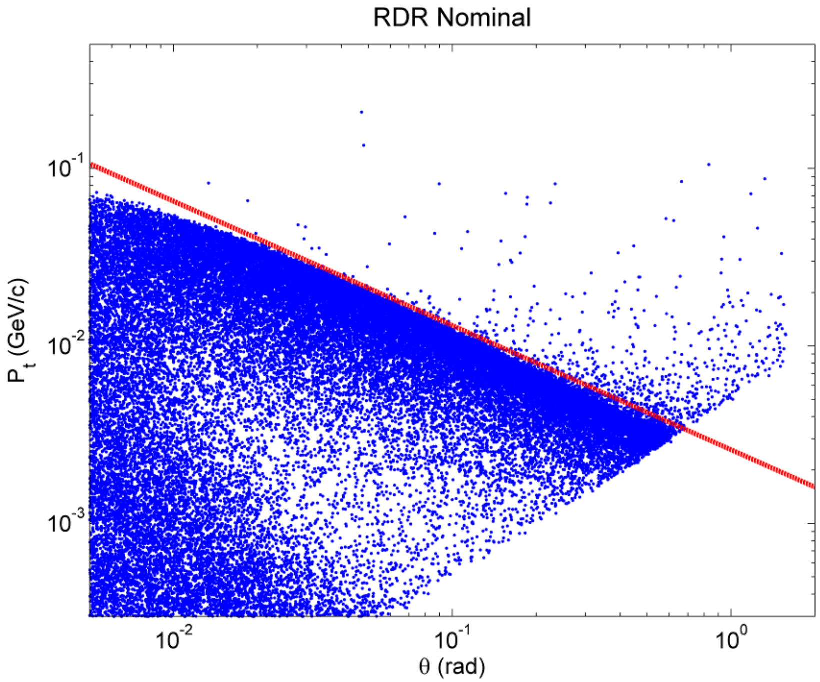
Travelling focus allows to lengthen the bunch

Thus, beamstrahlung energy spread is reduced

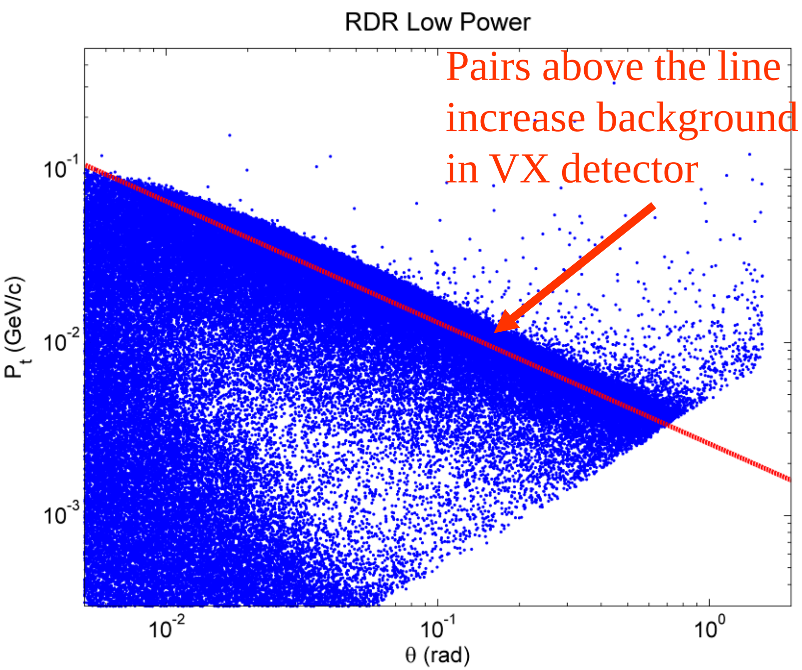
Focusing during collision is aided by focusing of the opposite bunch

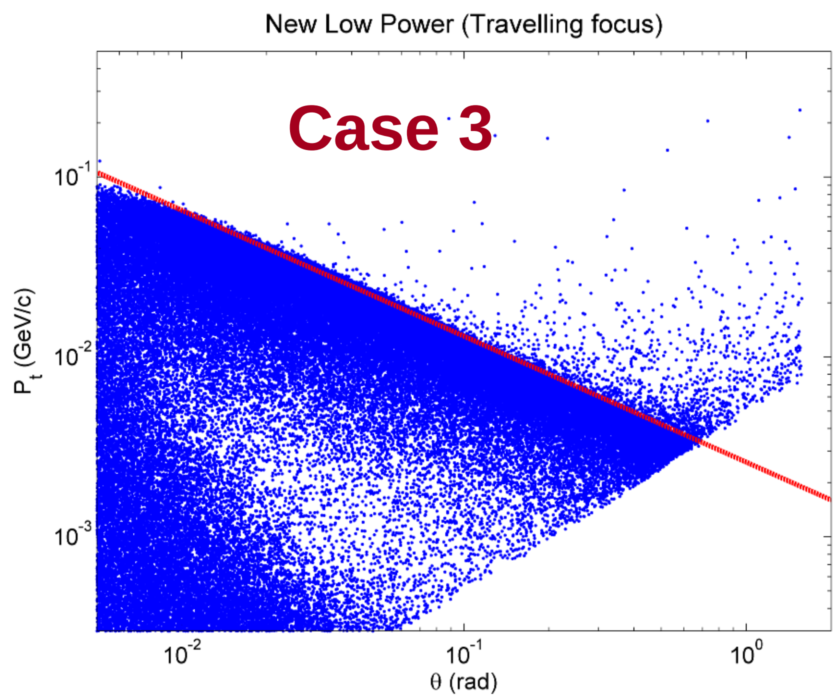
Focal point during collision moves to coincide with the head of the opposite bunch

e+e- pairs



- Edge of pairs distribution in θ-P_t important for VX background
- RDR Low P: edge higher=> unfavorable for background
- New Low P: edge location similar as RDR Nominal

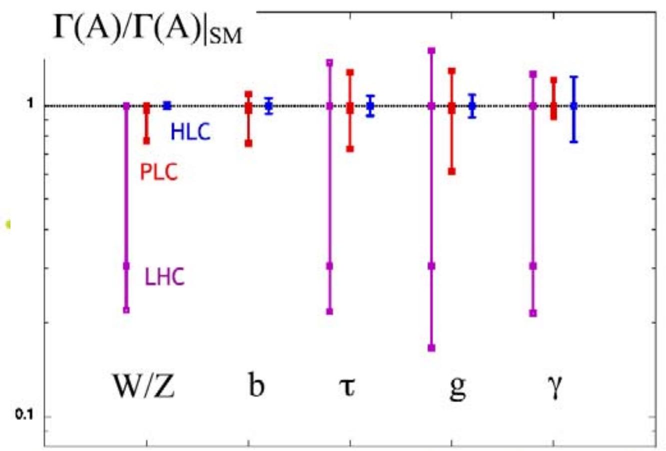


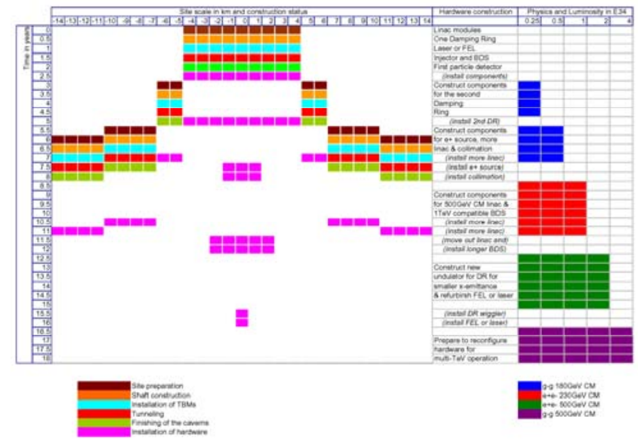


Independently confirmed by Takashi Maruyama

Contribution to the report on staging

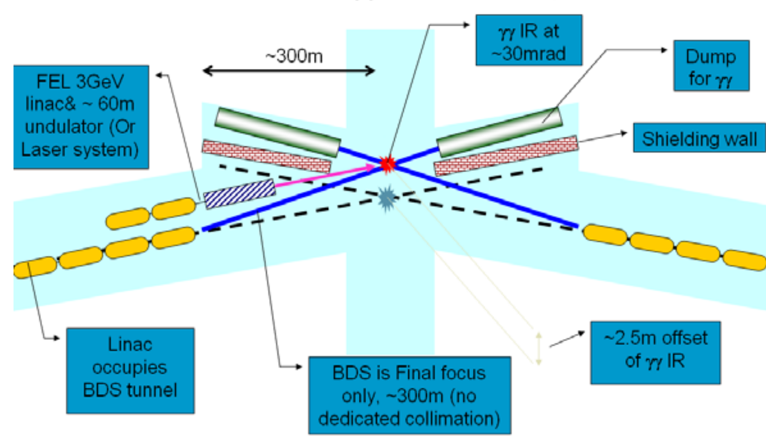
Stage	E CM (GeV)	Mode	E reach (GeV)	BDS (km per side)	Total site (km)	Lumi E34	Physics program (yrs)	Features
1st	180	$\gamma\gamma$	128	0.3	8.8	0.25	2	Single DR
2nd 3rd	180	$\gamma\gamma$	128	0.3	8.8	0.5	2	Faster kicker or second DR
4th	230	e^+e^-	230	0.8	12.1	0.9	3	Add e+ source Lengthen BDS Add dedicated collimation
5th	500	e^+e^-	500	2.2	27.2	2	5	Lengthen BDS to 1 TeV layout
6th	500	$\gamma\gamma$	400	2.2	27.1	4.5	2	Lower DR x-emittance





- GDE requested to evaluate $\gamma\gamma$ as 1st stage – a report edited by M.Peskin, T.Barklow, J.Gronberg & A.S.
  - Physics case, machine configuration, IP parameters, laser or FEL photon driver, tentative cost
- Cost comparison (P.Garbincius)
  - 180 GEV CM photon collider PLC (costs 52% of ILC RDR)
  - 230 GeV CM e+e- collider HLC (costs 67% of ILC RDR)
- Path for further cost reduction of 1st stages outlined
- Enabling technologies described

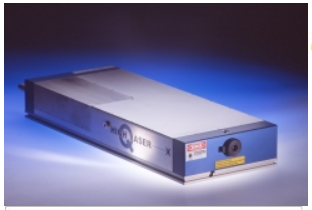
180GeV CM $\gamma\gamma$ initial configuration



Photon Collider Laser, LLNL

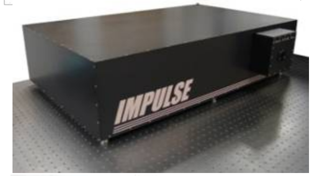
- We have created a strawman design for the laser and have identified workable technologies for creating an appropriate bunch train at 30mJ/pulse
- Need to quantify system design tolerances for wavefront quality, stability and phase matching in order to design the system
  - Require simulations of the recirculating cavity and the high power amplifier stage
- Remainder of this year will be devoted to simulations
- We are aiming to have a pre-conceptual design of the full system ready to be reviewed by laser experts next year

High Q Laser femtoTrain



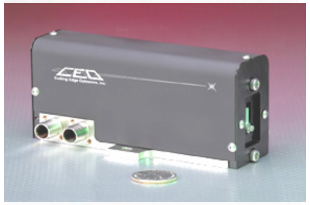
KM Labs pulse stretcher/ compressor

Clark MXR 20 W @ 2 MHz



Lasermetrics Pockels cell and driver

Cutting Edge Optronics' slab pumphead, the Whisper MiniSlab™

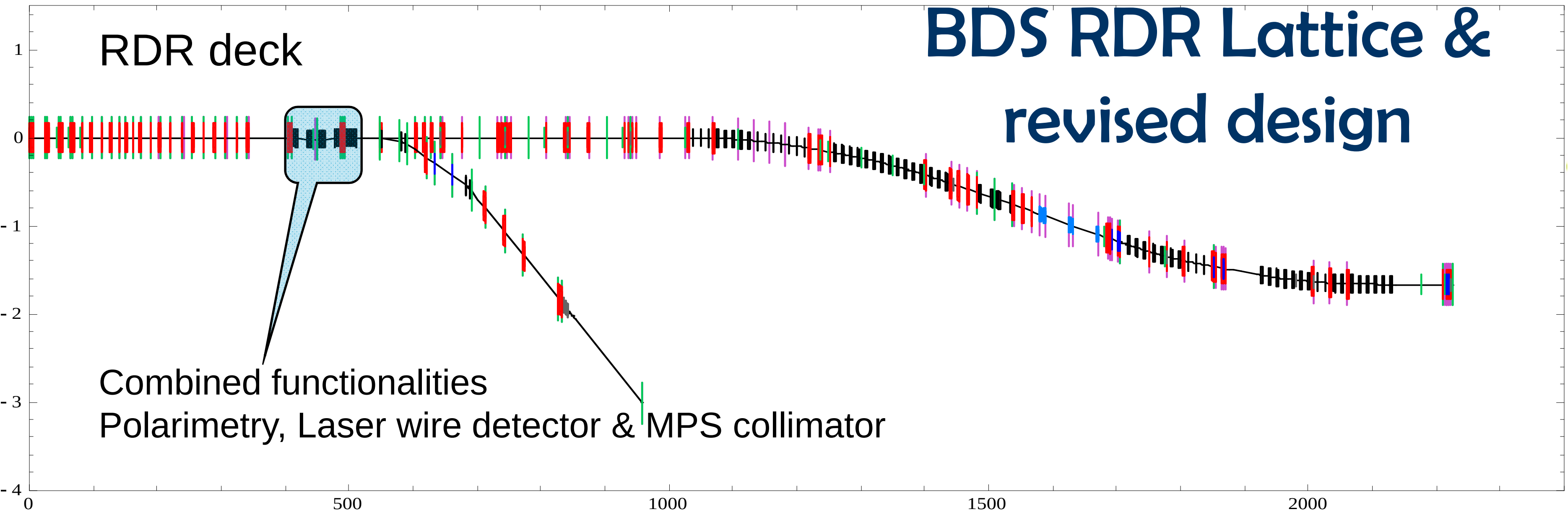


Cutting Edge Optronics RBA PowerPULSE

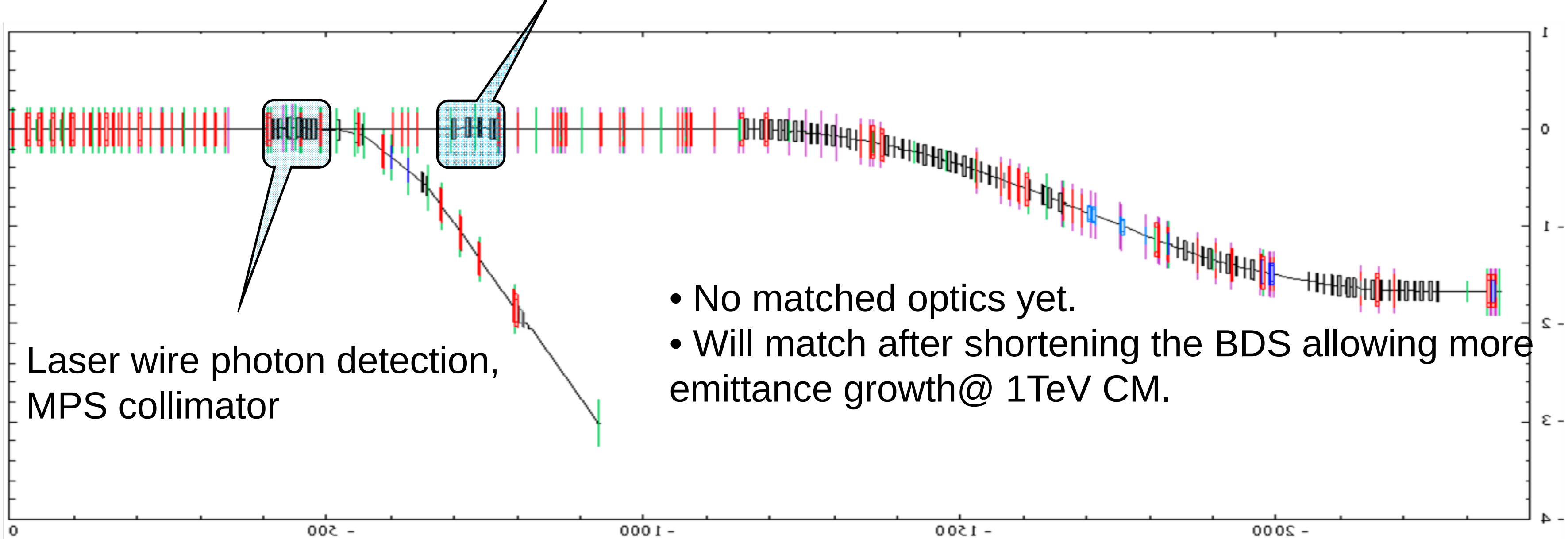
BDS Lattice design plans

- BDS Lattice improvements & modifications:
  - next steps of modifying the RDR deck to separate combined functionalities of upstream polarisation measurements + laser wire detection + MPS
  - Reduction in BDS length to allow more emittance growth @1TeV CM.
- Studies for BDS with central region integration
- Plan to have revised lattices ready by October'09.

BDS RDR Lattice & revised design



Include additional chicane for polarimetry:



- No matched optics yet.
- Will match after shortening the BDS allowing more emittance growth@ 1TeV CM.

D.Angal-Kalinin, F. Jackson, J. Jones, Y. Nosochkov, A. Seryi, M.Woodley

Fin. status at BNL

- Budget FY09 $1,300K
  - For 6 month:
    - Budgeted efforts (1/2 of total): $650K
    - Actual efforts $337K (= 52 % spending rate)

- Slow restart on work this year
  - Problems re-starting – electrical (engineering and technical) resources took ~six months to secure as they had been re-assigned and were in the middle of other tasks when the new fiscal year began.
  - The decision to shift from ILC prototype to ATF2 magnet - technical, program uncertainties regarding ATF2 caused delays in getting started
- But have been ramping back up rapidly and expect good progress on QD0 winding and ATF2 work this year

Fin. status at LLNL

- Budget FY09 $200K
  - For 6 month:
    - Budgeted efforts (1/2 of total): $100K
    - Actual efforts $60K (= 60 % spending rate)

- Slow start due to need to free up laser experts but ramping up
- Expect to complete milestones of FY09
  - Simulation of High Power Amplifier
  - Simulation of Recirculating Cavity

Fin. status at SLAC

- Budget FY09 $2,991K (CR: $2,600K)
  - For 6 month:
    - Budgeted efforts (1/2 of CR level): $1,300K
    - Actual efforts $708K (= 55 % spending rate)

- Affected by
  - Several people lost to other jobs, projects or retired
  - Hiring replacement could not be initiated until CR was over
- Recovery plan
  - New hires & enhanced contributions to key areas
  - Expect to reach planned rate of efforts by the end of the year
  - Plan the FY10 milestones, assuming restored level of efforts

Recovery approach at SLAC in FY09

- Enhance SLAC contribution to key BDS areas, leveraging on SLAC expertise:
- ATF2:
  - Engaged several new people, with recent expertise in commissioning
  - Initiated and leading collaboration with IFIC (Spain) on multi-OTR system for ATF2, which will allow fast (seconds instead of hours) ε measurement
  - Initiated and leading the efforts to upgrade the ATF2 mover drive system for sextupoles, which would allow shortening tuning time
  - Plan to provide precise HLS sensors (developed for LCLS) and expertise of their installation to monitor ATF2 beamline stability
- MDI:
  - Planned an extended (2 month) MDI working meeting at SLAC, May-June, with CERN & DESY, experts, to continue on MDI design, for practical push-pull solution
  - Re-engage radiation physics group to evaluation of updated IR design
- Beam dump design:
  - Planned extended (~month) working meeting at SLAC with BARC (India) expert on the beam bump design work
- BDS optics design:
  - Plan to ramp in Q3
- Have two staff positions for BDS posted, plus, looking for post docs too

FY10 ART BDS milestones

tentative

- SLAC
  - Achieve intermediate scaled ILC beam size at ATF2
  - Review the preliminary beam dump design
  - Review MDI design progress in 2nd IRENG-like workshop
- BNL
  - Finish ILC long coil testing
  - Finish ATF2 FF Upgrade Magnet Design
  - Finish ATF2 coil testing
- LLNL
  - Finish simulation and pre-conceptual design of full laser system
  - Convene a review panel of outside experts to review the design

Conclusion

- The BDS group, and its ART part, in TDP phase, is focused on
  - ATF2 test facility
  - Machine Detector Interface
  - and several other key systems
- that may make significant contribution to reduction of cost, risk and increase of machine performance