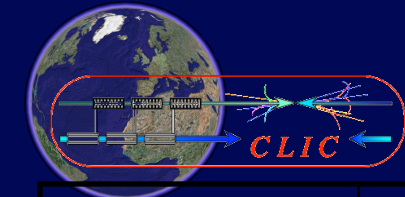


Summary of Linear Collider Test Facilities Working Group

R. Corsini and T. Tauchi

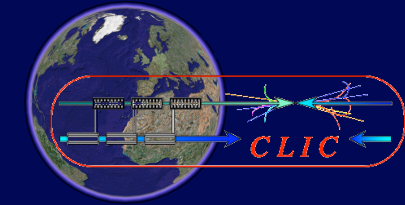


Linear Collider Test Facilities Working Group Summary

CLIC 08

CERN, 14-17 October 2008

Schedule	15 Oct.08 (Wed)	16 Oct. 08 (Thu)
Morning	<p>Review of Test Facilities</p> <p>ATF Status, J. Urakawa (KEK) ATF II Status, T. Tauchi (KEK) CTF3 Status, G. Geschonke (CERN)</p> <p>CTF3 Commissioning and Operation, P. Skowronski (CERN) Modeling, Tools and Beam procedures in CTF3, S. Bettoni (CERN) Damping of RF deflectors vertical instability in CTF3, D. Alesini (INFN-LNF) Status and commissioning plans for CALIFES, W. Farabolini (CEA)</p>	<p>Common session : Inj. DR, Instr.</p> <p>Linear and non-Linear Correction using Turn-by-Turn BPM Data, R. Tomas (CERN) High Precision Emittance Measurements in the SLS, Ake Andersson (MAX-Lab) Damping Ring BPM Developments, M. Wendt (FNAL)</p> <p>Common session : RF Str. Sources</p> <p>NEXTEV, S. Matsumoto (KEK) SLAC +12 GHz Klystron, S. Tantawi (SLAC) Introduction to the CERN Klystron Test Area, K-M. Schirm (CERN) Design&Planning Progress of the CERN Klystron Test Area, F. Peauger (CEA) Two-Beam Test Stand Status, I. Syratchev (CERN), R. Ruber (Uppsala Univ)</p>
	<p>Common session:Instrumentation</p> <p>Longitudinal beam diagnostics at CTF3, A. Dabrowski (CERN) Coherent Diffraction study at CTF3, M. Micheler (R. Holloway U.L.) Femtosecond Synchronization at CTF3, Alex. Andersson (CERN)</p> <p>High precision BPM at CTF3, L. Soby (CERN) Beam Position Monitors using Reentrant Cavity, C. Simon (CEA/Saclay) Status on the construction of BPS at CTF3, A. Faus-Golfe (IFIC) Fast scanning system for the PETRA laser-wire experiment, A. Bosco (JAI-RHUL)</p>	<p>Common session : Beam dynamics, BDS+MDI</p> <p>Beam-based alignment studies in CTF3, E. Adli (CERN) ATF2+CLIC BDS beam-based alignment and tuning, R.Tomas(CERN) ILC BDS alignment and tuning, G.White (SLAC) The ATF2 final doublet system, A. Jeremie (LAPP)</p> <p>Closing session</p> <p>CESR TA Status and plans, J. Calvey (Cornell Univ.) ATF II cavity BPMs, S. Boogert (RHUL) CTF3 consolidation, evolution and future perspectives, R. Corsini (CERN) Panel discussion on Test Facilities collaboration</p>
Afternoon		



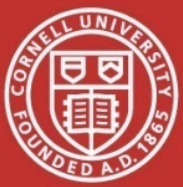
CesrTA Status and Plan , J.Calvey (Cornell univ.)

Operation : Run2 until 2010

in parallel to CHESS(Cornell High Energy Synchrotron Source)

Major goals:

1. e cloud with wigglers
 - various simulations have different predictions
 - major issue is SEY(Secondary Electron Yield)
2. low emittance $<20\text{pm}$, 2 GeV, 56 ms damping time
(45 bunches, 14ns spacing , 9 bunches, 280ns)



- **L3 Straight**

- Instrument large bore quadrupoles and adjacent drifts
- Install of PEP-II experimental hardware (including chicane) in early 2009
- Provide location for installation of test chambers

- **Arcs where wigglers removed**

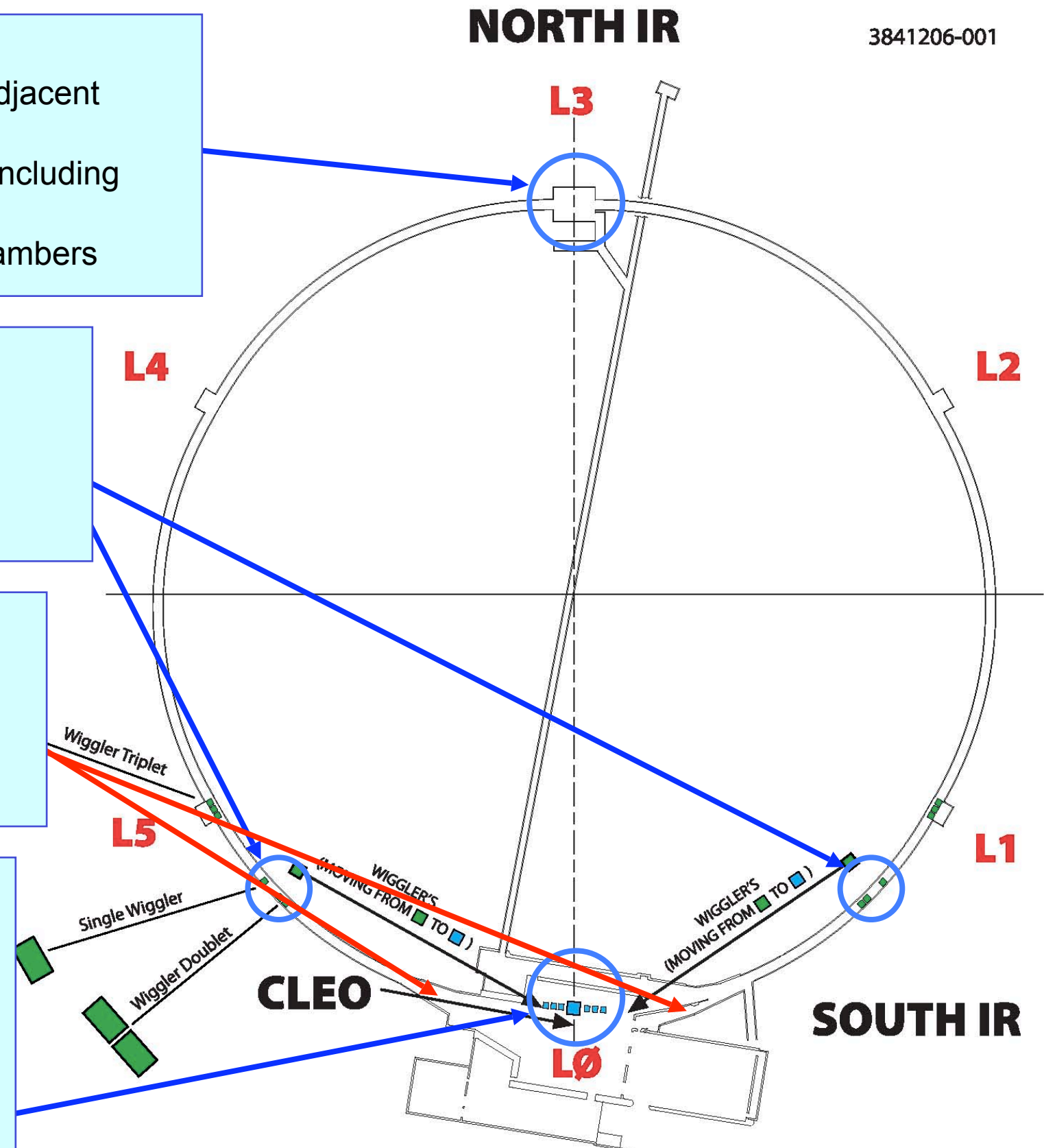
- Instrument dipoles and adjacent drifts
- Provide locations for installation of test chambers

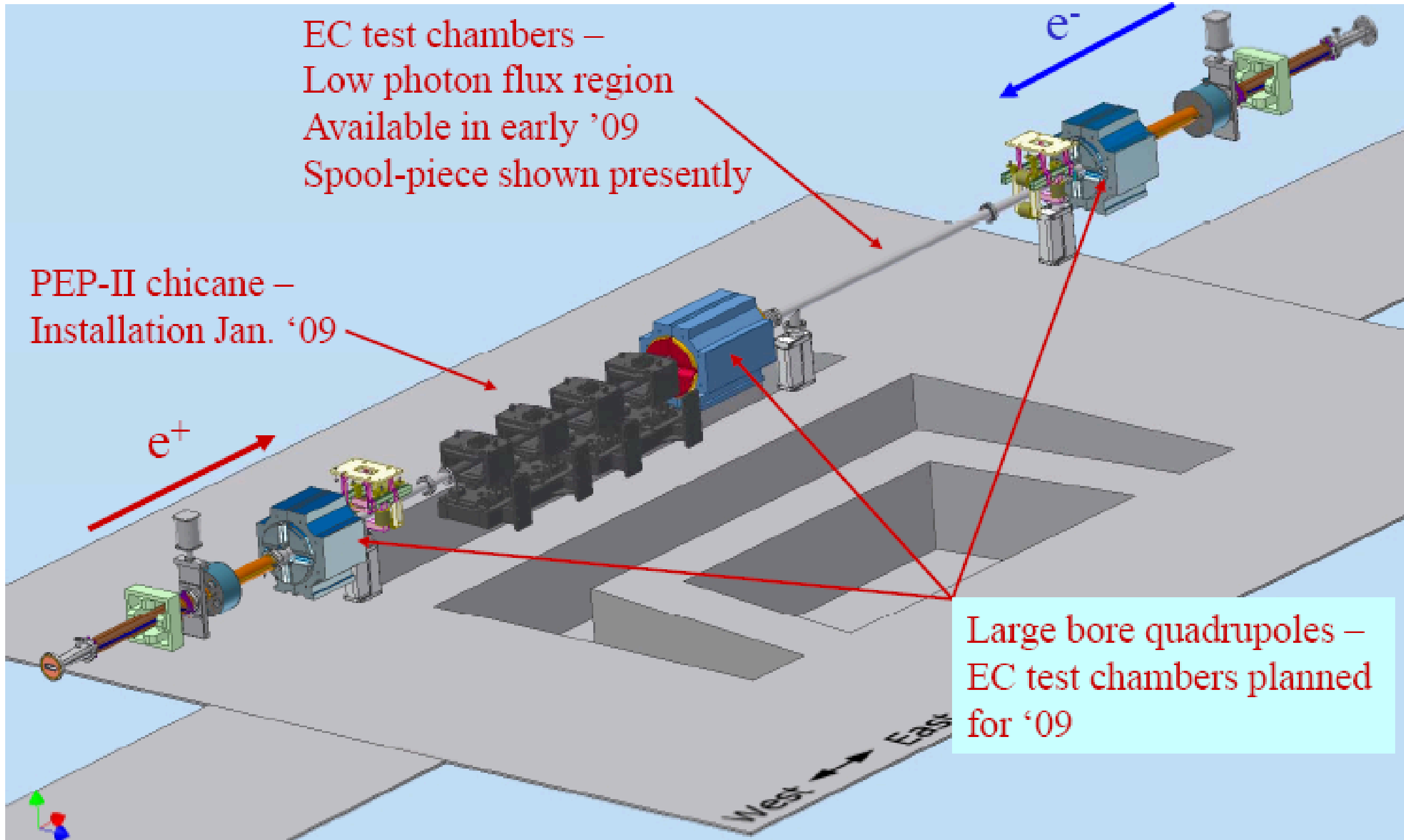
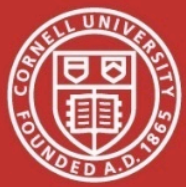
- **CHES line upgrades for x-ray beam size monitor**

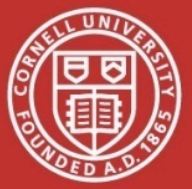
- D-line this summer
- C-line next year

- **L0 Straight**

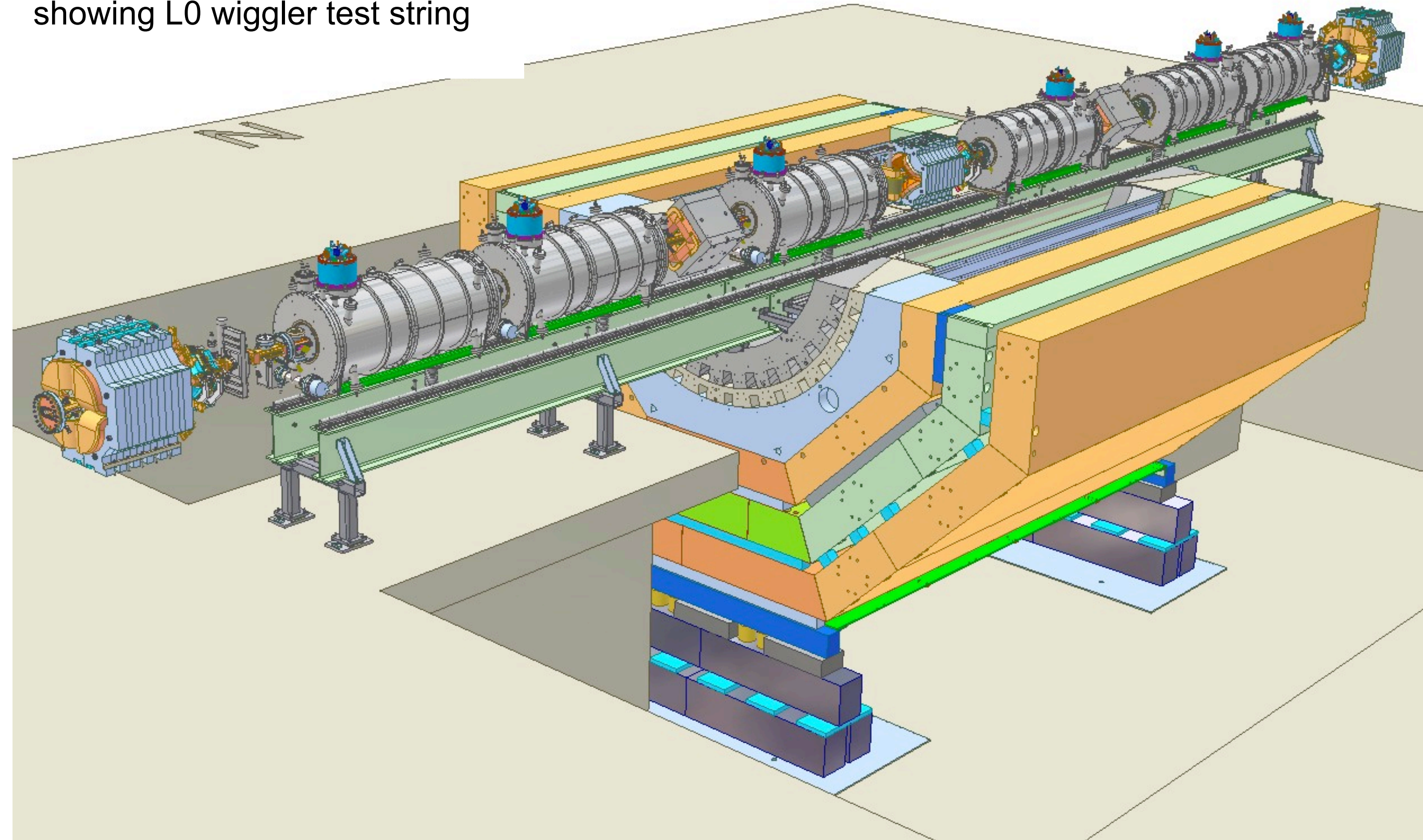
- All wigglers in zero dispersion regions for low emittance
- Instrumented wiggler straight and adjacent sections

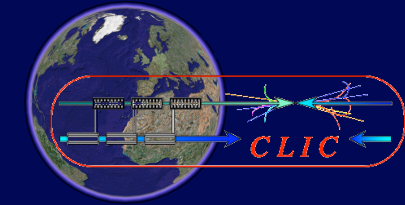






- Cutaway through CLEO iron showing L0 wiggler test string





ATF Status, J.Urakawa

1.3GeV, 1.5Hz, 20bunches/2.8ns, damping time < 6ms (150Hz rep.rate) with wigglers

fast ion instability - remove all the wigglers for higher currents , i.e. 2×10^{10} /bunch

fast kicker R&D for 2.8/5.6ns bunched beam extraction, first exp. in Jan.2009

- ILC like beam structure, i.e. 30 (60) bunches with 308/154 ns spacing

vertical emittance goal < 2pm with upgrading 96 BPMs (electronics) - **CLIC goal**

beam instrumentation

- OTR, ODR, pulsed/CW laser wire, XSR, CSR

positron sources based on laser cavity

M.Wendt (FNAL), Echotek digital receiver, 20 BPMs have been upgraded at ATF-DR;

resolution: turn by turn (1MHz) 10um, narrow band mode 100nm (1kHz)

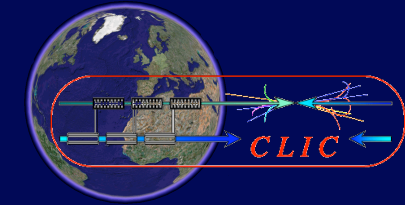
implementation of calibration with two signals with $714 \pm \epsilon$ MHz for y and x

no current dependence and less noise

all 96 BPMs in FY09/10

R.Tomas (CERN) - linear and non-linear correction using turn by turn BPM data

- experiments and analysis at SPS, LHC, ATF-DR 05-06, DIAMOND



ATF International Collaboration

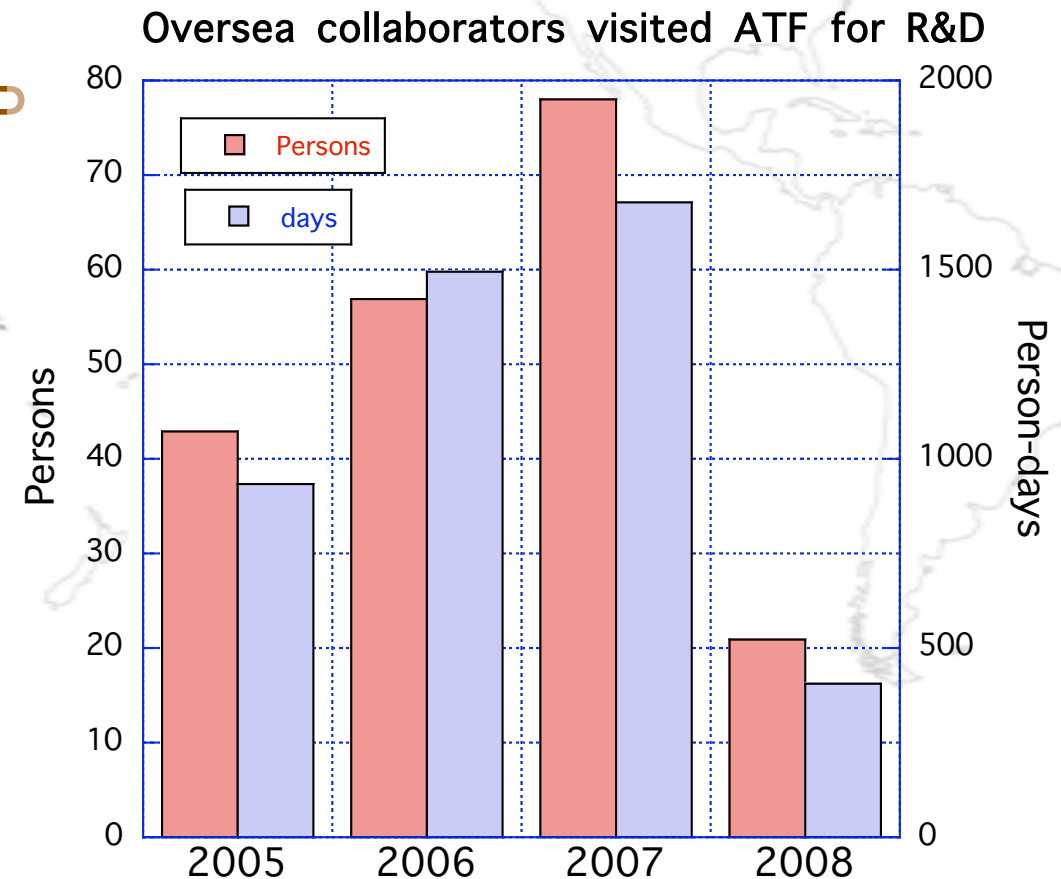
CERN
 DESY
 LAL, Orsay
 Tomsk Polytechnic Univ.
 INFN, Frascati
 University College London
 Oxford Univ.
 Royal Holloway Univ.

KEK
 Waseda U.
 Nagoya U.
 Tokyo U.
 Kyoto U.
 Hiroshima U.
 PAL
 IHEP

SLAC
 LBNL
 FNAL
 Cornell Univ.

Overseas collaborators visited for R&D at ATF

**23 Institutes,
 ~60 peoples,
 ~1500 people-days**

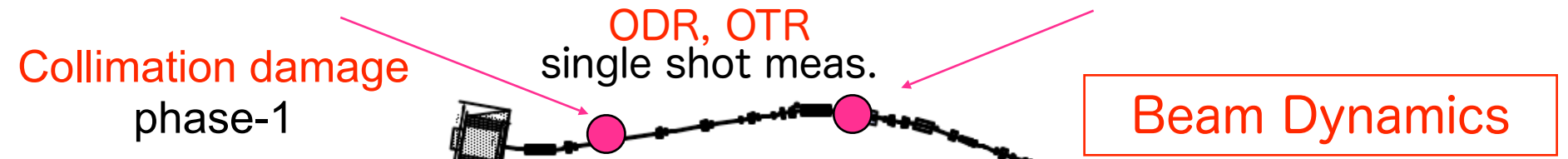


ATF Accelerator Test Facility, KEK

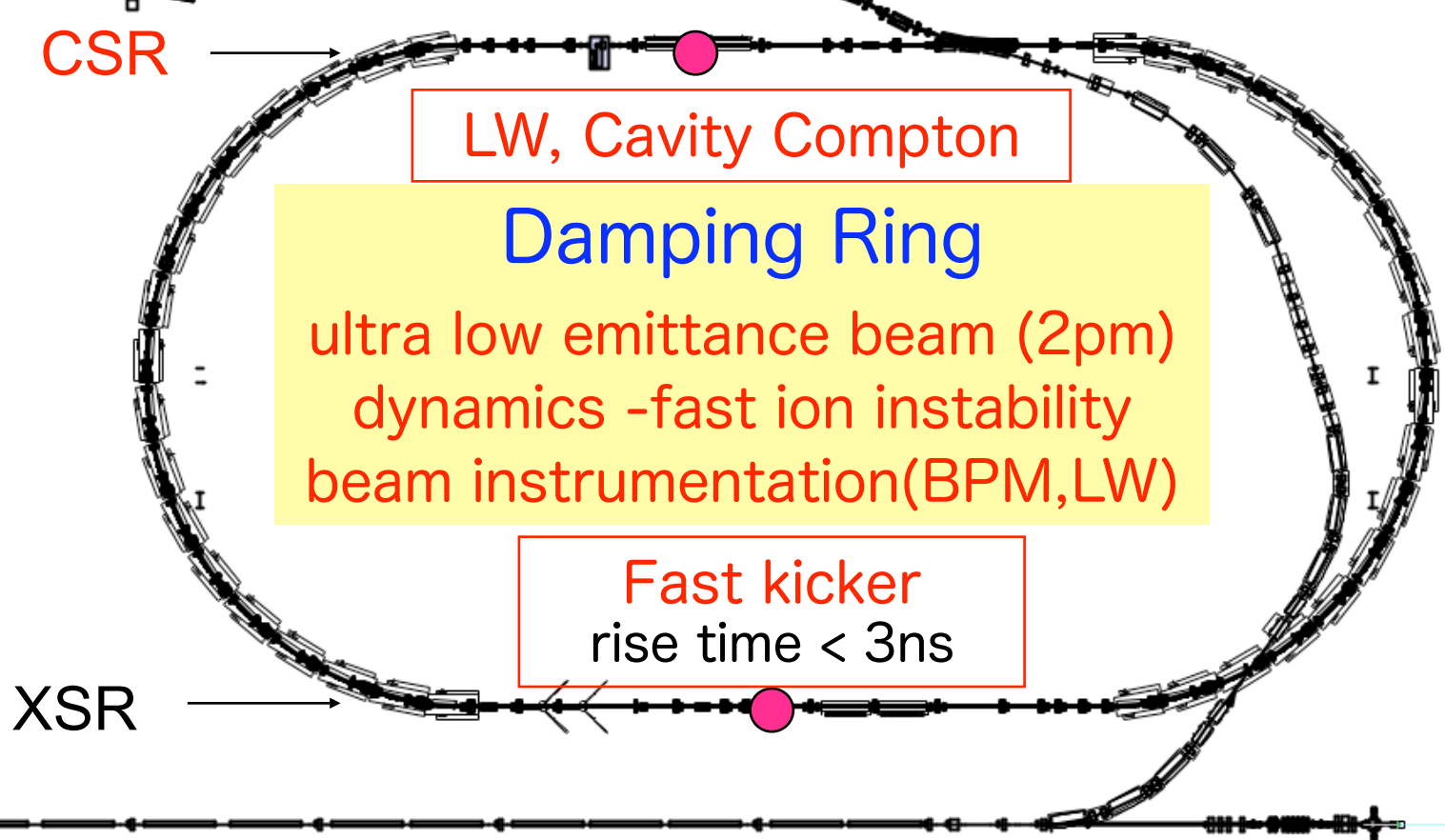
1997-2008

Extraction line :utilization of low emittance beam
beam instrumentation, collimator damage

Cavity BPM nanometer res.	FONT fast feedback (ns)	Pulsed Laser Wire Scanner for beam size monitor (μm)
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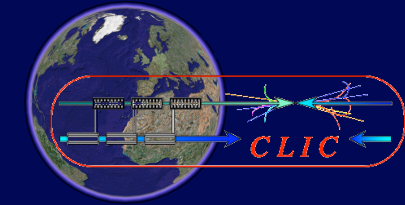


Energy: 1.28 GeV
 Electron bunch:
 2×10^{10} e/bunch
 1 ~ 20 bunches/train
 3 trains/ring
 1.56 Hz



RF Gun
multi-bunch beam

S-band Linac (70m)
multi-bunch acceleration



High precision emittance measurements in the SLS, A.Andersson (MAX-lab)

SLS (Sweden light source) : 2.4GeV, C=288m, 400mA ring

beam size measurement by π -polarization SR lights (400nm wave length)

with two peaks in vertical

- finite light between peaks gives beam size information
- assuming Gaussian distribution

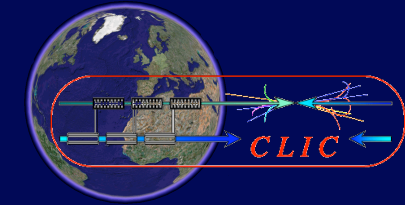
vertical emittance = 3.2 ± 0.7 pm, y/x emittance ratio(coupling) = $0.05 \pm 0.02\%$

still factor of 6 compared to 0.55pm emittance limit

improvements in future with

- 24 from 8 sexupoles
- BBA with rotation of sextupoles etc.

alignment of magnets, 50um in x and y, 100urad



ATF2 Status, T. Tauchi

ILC scaled-down final focus system,

international collaboration from proposal, design, construction and operation

same number of magnets, same beam tuning, ILC beam instrumentation

Goal - 37nm at the compact final focus optics with local chromaticity correction, - 2010

- stabilization at nanometer level with ILC-like beam structure, - 2012

- prototype of superconducting and permanent final quadrupole magnets, 2012 -

ATF2 commissioning will start on 4th November, 2008.

R.Tomas (CERN), BDS BBA and tuning with pushed beta* optics

G.White (SLAC), ILC BDS alignment and tuning with flight simulator

A. Jeremie (LAPP), ATF2 final doublet system

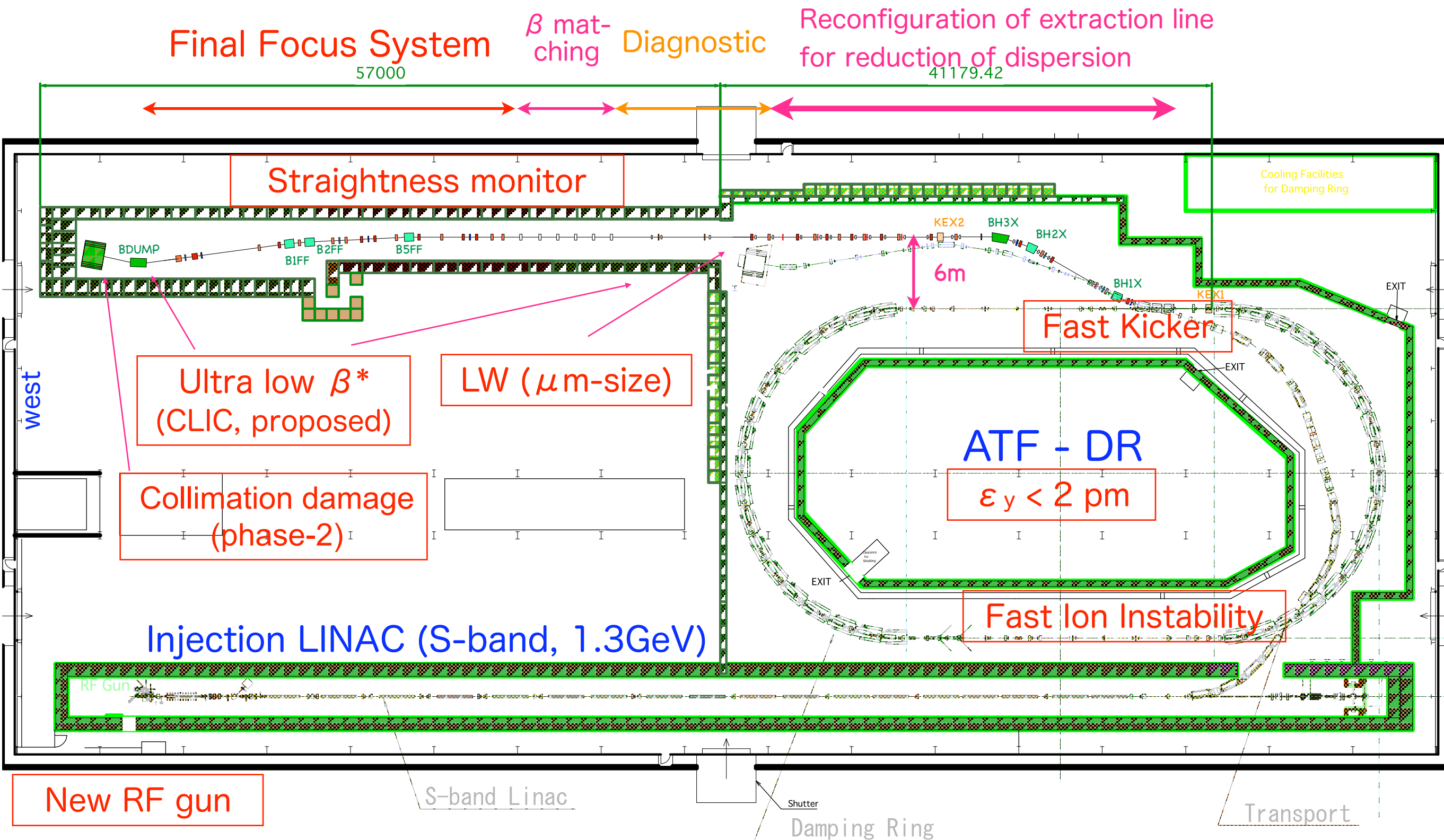
S. Boogert (RHUL), ATF2 BPM system

A.Bosco (RHUL), Fast scanning system for the PETRA laser-wire experiment

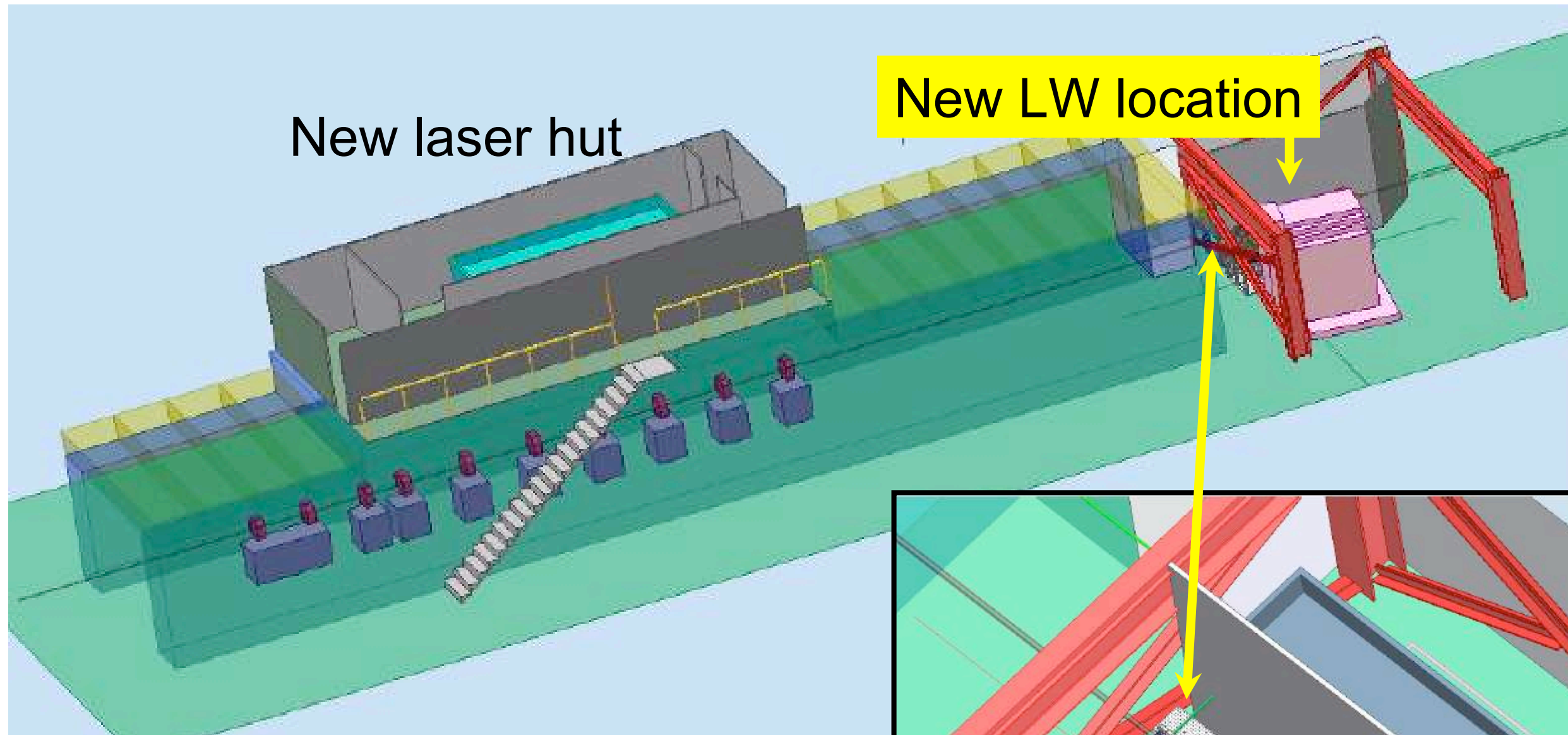
E. Adli, Beam-based alignment (BBA) studies in CTF3

ATF2 beam line

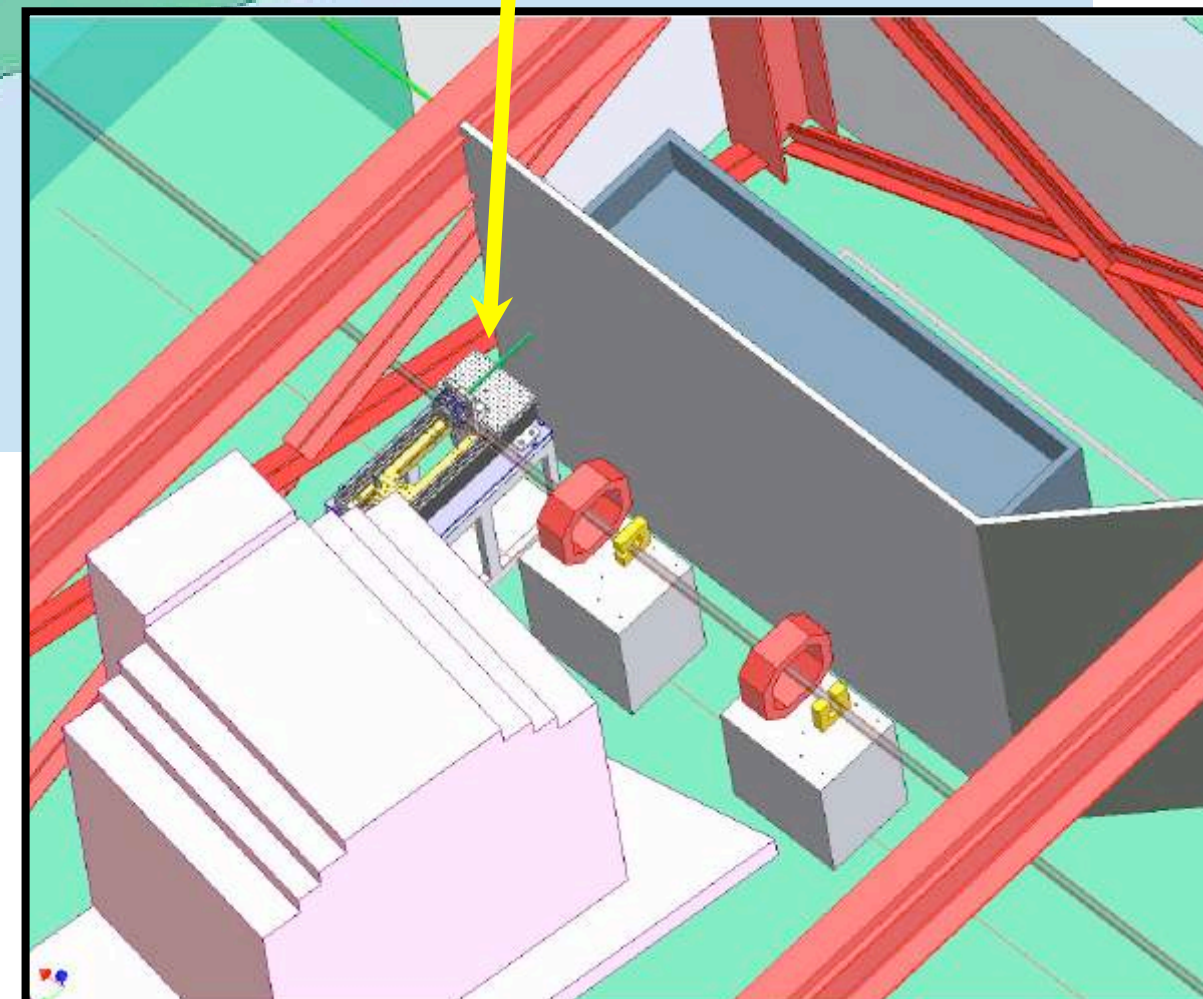
All Q- and S-magnets have cavity-type beam position monitors(QBPM, 100nm) and movers.



ATF2 Laser-wire

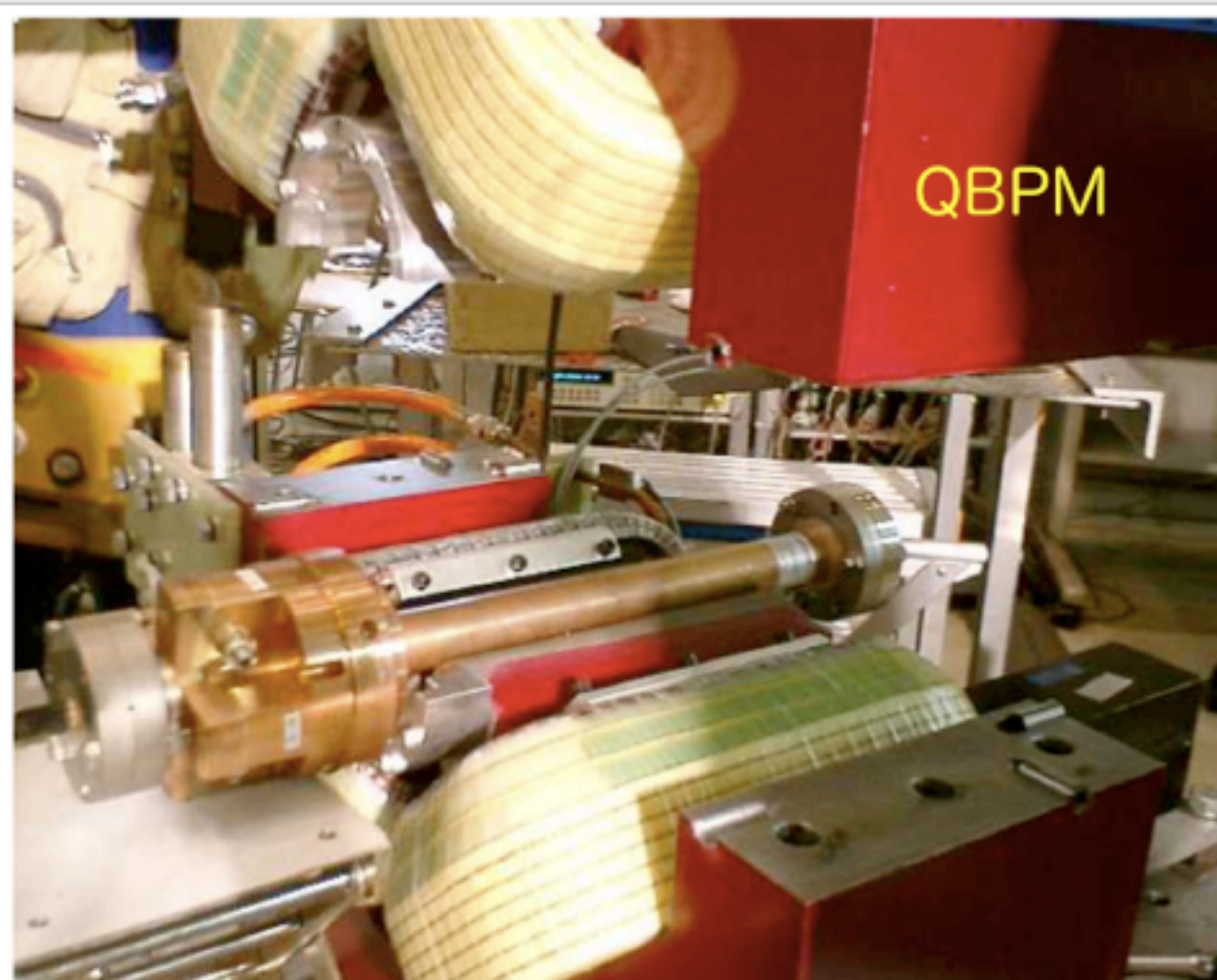


- Detailed design of layout, light path, laser hut are underway.
- An additional LW location has been reserved downstream for multi-axis scans → **LC-ABD-II**

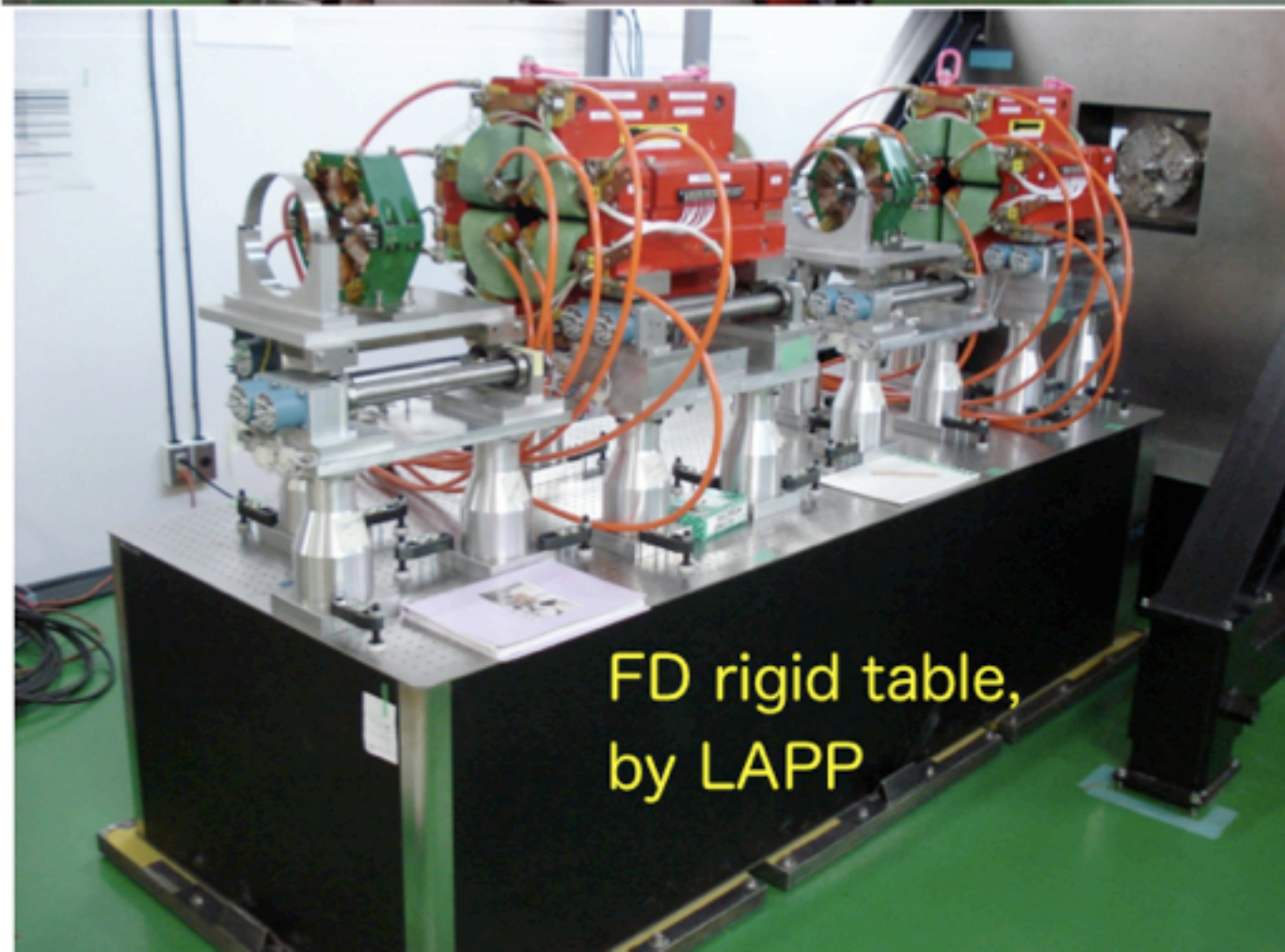




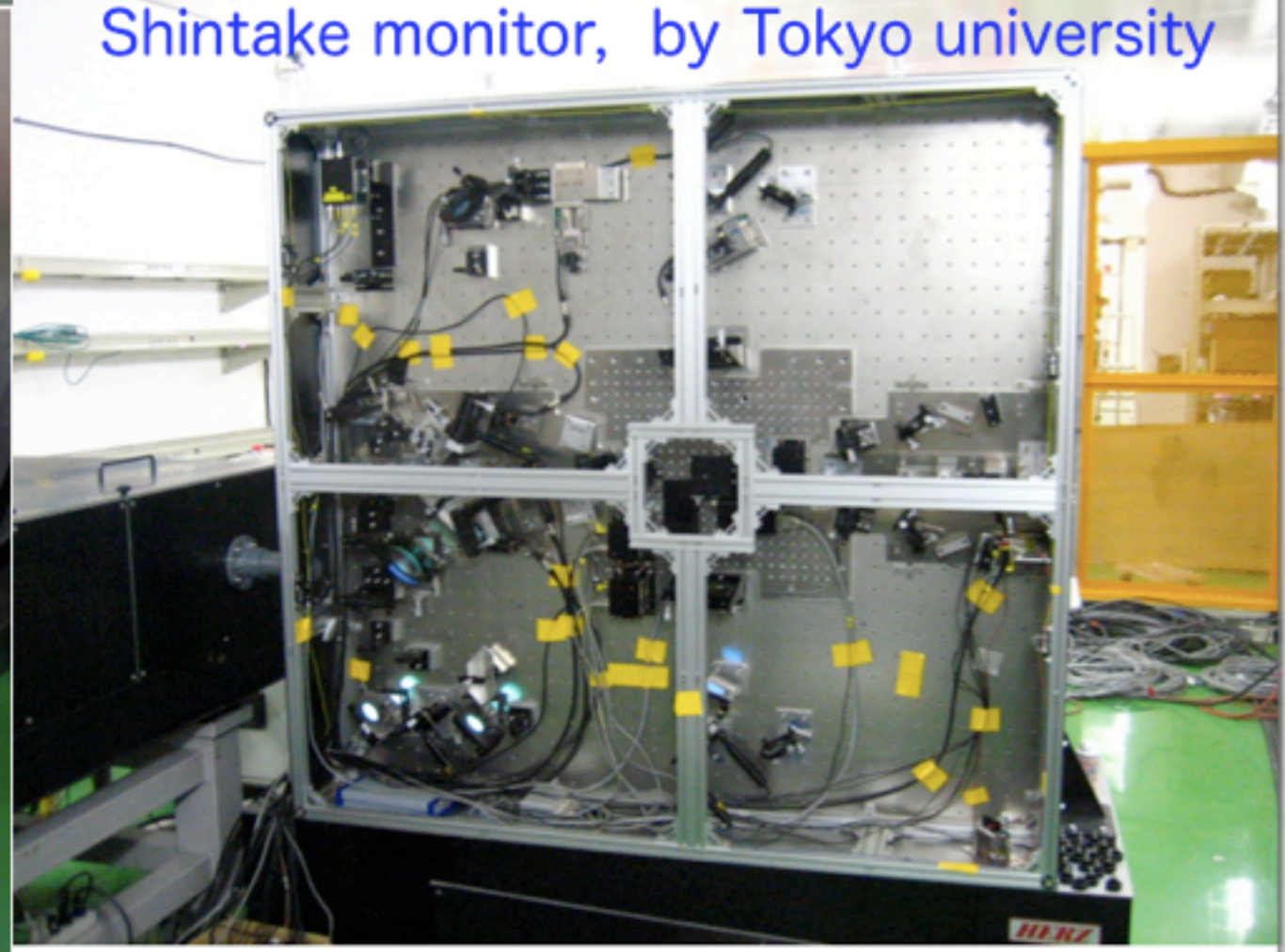
10 Oct 2008

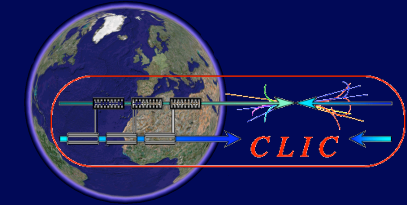


Shintake monitor, by Tokyo university



FD rigid table,
by LAPP





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CLIC 08

CERN, 14-17 October 2008

	2010	2012	2015
CLIC	CDR with cost estimation	“world” review with LHC results 250MCHF and 1000 - 1200 FTEs for 6 years in addition, “same” contribution from non-CERN	TDR construction ready
ILC	TDP1 interim report, critical R&D	TDP2 new baseline design	
CesrTA	electron cloud (SEY) low emittance (<20pm)		
ATF	low emittance (1pm, 2009) fast kicker		
ATF2	local chromaticity optics 37nm	IP stabilization at nanometer level	SC &PM final Q prototype