

CLIC Workshop 08

Instrumentation Working Group
In conference room Bldg

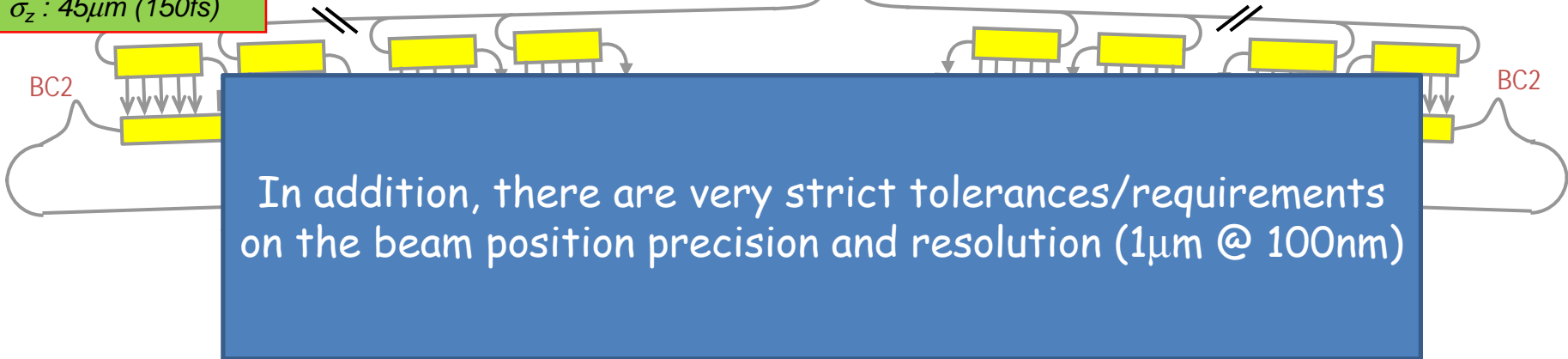


CERN, 14-17 October 2008

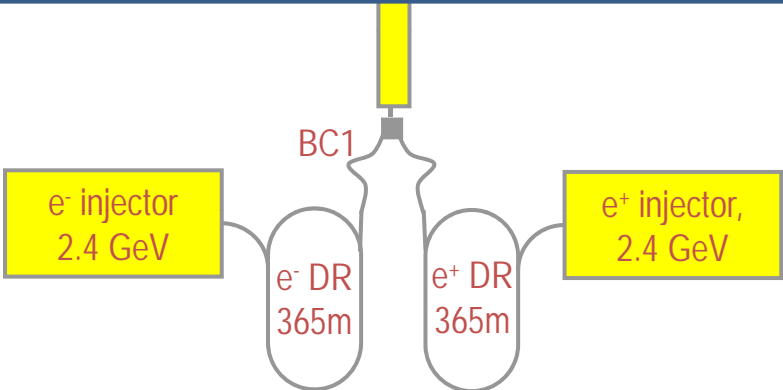
Main Beam parameters all along the machine

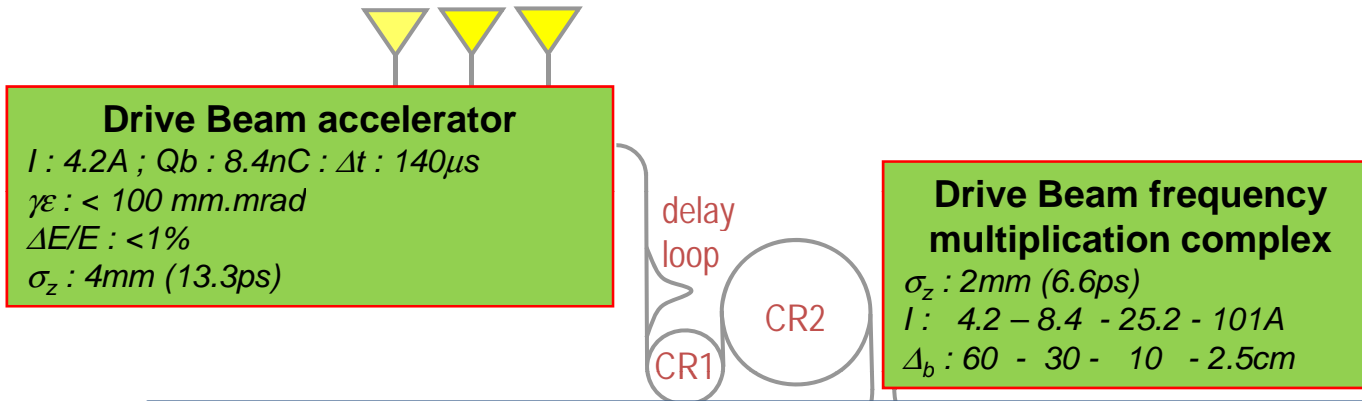
Entrance linac
 $\gamma\epsilon_x : 0.60 \text{ mm.mrad}$
 $\gamma\epsilon_y : 0.01 \text{ mm.mrad}$
 $\Delta E/E : 1.5\%$
 $\sigma_z : 45\mu\text{m} (150\text{fs})$

Final Focus
 $\gamma\epsilon_x : 0.66 \text{ mm.mrad}$
 $\gamma\epsilon_y : 0.02\text{mm.mrad}$
 $\Delta E/E : 0.35\%$
 $\sigma_x = 40 \text{ nm}$
 $\sigma_y = 1 \text{ nm}$



Damping ring
 $\gamma\epsilon_x : 10 \rightarrow 0.381 \text{ mm.mrad}$
 $\gamma\epsilon_y : 10 \rightarrow 0.004 \text{ mm.mrad}$
 $\Delta E/E : 0.134\%$
 $\sigma_z : 1.5\text{mm} (5\text{ps})$





In addition, there are very strict tolerances/requirements on the beam phase stability ($0.1^\circ @ 12GHz$)

Drive Beam parameters all along the machine

Drive Beam Parameters

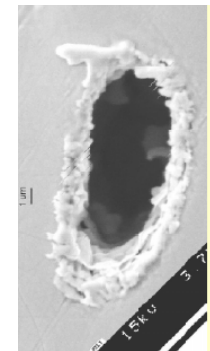
	Generation Complex	Decelerator (24 units)
Electrons energy		
Beam current /charge		
Total Beam Energy		
Bunch length	6-13ps	3.3ps
Minimum beam size		
Charge density	2.3 10 ¹⁰ nC/cm ²	1.2 10 ⁹ nC/cm ²

The thermal limit for 'best' material (C, Be, SiC) is ~ 1 10⁶ nC/cm²

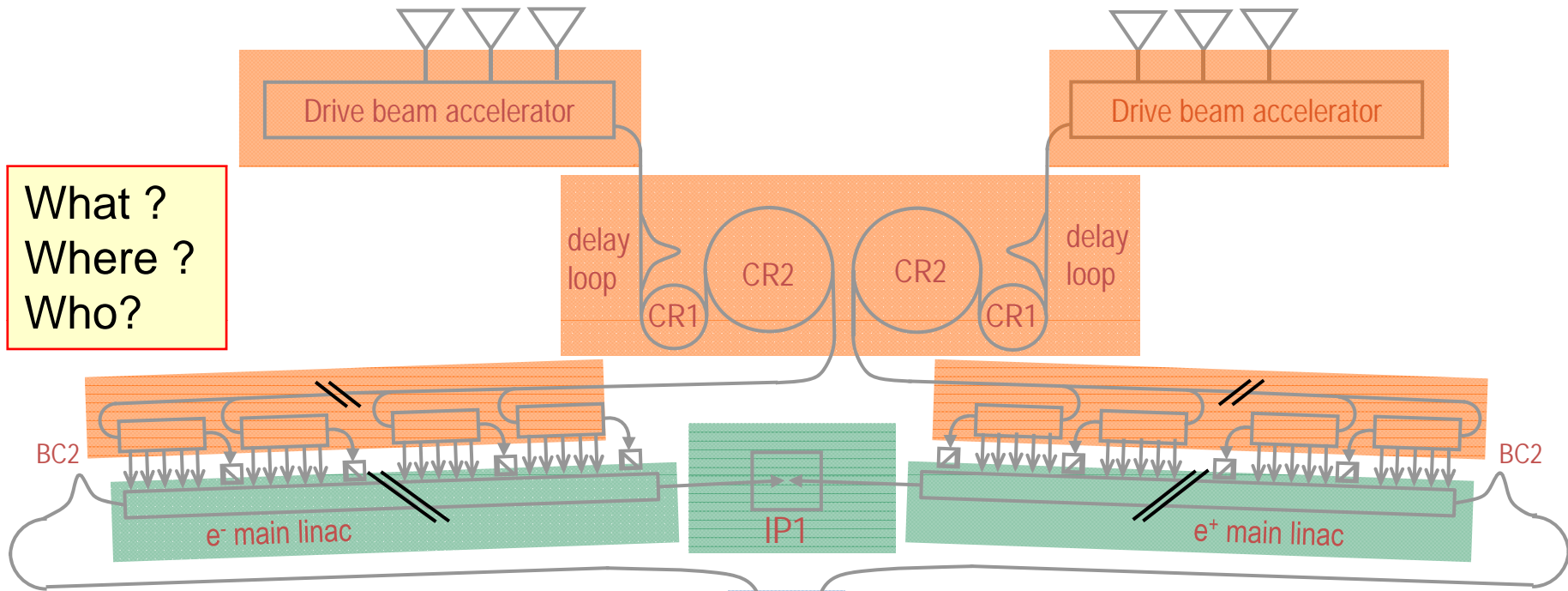


This is just the RF source !!!




- Guarantee the efficient production of 12GHz RF power
- With a high level of reliability and availability

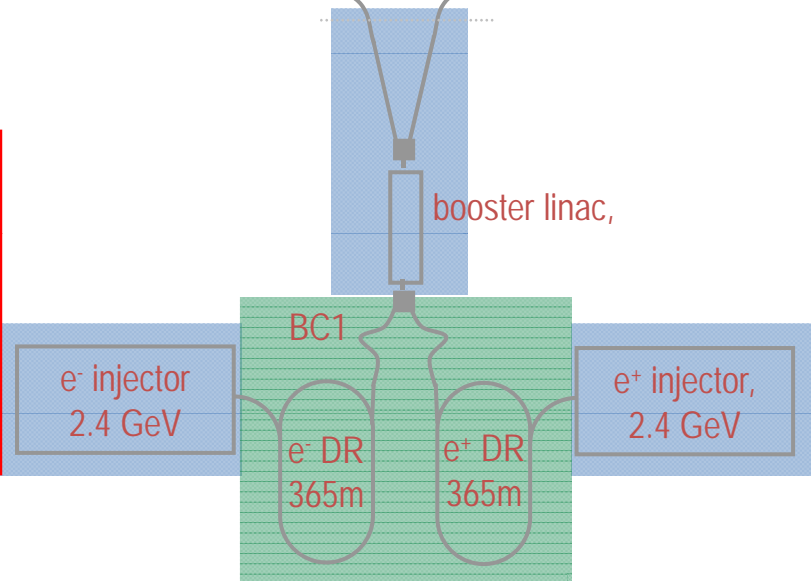


What ?
Where ?
Who?

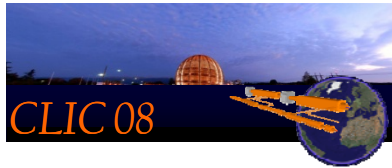


Requirements for beam diagnostics

-  Classical Conditions already achieved
-  ~ Similar to ILC at ATF – KEK, SLAC, Desy, Jlab ...
-  Under development @ CTF3 CTF3 collaboration, FP6, FP7



CLIC 3 TeV



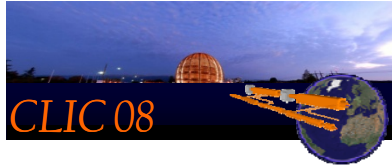
Comparison between CLIC and ILC

	CLIC	ILC
<i>Center of mass energy (GeV)</i>	3000	500
<i>Main Linac RF Frequency (GHz)</i>		
<i>Luminosity ($10^{34} \text{ cm}^{-2} \text{ s}^{-1}$)</i>	5.9	2
<i>Linac repetition rate (Hz)</i>		
<i>Accelerating gradient (MV/m)</i>	100	28
<i>Proposed site length (km)</i>		
<i>Total site AC power (MW)</i>	322	230
<i>Wall plug to main beam power efficiency (%)</i>	8.7	9.4

Most Critical Beam Parameter

	CLIC	ILC
<i>Bunch Length in the Linac (fs)</i>		
<i>Typical Beam Size in the Linac (μm)</i>		
<i>Beam size at IP : σ_x / σ_y (nm)</i>		

- Identify the Requirements for beam instrumentation
- Give a status of the present knowledge/development
- Identify the weak points and their consequences (Propose solution ?)
- Potentially stimulate new collaborators to join the crew



Wednesday am

Council Chamber

- - Main Beam linac specifications
Daniel Schulte
 - Status on drive beam decelerator studies
Erik Adli
 - Phase tolerance and consequences on beam instrumentation
Daniel Schulte
- Overview of CLIC Instrumentation requirements
Thibaut Lefevre
- LHC Instruments
Rhodri Jones
- Overview of ILC instrumentation
Marc Ross

40-S2-C1

Wednesday pm

60-6-002

- Longitudinal beam diagnostics at CTF3
Anne Dabrowski
- Beam Position Monitors using a reentrant cavity
Claire Simon
- High precision BPM at CTF3
Lars Soby
- CDR@CTF3
Max Micheler
- CTF3 Femtosecond synchronization
Alexandra Andersson
- Status on the construction of BPS at CTF3
Angeles Faus-Golfe
- Fast scanning system for the PETRA laser-wire experiment
Alessio Bosco

Thursday am

60-6-002

- Linear and non-Linear Correction using Turn-by-Turn BPM Data

Rogelio Tomas

- High Precision Emittance Measurements in the SLS

Ake Andersson

- Damping Ring BPM developments

Manfred Wendt

Thursday am

304-1-007

- LAPP BPM read-out electronics in CTF3
Vilalte SEBASTIEN
- BPM amplifier for CTF3 TBL: Status and future work
Iouri KOUBYCHINE
- Beam Diagnostics development for CLIC in the Quasar group
Carsten WELSCH
- Fibre laser development for use in accelerator beam diagnostics
Laura CORNER

Thursday pm

Council Chamber

- Wakefield & Cavity-based Monitors: Wakefield Monitor Development & Tests in the TBTS

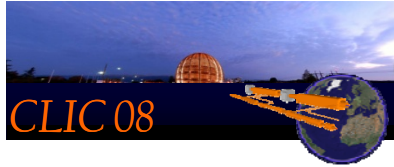
Franck PEAUGER

- Wakefield & Cavity-based Monitors: High Resolution BPM
Igor SYRATCHEV

- Wakefield & Cavity-based Monitors: Fermilab BPM Development Plans

Manfred WENDT

304-1-007



Please join in !
Note: we are changing rooms often –
Please check the locations in advance !