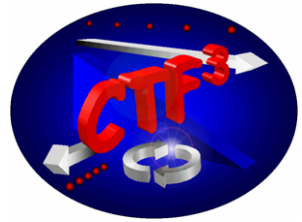


CLIC / CTF3 meeting 28.1.2005

G.Geschonke

CTF3 objectives

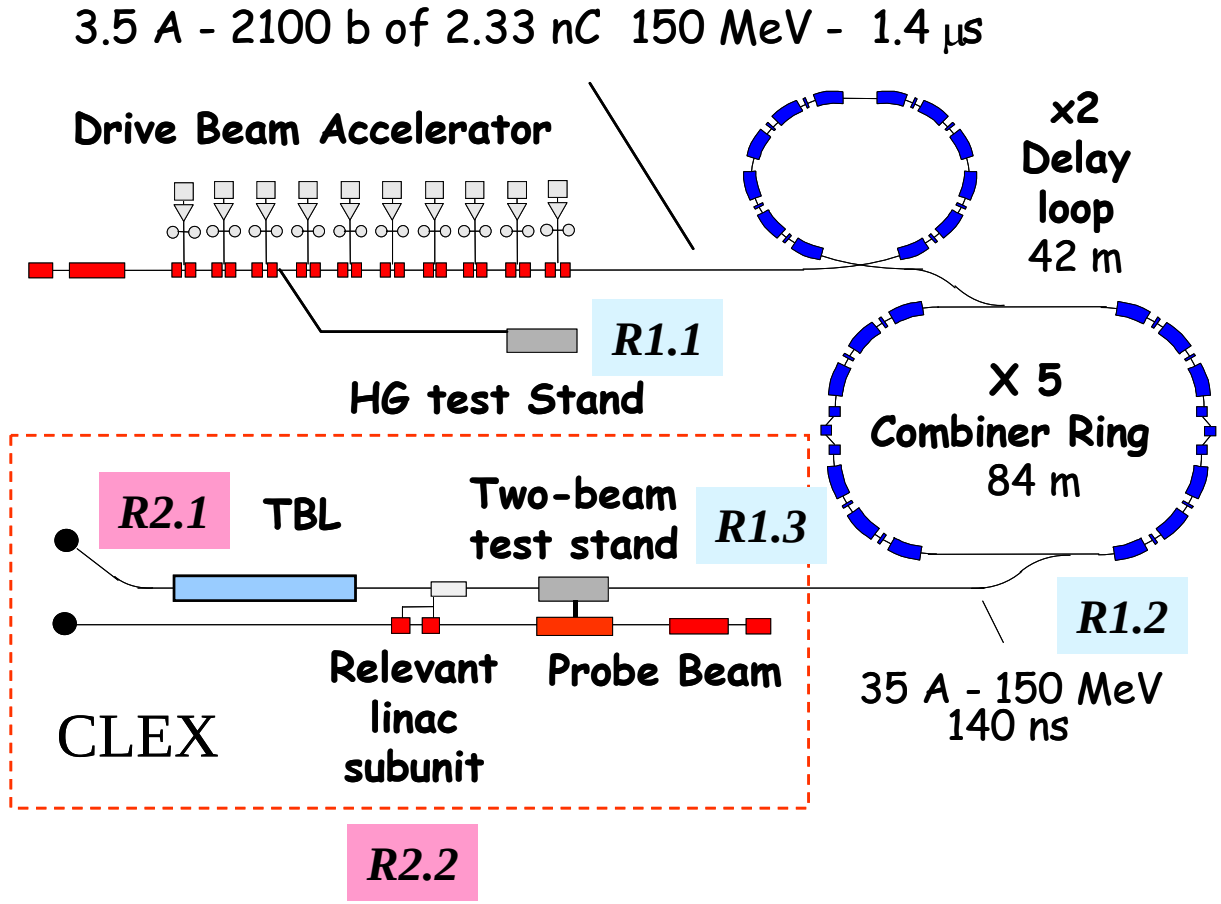
R1.1 CLIC accelerating structure,

R1.2 Drive beam scheme with a fully loaded linac

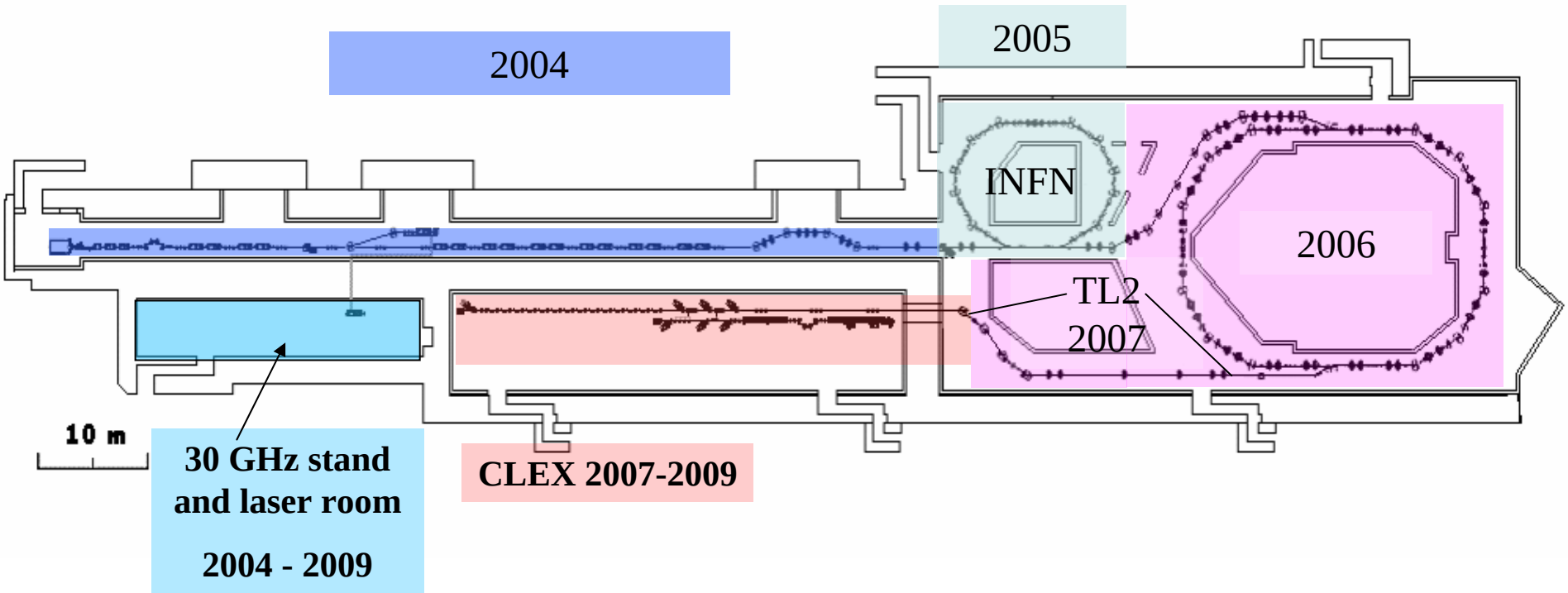
R1.3 Power-Extraction Structure (PETS)

R2.1 stability and losses in the drive beam decelerator,

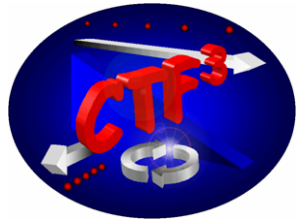
R2.2 Test of a relevant linac sub-unit with beam



CTF3 programme



Status of existing / past collaborations



LAL: Gun for Preliminary phase
HV for gun, pulser and control electronics, pre-bunchers

SLAC: Gun on loan, Design of Injector, participation in commissioning

Uppsala University: Operations support, Phase monitor

RAL: Laser development for photo injector ,

Turkey: Operations support

CARE-ELAN: CTF3 workshop

INFN: Participation in operation/commissioning
RF deflectors 3 GHz
Delay Loop : full responsibility
Bunch length chicane,
longitudinal diagnostics experiment

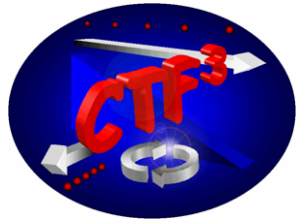
Northwestern University Illinois:
Drive Beam accelerator structure
Beam loss monitoring

Finnish Industry: One person for CLIC/CTF3

Many **CERN** groups

Photo injector (partly funded by CARE/PHIN)
LAL: RF gun
RAL: Laser
CERN: Photo cathodes

Context

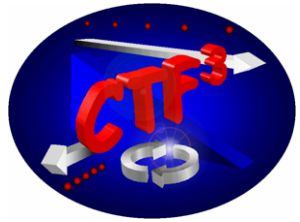


To keep the programme on schedule:
17.2.MSFr + 95 man-years missing

More collaborations

First meeting called by CERN DG on 19. May 2004
Invitation to all member state delegations and selected institutions

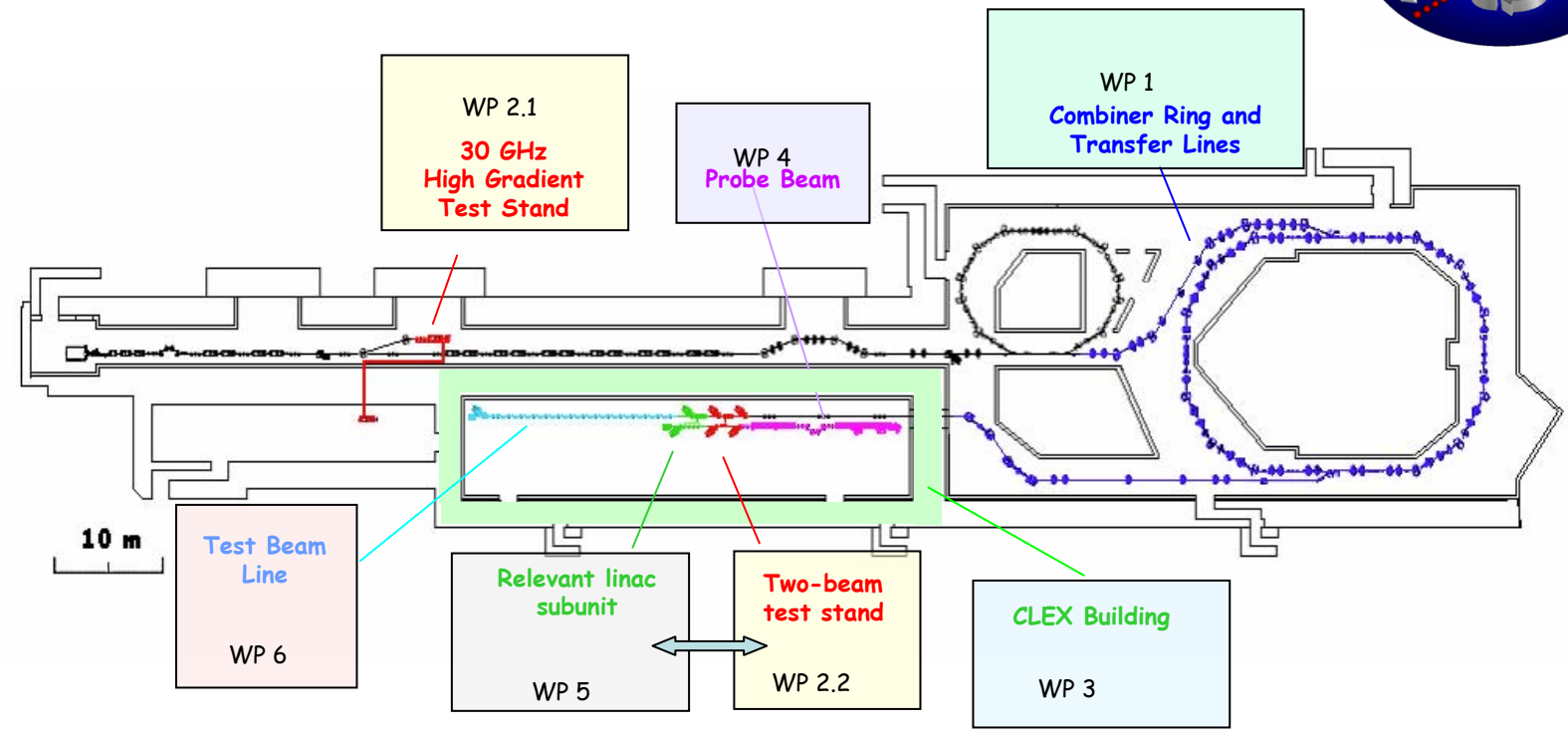
CLIC Collaboration Meeting held at CERN on 19-5-2004

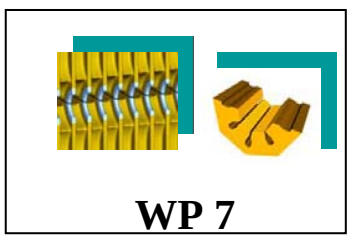


Participation :

- Belgium R. Gastmans
- CERN : R. Aymar, C. Benvenuti, D. Blechschmidt, H. Braun, R. Corsini, J.P. Delahaye, J. Ellis, J. Engelen, G. Geschonke, E. Jensen, P. Lebrun, S. Myers, L. Rinolfi, I. Syratchev, F.Tecker, I. Wilson, W. Wuensch
- CIEMAT/Spain M. Aguilar-Benitez, L. Garcia-Tabarez
- Cockroft Institute/UK J. Dainton
- DAPNIA/Saclay M. Jacquemet, J. Zinn-Justin
- Helsinski Institute of Physics D.O Riska
- INFN-LNF S.Bertolucci, A Ghigo
- JINR/Dubna V. Kekelidze
- LAPP/Annecy J. Colas, Y. Kariotakis
- LAL/Orsay T. Garvey, P. Lavocat
- MSL/Stockolm O. Skeppstedt
- NIKHEF/Netherlands K. Gaemers
- NWU/USA M. Velasco
- Poland T. Kurtyka
- RHUL/UK G. Blair
- SLAC/USA R. Ruth
- Strathclyde University/UK A. Phelps
- Uppsala University, Sweden T. Ekelof

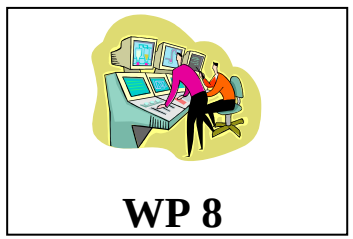
Work packages





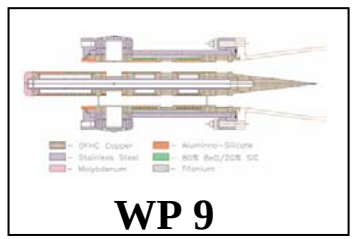
WP 7

Structures



WP 8

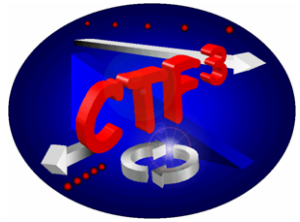
CTF3 Operation



WP 9

30 GHz power source

2. CLIC meeting 28.1.2005



Belgium
R. Gastmans

China
Honglin Zhuang

France
J.Colas
Y. Karyotakis
B. D'Almagne
T. Garvey
M. Jacquemet
A. Mosnier
J.Zinn-Justin

Finland
A.Heikkilae
D.O. Riska

Italy
A. Ghigo

Japan
J. Urakawa

Netherlands
F.Linde

Pakistan
Shoaib Ahmad

Poland
T.Kurtyka

Russia
V.N. Samoilov
G. Denisov
A.N. Skrinsky
Pavel Logachev

Spain
M. Aguilar-Benitez
L. Garcia-Tabares
Domenec Espriu
A. Faus-Golfe

Sweden
T. Ekelof
V. Ziemann pour C.Ekstrom
Hans-Åke Gustafsson

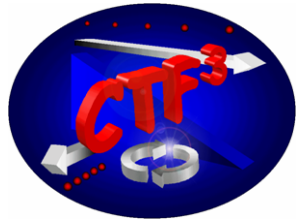
Turkey
A. Kenan Ciftci

UK
J.Dainton
R. Wade

USA
M. Velasco
R. Milner
T. Zwart (collegue Milner)
R.Ruth

CERN participants (17)
R. Aymar
D. Blechschmidt
H. Braun
P. Ciriani
R. Corsini
JP. Delahaye
J. Ellis
J. Engelen
G. Geschonke
E. Jensen
P. Lebrun
S. Myers
D. Schulte
I. Syratchev
M. Wilbers
I. Wilson
W. Wuensch

Accelerated programme – contacts and discussions



Finland

Discussions with **Finnish Industry**

Power converters: latest February 2006

Discussions / specifications

prototyping

RF structure (30 GHz) ongoing development

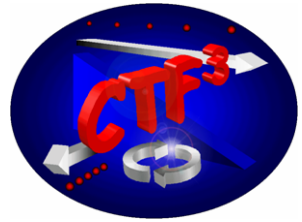
technology – bimetal (WP 7.3)

engineering support (person)

manufacturing technology development, 3-D machining

Result:
No power supplies,
work on accelerating structures: high precision 3-D machining as well as bi-metal materials.
Helsinki Institute of physics: one person until 2007, machining techniques.

Accelerated programme – contacts and discussions



France

Probe Beam latest February 2007

several discussions with **CEA-Dapnia, IN2P3 - LAL, (- LAPP)**

full responsibility for Probe Beam including gun (photo injector? laser ?)

use existing material from LPI as far as possible

Electronics for CR Beam Position monitors **LAPP**

April 2006

specifications defined

very interesting novel approach could be developed

Magnets for Combiner Ring **LURE**

Nov 2005

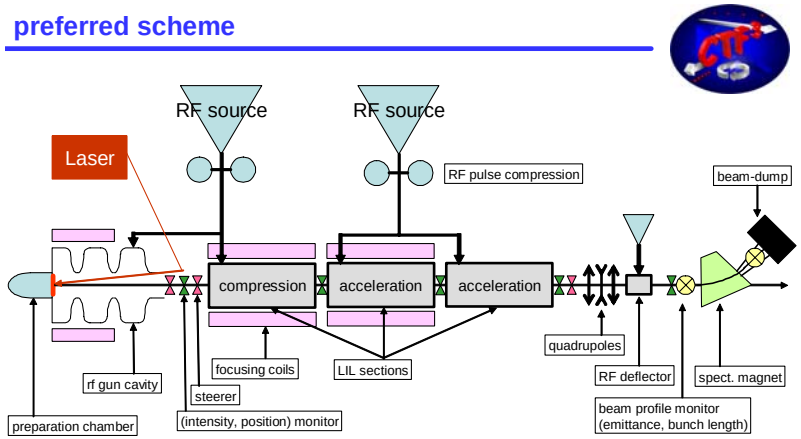
32 Super-ACO quadrupoles

Automated test stand

required during whole operations period from now on

Discussions with **DAPNIA**

preferred scheme



comments : focusing magnets, number of diagnostics and steerers determined after complete simulations

CTF3 / PBL meeting (20/01/05) Page 4

Result: strong commitment

CLIC meeting 11.2.2005

Accelerated programme – contacts and discussions

Italy

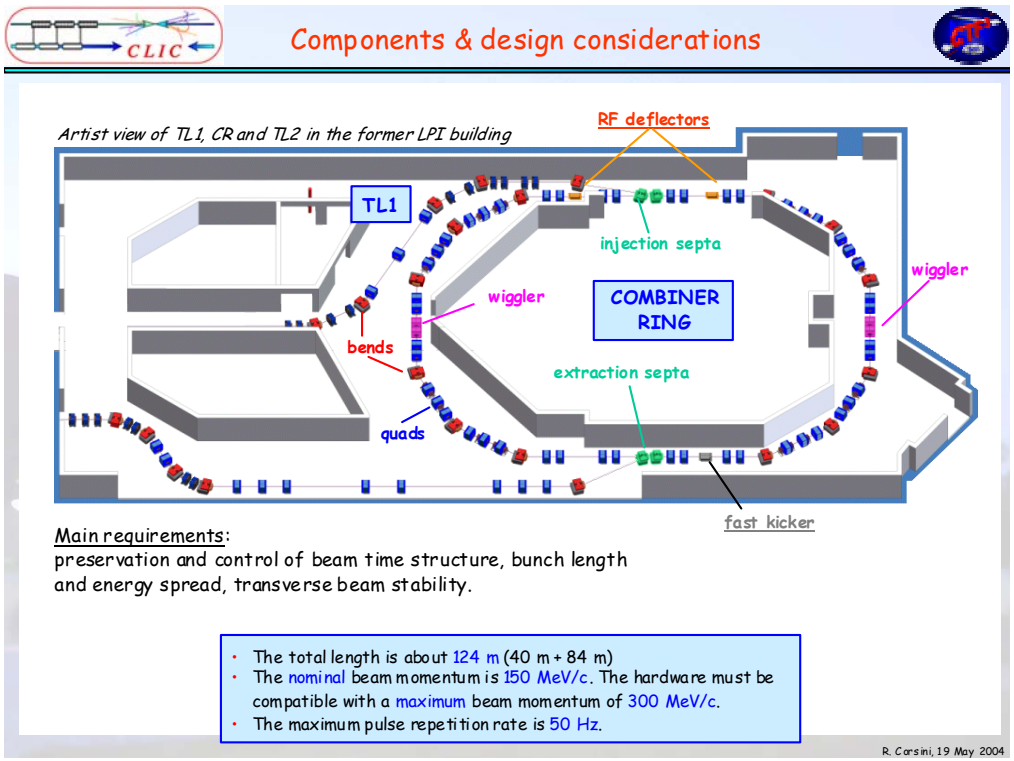
Combiner Ring optics, design, vacuum system, path length wigglers

Very well established collaboration with **INFN/LNF**

optics very well advanced, such that components can be defined

one path length wiggler ordered

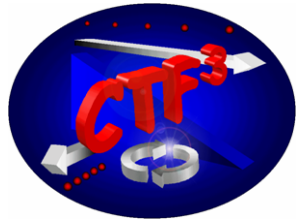
vacuum chambers for CR and TL1 and TL2, incl. Beam diagnostics (w/o electronics)



CR installed and commissioned in 2006

Result:
no 2. wiggler, no TL2 chambers
500 k€ for vacuum system

Accelerated programme – contacts and discussions



Japan
High gradient structure work with KEK

see statement

Poland
Software development Institute of Applied Mechanics of the Cracow University of Technology
Interface between HFSS and ANSYS

ok

Russia
Magnet manufacture for CR in collaboration with BINP November 2005
already ordered 11 quadrupoles, 26 sextupoles

Probably more collaboration

Work for 30 GHz programme
Discussions with **IAP**
stand-alone 30 GHz power source development
Surface heating tests

Interesting developments
Funding to be found

JINR
Software for automatic conditioning
one physicist already working

ok

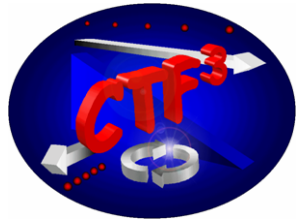
KEK Statement

KEK Accelerator Lab. is encouraging the staff to contribute if he is interested in CTF3 R&D (ex. high gradient acceleration or RF power source technology etc.). Young physicists and senior researchers of KEK will join CTF3 R&D at CERN like Dr.Kamitani and so on. JSPS makes the chance to young physicists for staying 10 months and senior staff for 3 months. There are many staffs who are researching the accelerator science based on normal conducting technology. They want the opportunity to join CLIC project and CTF3 R&D if possible. Unfortunately, I can not say the amount of the contribution from KEK clearly and KEK can not sign up this MOU at present.

KEK-ATF Situation

- KEK-ATF is going to do R&D's for high quality beam generation. Especially, we have to supply the beam to ATF2 which we will construct from this summer and complete until the end of JFY 2007 by an international collaboration (see the proposal in PAC05).
- ATF and ATF2 are internationally open for LC R&D under maintenance of KEK staffs.
- LC R&D for beam generation, beam tuning and beam instrumentation studies will be continue until about 2013.

Accelerated programme – contacts and discussions



Spain

Several discussions with **CIEMAT and Industry**

Equipment for Combiner Ring installed for start-up in spring 2006

Corrector magnets

already being manufactured

2 double septum magnets

based on modified Daphne design, CERN collaboration

CERN will supply power supply

Ejection kicker for CR *design with collaboration from INFN/LNF*

Pulser in collaboration with LLNL and CERN

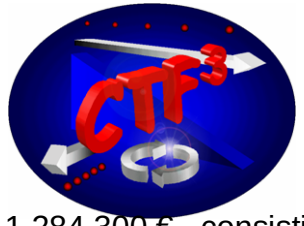
Equipment for TBL April 2007

TBL quadrupoles with precision movers

RF structure work ongoing development. Before end 2006

Develop and build one PETS structure for TBL in collaboration with CERN

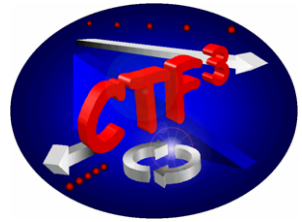
Spanish Contribution



1) CIEMAT (Spain) will be responsible for an overall contribution to the CTF3 collaboration estimated in 1.284.300 € , consisting of magnets, power supplies and radio frequency devices (see table below)
2) A significant technical part of the contribution will be provided by Industry through CIEMAT.
3) Financial support has been required from the Spanish Ministry of Science & Education. The support is divided in two annuities and the overall required amount for the present year (2005) is 433.000 €. CIEMAT own contribution for 2005 is estimated in 262.300€
4) The financial proposal for 2005 is now under evaluation and soon will be decided. For the moment , there is a good expectation for its approval.
5) Contributions from other Spanish Institutes are likely to happen

SUMMARY OF SPANISH PROPOSED CONTRIBUTION TO CTF3

ITEM	CTF3 WP	DESCRIPTION	COST ESTIMATE (€)	DEAD LINE
Correctors	WP 1.2	33 H/V Orbit Correction Magnets for the Combiner Ring and Transfer Lines (Based on existing design)	97.300	July-2005
Septa	WP1.2	2 Double Septa Magnets for the Combiner Ring (Based on a reference design)	232.500	Dec-2005
Kicker Magnet	WP 1.8	1 Fast Extraction Kicker (Based on a reference design)	161.000	Oct-2006
Kicker Power Supply	WP 1.8	1 Power Suply for the Fast Kicker based on Solid State Technology (Based on a conceptual design)	192.000	Oct-2006
TBL Quads	WP6	15 Quadrupole Magnets with motorised support structure for the Test Beam Line (Based on a reference design)	374.500	Mid-2007
PETS	WP7	1 Power Extraction Transfer System Prototype (Based on a reference design)	227.000	Dec-2006



CTF3 Kickers and Septa

Conclusions

A solution is proposed for the DL septa using existing septa (ex e^+ and e^- injection into EPA).

A collaboration are proposed with CIEMAT for the CR Septa using designs based on DAF NE and TERA.

A temporary solution is proposed for CR kicker using existing magnets and pulse generators (ex e^+ and e^- injection into EPA).

A final solution is proposed requiring collaborations with CIEMAT for the stripline magnet and Lawrence Livermore Lab for the pulse generator.

Accelerated programme – contacts and discussions

Sweden

Detailed discussions with **Uppsala University,**
resulting in a funding request to **Swedish Research Council**

Result:
Proposal refused, to be re-submitted

TL2 incl. bunch compressor

optics design, missing magnetic elements (6 dipoles) and power converters, beam diagnostic equipment,

Two Beam Test Stand

optics, magnets, vacuum, diagnostics (spectrometers, optical screens, BPMs, WCMs) , for Probe Beam and Drive Beam

RF diagnostics and data handling.

(PETS and accelerating structures not included)

To be commissioned in 2007

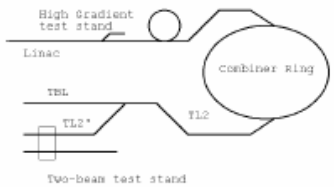
Magnets and power supplies from Celsius

suitability being assessed

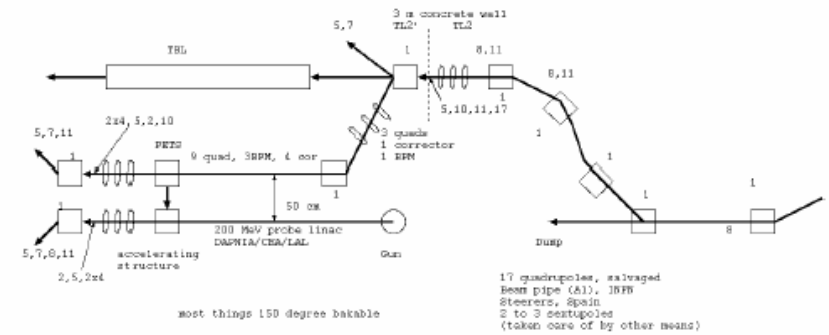
Being assessed

Volker Ziemann / CTF3 collaboration meeting

TL2 and Two-Beam Test Stand



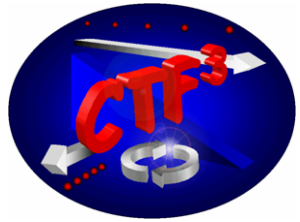
Numbers mean diagnostic equipment, explained on next slide



Summary

- Plan to participate in the build-up the high gradient test stand.
- Transfer that know-how to the **Two-Beam test stand** and build it.
- Optimize and build the transfer lines **TL2 and TL2'.**
- We're waiting for the decision from VR and Wallenberg Foundation.

Accelerated programme – contacts and discussions



Turkey

Accelerator operation (coordinated by Ankara University)

Turkish Universities send graduate students to participate in operation.

The first student has finished the first three months

Ok,
Turkey is also participating in studies of CLIC physics

UK

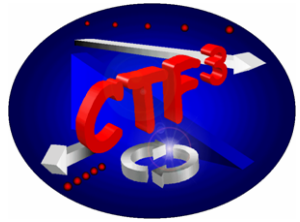
Stand alone 30 GHz power source (Strathklyde)

Beam Diagnostics RHUL

Cockcroft Institute participation

Encouraging statement by British delegation

Accelerated programme – contacts and discussions



USA

A prioritised list of sub systems has been sent to the US coordinator and DOE

Beam Diagnostic equipment for TBL **Northwestern University Illinois** to be commissioned in 2007

proposal drafted

Pulser for fast kicker **LLNL** to be installed in CR for start-up 2006

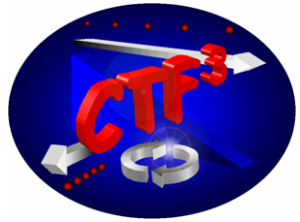
very interesting technology, could be developed by LLNL or in collaboration with CIEMAT and CERN

30 GHz stand alone power source at the latest in 2007

Accelerating structure testing

R.Ruth appointed as coordinator
Meeting planned to define topics.

Accelerated programme – contacts and discussions



CERN

Combiner ring magnets (with BINP)
CLEX building,
Accelerating / PETS development
Operation, maintenance, exploitation,
Project management

CLIC / CTF3 accelerated programme 4.2.2005

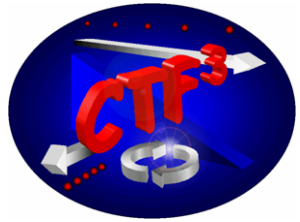
Work Packages		Participation		Pledged resources			Resources missing		status	delivery	commitment critical path
				M CHF	my	% missing	M CHF	my			
1. Combiner Ring (CR), Transfer Line (TL1) Transfer Line (TL2) Bunch compressor (BC)	1.1 Optics layout	CR and TL1	CERN, LNF						ok, ~finished	4_2006	confirmed
	1.2 Magnets	Correctors	Ciemat	0.146					ok (started)	11_2005	done
		32 quadrupoles	Lure						ok		
		CR+TL1 quads, sextupoles	BINP, CERN	0.33	1				ok, ordered		
	1.3 Vacuum system	CR, TL1 chambers	LNF	0.6					ok, MoU in preparation	2-6_2006	2_2005
		CR, TL1 pumps, gauges, electronics	CERN	0.2	1				ok		
	1.4 Beam diagnostic equip.	Monitor chambers	LNF	0.15					ok, MoU in preparation	2_2006	2_2005
		BPM electronics development	LAPP			100	0.3	0.5	schedule problem	4_2006	6_2005
		BPM electronics manufacture				100					1_2006
	1.5 Power Converters	All magnet power supplies	Finnish Industry ?			90	0.8	1.2	only prototypes	2_2006	5_2005
			Sweden (CELSIUS)			?					
	1.6. Technical services & installation	Infrastructure, Installation support	CERN	1.05	2				ok	4_2006	11_2005
		Installation support	LNF						ok, MoU in preparation		
	1.7. Control & software		CERN	0.1	1	50				4_2006	11_2005
	1.8. Fast kicker & pulser septa	Stripline kicker, septa	Ciemat (LNF support)	0.59					ok, ready for MoU	3_2006 temp solution for kicker possible	3_2005
		Pulser	Ciemat CERN (support)	0.288					ok, ready for MoU		
			LLNL						US participation ?		
	1.9. RF distribution system	3 GHz waveguides	CERN	0.1	0.2				ok	11_2005	6_2005
	TL2 Transfer line	Optics	~~Sweden~~			100		0.5		3_2006	10_2005
		Magnets, power converters	~~Sweden~~			100	0.36	0.6		1_2007	6_2005
			Sweden(Celsius)			?			under discussion	10_2006	5_2005
		Beam diagnostics	~~Sweden~~			100	0.1	0.5		2_2007	2_2006
		TL2 chambers, pumps, gauges, electronics	~~Sweden / INFN~~			100	0.2	0.5		2_2007	7_2006

2. 30 GHz RF power test stand	2.1. Automated test stand	Software	~~Dapnia~~				2	4			
			JINR						1 person for 2 yrs	4_2005 =>	done
		Hardware	~~Sweden~~			100				2006	5_2005
	2.2. Two-beam test stand	Beam line, diagnostics	~~Sweden~~			100	0.9	4	new proposal being formulated	2_2007	6_2005
	2.3. 30 GHz RF pulse compression		CERN						ok, ordered	5_2005	done
3. CLEX building			CERN	1	2				ok	2006	2005
4. Probe beam linac			DAPNIA						design started schedule ? MoU in preparation	2_2007	5_2005
			LAL						without laser		
		Laser for photo injector				100	0.25				
5. CLIC linac unit		PETS and accelerating structures				100	1.5	8		5_2008	2005
6. 35 A Test beam line (TBL)		Quadrupoles & precision movers	Ciemat	0.561					ok, ready for MoU	4_2007	6_2005
		Beam line design				100		0.5		1_2007	1_2006
		Diagnostic equipment	NWU			50	0.2	1	US participation ? without BPMs	1_2007	1_2006
			RHUL ?								
7. 30 GHz structure development	7.1. Accel. structure	Design	CERN			?			ok	2005-2009	as soon as possible
			Poland								
	7.2.PETS	Prototype development (one PETS)	Ciemat	0.34			2.2	5	ok, ready for MoU		
		Design	CERN						ok		
		PETS series for TBL				100				5_2007	6_2005
	7.3. Structure technology		Finland			?	0.4	10	ok	2005-2009	as soon as possible
8. CTF3 operation		One graduate student during operating periods for 2 years	Turkey			90	0.5	23	ongoing	2005-2009	as soon as possible
			CERN						ok		
9. 30 GHz stand-alone source			Strathclyde						UK participation ?		
			IAP			100			proposal made	2008	2005
			US						US participation ?		
			totals				**9.71**	**59.3**			

, Missing: 9.71 MSFr, **59.3 man-years**

Before: 17.2 MSFr, 95 man-years

Conclusion



- Programme assured up to including Delay Loop

- For Combiner Ring:
  CERN will launch power supplies and BPMs