

ILC08 BDS Conveners

Deepa Angal-Kalinin , Andrei Seryi
Hitoshi Yamamoto

LCWS08 MDI Conveners

Tom Markiewicz, Andrei Seryi, Karsten Buesser,
Stewart Boogert, Toshiaki Tauchi, Tsunehiko Omori

ILC08 BDS Session Schedule

	8:30-10:00	10:30-12:00	13:30-15:30	16:00-18:00
Monday Nov. 17			(MDI)	
Tuesday Nov. 18	ATF-ICB	joint : MDI	(MDI) Joint: CFS, DR Central Region Integration	Joint : CFS, DR Central Region Integration
Wednesday Nov. 19	Joint with detectors ?	Joint : $\gamma\gamma$, MDI	(MDI)	Summary preparation

Low power option special session ?

CLIC session ? , summary of CLIC08 workshop

Minimum machine configuration session with MDI or detectors ?

Joint with MDI : push pull (platform, QF1 position, IR hall), longer L*,
IR interface document

Project managers

Detector liaison
S.Yamada, RD, (KEK)

BDS A.Seryi (SLAC)

deputy for r&d
deputy for cost & docs.

ATF2 construction, commissioning & operation
T.Tauchi (KEK)

Interaction Region and IR integration
B.Parker (BNL) chair, T.Markiewicz (SLAC) deputy

Detector concept liaison
ILD: K.Buesser, T.Tauchi
SiD: P.Burrows, M.Oriunno
4th : B.Ashmanskas, A.Mikhailichenko

Accelerator design & its integration
D.Angal-Kalinin (STFC)

Vacuum science, O.Malyshev (STFC)

Photon collider design, J.Gronberg (LLNL)

E-saving magnets & PS, C.Spencer, P.Bellomo (SLAC)

Crab cavity system
P.McIntosh (ASTeC)

BDS Beam Dump system
S.Pollepale (BARC) chair, R.Arnold (SLAC) deputy

BDS Collimation system
N.Watson (Birm.U.)

BDS instrumentation
P.Burrows (Oxford)

Laser wires, G.Blair (RHUL)

Alignment, D.Urner (Oxford)

BPM systems, S.Boogert (RHUL)

tentative

sub-WP shown are
examples and not a
complete list

**BSD TDP
structure
2008-...**

August 6, 2008



New developments in ILC design

- A “minimal machine” is being investigated
 - It includes various cost saving ideas
 - e.g. rearrangements of beamlines in central region
 - AND a lower power option, but improved one, with better performance for physics
 - This new low P option may use tighter focusing at IP and **traveling focus**.
 - Are there ways to study these IP conditions at ATF2?
 - Could traveling focus be arranged? And if yes, could it be detected without second beam?



Comparison of parameter sets

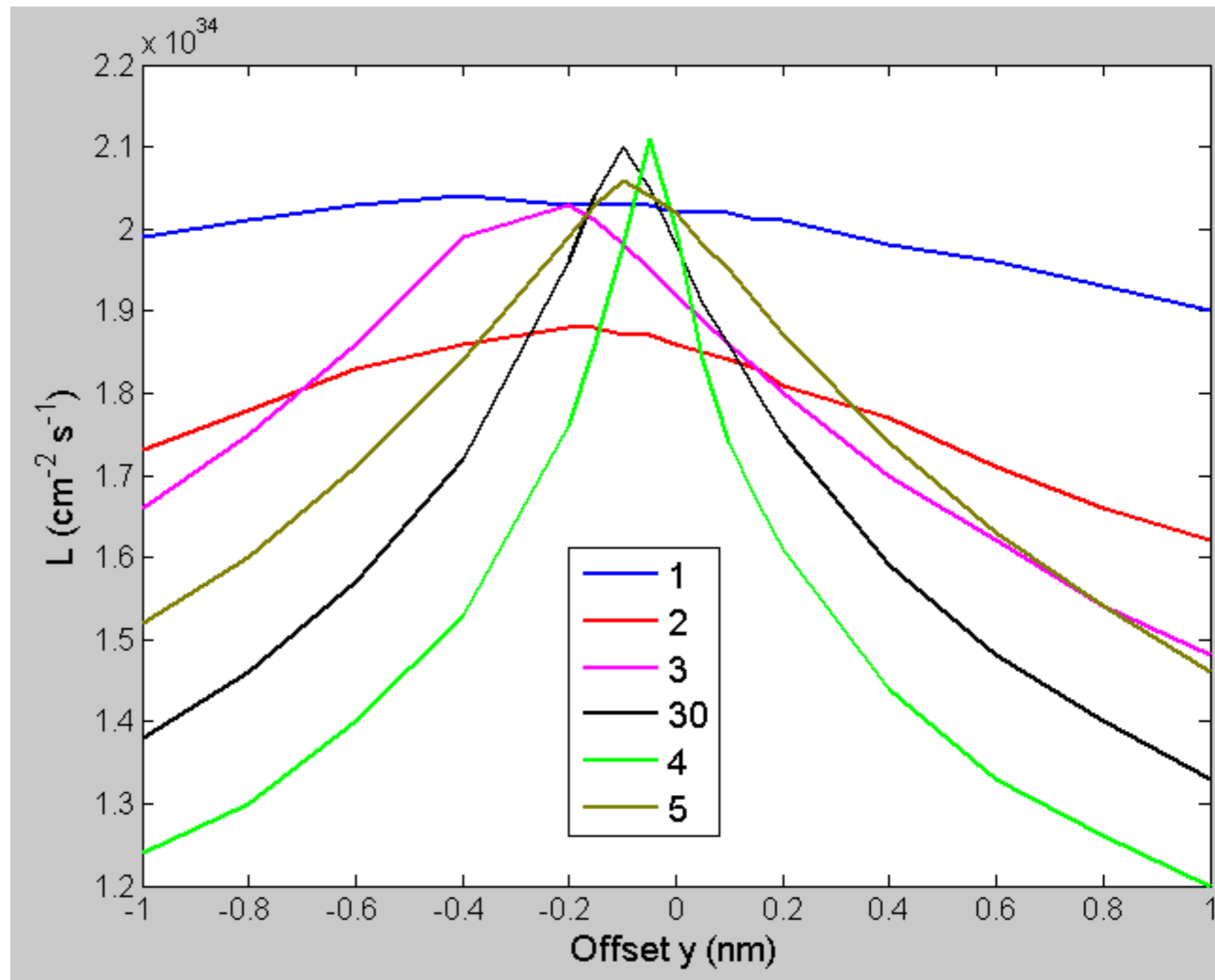
	Nom. RDR	Low P RDR	new Low P	new Low P	new Low P	new Low P
Case ID	1	2	3	30	4	5
E CM (GeV)	500	500	500	500	500	500
N	2.0E+10	2.0E+10	2.0E+10	2.0E+10	2.0E+10	2.0E+10
n_b	2625	1320	1320	1320	1105	1320
F (Hz)	5	5	5	5	5	5
P_b (MW)	10.5	5.3	5.3	5.3	4.4	5.3
$\gamma\epsilon_x$ (m)	1.0E-05	1.0E-05	1.0E-05	1.0E-05	1.0E-05	1.0E-05
$\gamma\epsilon_y$ (m)	4.0E-08	3.6E-08	3.6E-08	3.6E-08	3.0E-08	3.0E-08
β_x (m)	2.0E-02	1.1E-02	1.1E-02	1.1E-02	7.0E-03	1.5E-02
β_y (m)	4.0E-04	2.0E-04	2.0E-04	1.0E-04	1.0E-04	1.0E-04
Traveling focus	No	No	Yes	Yes	Yes	Yes
Z-distribution *	Gauss	Gauss	Gauss	Flat	Flat	Flat
σ_x (m)	6.39E-07	4.74E-07	4.74E-07	4.74E-07	3.78E-07	5.54E-07
σ_y (m)	5.7E-09	3.8E-09	3.8E-09	2.7E-09	2.5E-09	2.5E-09
σ_z (m)	3.0E-04	2.0E-04	3.0E-04	3.0E-04	5.0E-04	2.0E-04
Guinea-Pig $\delta E/E$	0.023	0.045	0.036	0.036	0.039	0.038
Guinea-Pig L (cm ⁻² s ⁻¹)	2.02E+34	1.86E+34	1.92E+34	1.98E+34	2.00E+34	2.02E+34
Guinea-Pig Lumi in 1%	1.50E+34	1.09E+34	1.18E+34	1.17E+34	1.06E+34	1.24E+34

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



Higher sensitivity to offset

- In traveling focus case, higher disruption is needed for the bunches to keep focusing each other
- It then produces higher sensitivity to offset of the beams
- Operation of intra-train luminosity optimization is more challenging

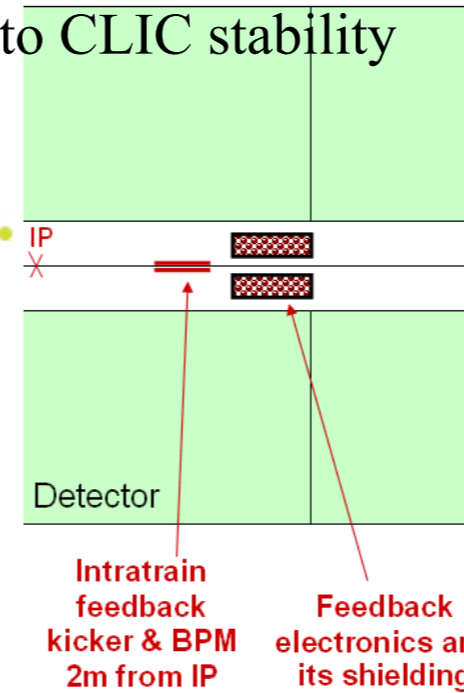


Longer L^* study

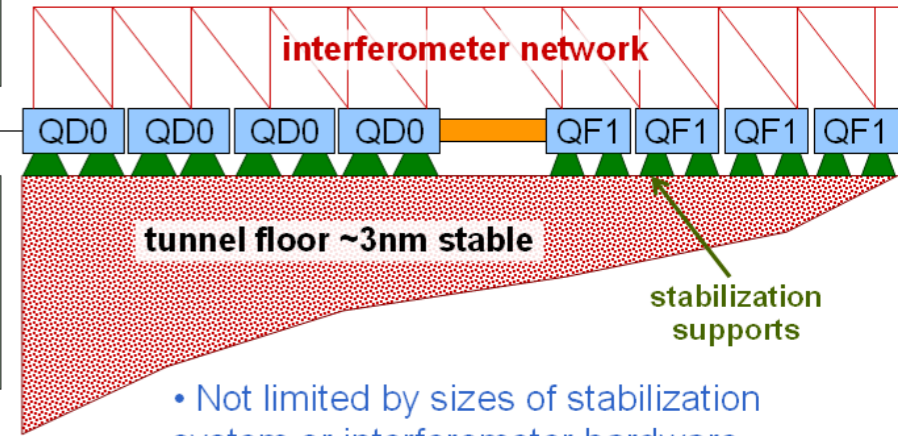
- Study of higher chromaticity optics at ATF2
 - smaller β^* or
 - longer L^*

- may be interesting for studies of simplified IR interface
- and for possible studies of CLIC BDS

Discussed approach to CLIC stability



- Slower than $1/L^*$ dependence of $L_{um} \Rightarrow \uparrow L^*$
- Reduced feedback latency – several iteration of intratraining feedback over 150ns train
- FD placed on tunnel floor, which is ~ten times more stable than detector – easier for stabilization



- Not limited by sizes of stabilization system or interferometer hardware
- Reduced risk and increased feasibility
- May still consider shortened L^* for upgrade

Simplified IR



- Longer L^* , long enough to have QD0 outside of detector, separating M/D more cleanly and simplifying push-pull
 - Some impact on luminosity is unavoidable; R_{vx} may need to be increased
- If a longer L^* design will be found viable, a question will be
 - whether to consider it as a permanent solution
 - if a Luminosity upgrade, by shortening the L^* , would be considered later, after operational experience will be gained with a simpler system