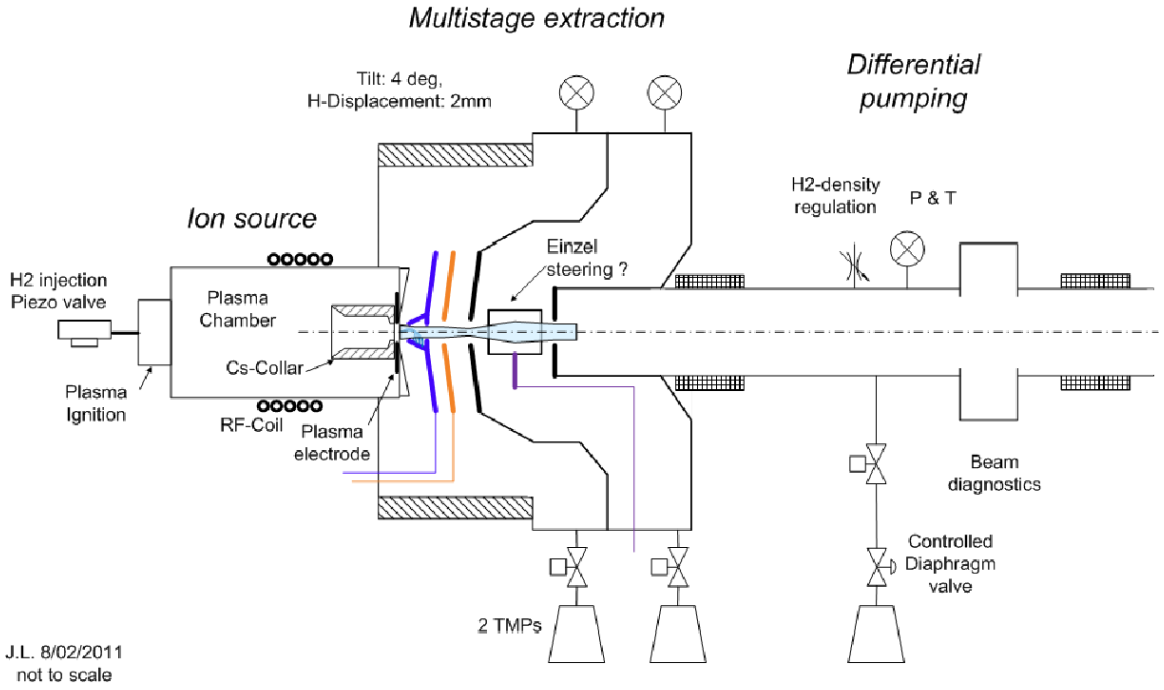
Design and Production of:

- New LINAC4 Front end Chamber
- New LINAC4 Faraday cage
- LEBT + Diagnostic Support for B357
- LINAC4 SPL Plasma generator + 2 Cesium oven
- Plasma Generator BNL
- Developments (2011 – 2014):
  New RF Plasma Generators

New LINAC4 Front end Chamber 1/4

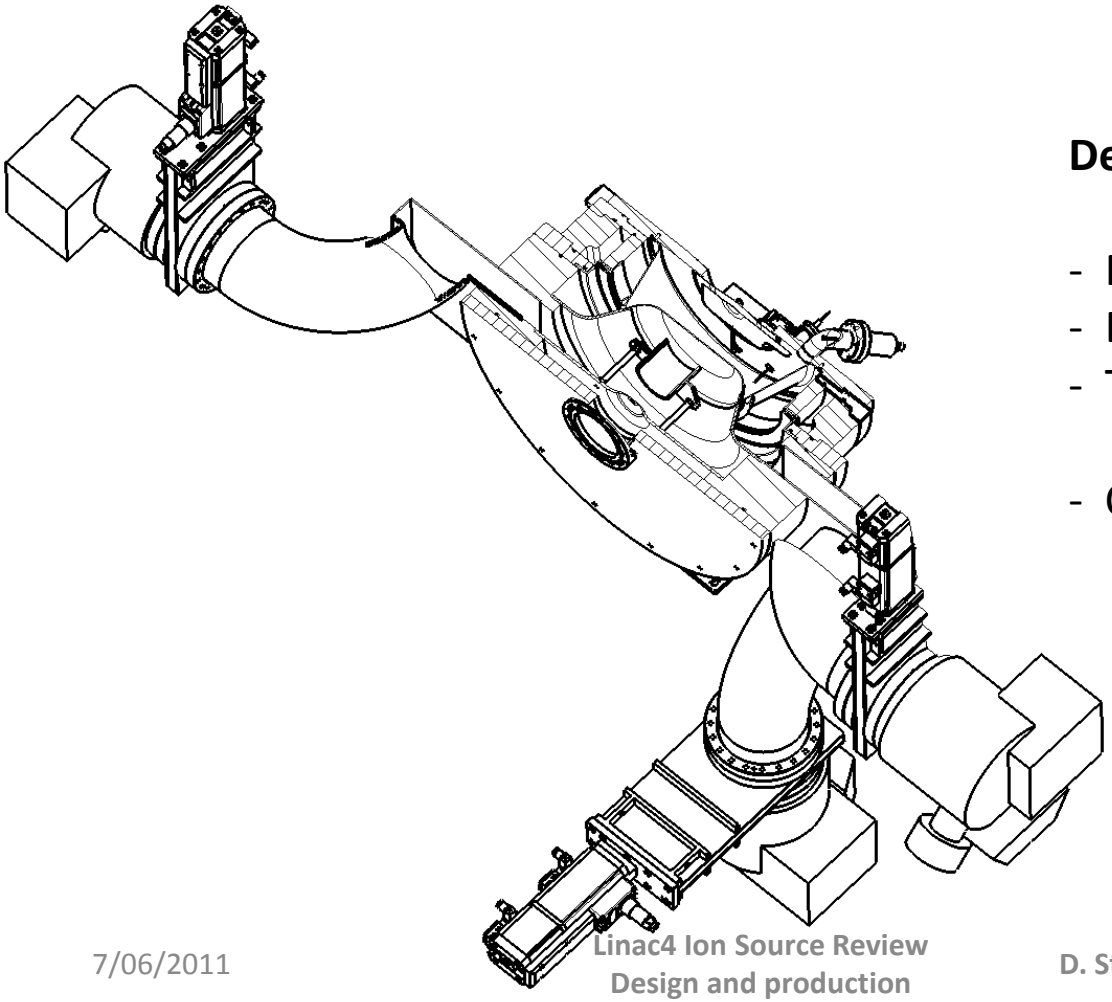
Diff. Pumping, Insulator, Tilt and alignment mechanism



1/20/2011 Ly

7

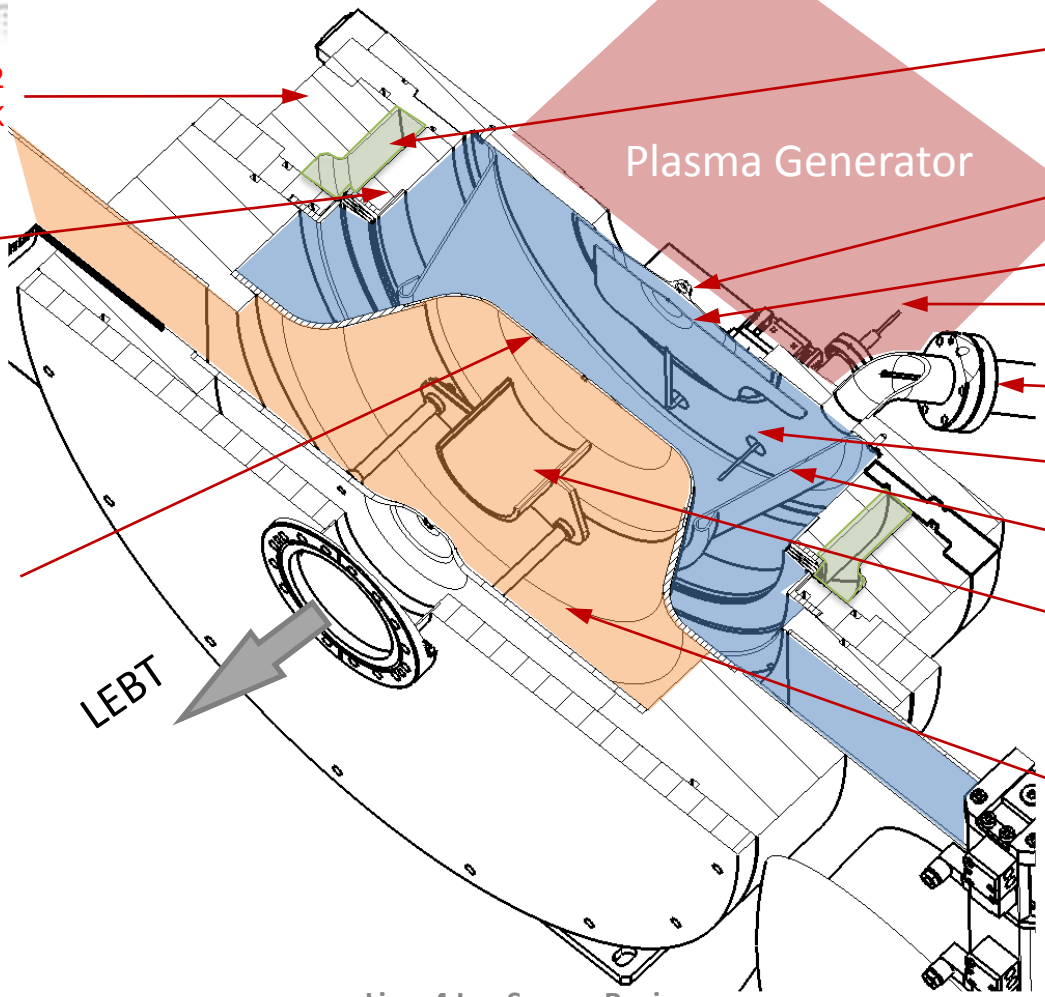
New LINAC4 Front end Chamber 2/4



Design of new Front end Chamber

- Multi-stage Extraction
- Differential Pumping
- Tilt and Alignment
  System for Electrode 2
- Ceramic Insulator

New LINAC4 Front end Chamber 3/4



Insolator 2
PEEK

Isolator 1
Ceramic

Electrode 3
(Fixe)

Pumping
Volume 2

Electrode 1
(Fixe)

Electrode 2 (Tilt
able and
Movable)

10 kV
Connexion

20 kV
Connexion

Pumping
Volume 1

Cesium
Protection

Einzel
Lens

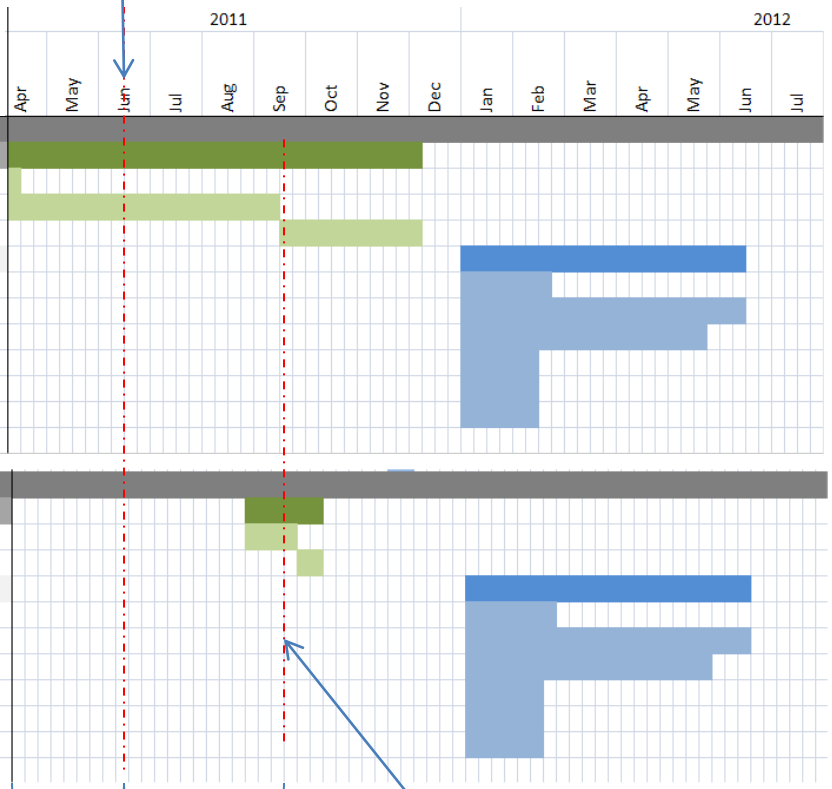
Pumping
Volume 3

New LINAC4 Front end Chamber 4/4

R&D Activity: tight but feasible depending on technical choices

Beam Optics

Linac4- 3MeV test stand							
Pre-LEBT and HT insulator Lina4		**317**		**1-Apr-11**	**5-Dec-11**		
Integration		5	2080	1-Apr-11	7-Apr-11	EC	
Design		90	37440	8-Apr-11	12-Sep-11	EC-YC	
drawings, Procurement		60	24960	13-Sep-11	5-Dec-11	PM	
Production		**120**		**2-Jan-12**	**15-Jun-12**	**GF**	
	Einzel lens	40		2-Jan-12	24-Feb-12		
	Insulator	120			15-Jun-12		
	Differential pumping chamber	100			18-May-12		
	Ground electrode	40			24-Feb-12		
	Support	40			24-Feb-12		
	Alignment table	40			24-Feb-12		
IS Test stand 357		**317**					
Pre-LEBT and HT insulator IS-TS 357		**215**		**22-Aug-11**	**15-Jun-12**		
Integration		25	10400	22-Aug-11	23-Sep-11	EC	
Procurement		10	4160	26-Sep-11	7-Oct-11	PM	
Production		**120**		**2-Jan-12**	**15-Jun-12**	GF	
	Einzel lens	40		2-Jan-12	24-Feb-12		
	Insulator	120			15-Jun-12		
	Differential pumping	100			18-May-12		
	Ground electrode	40			24-Feb-12		
	Support	40			24-Feb-12		
	Alignment table	40			24-Feb-12		

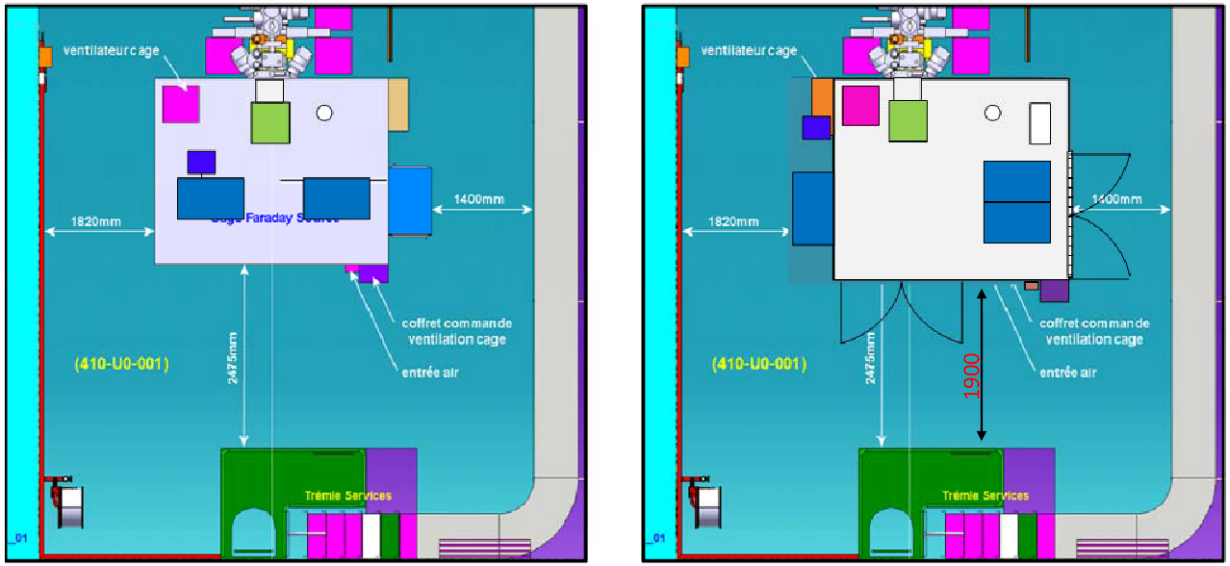


Pre-design

Details-design

Raw Material Order

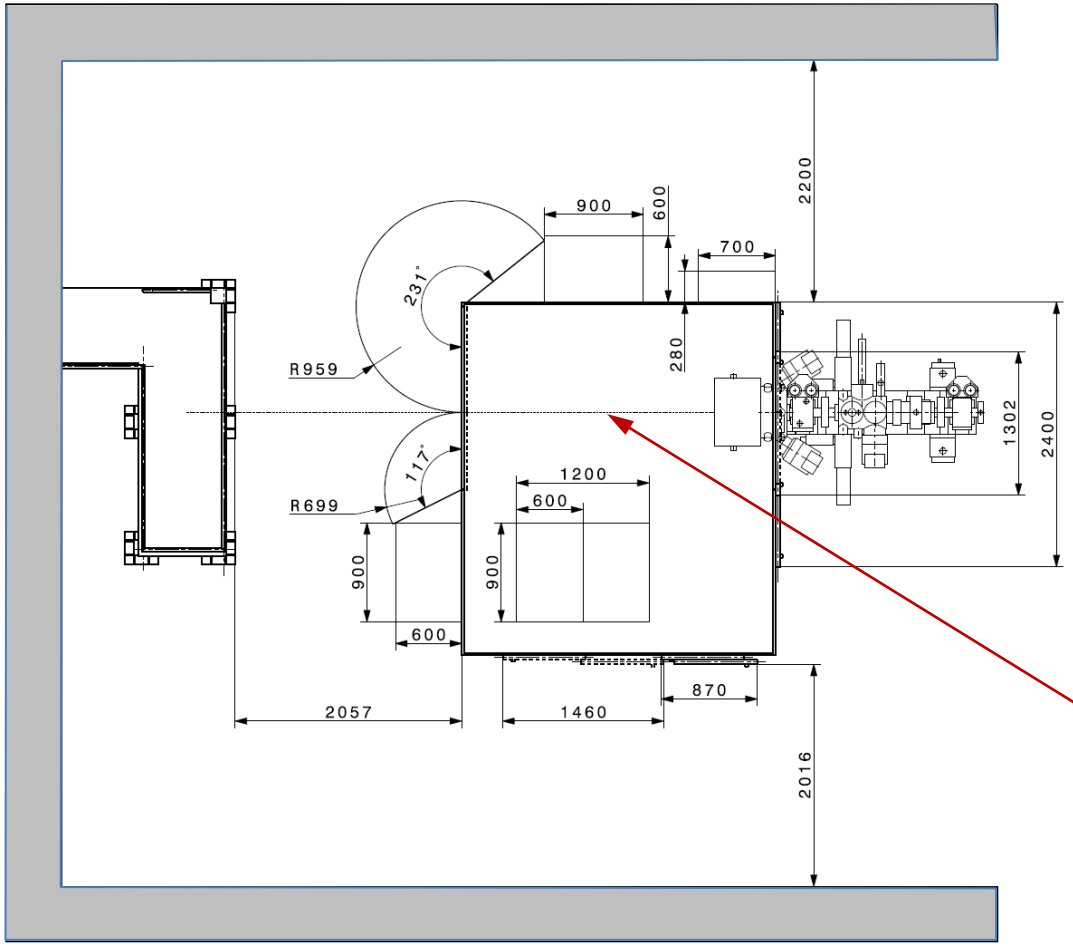
New LINAC4 Faraday cage 1/3

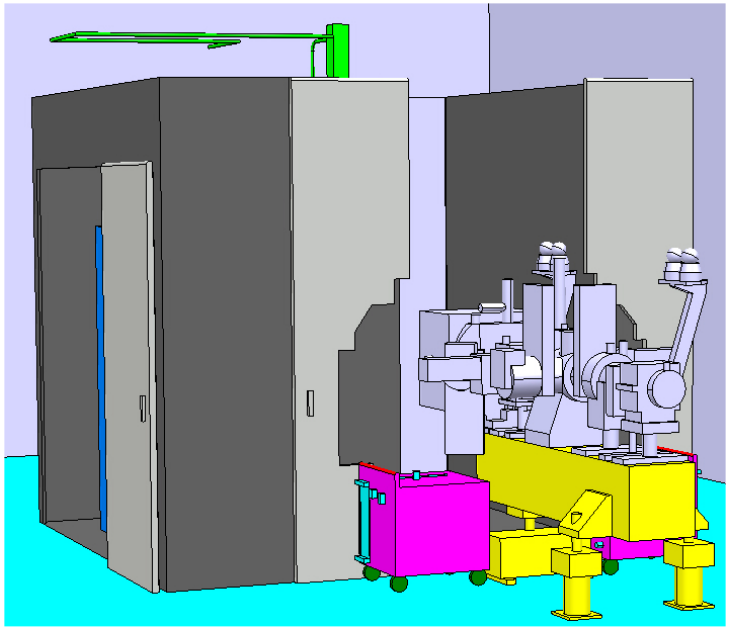


- Modify Faraday cage for longer extraction zone
- Move Racks and design cabling within a surface current equipotential
- H2 injection out of HT cage
- *Add manipulation light crane tbdc.*
- Move RF insulation-transfo to the side
- Increase cage length by 50 cm

1/20/2011 Ly

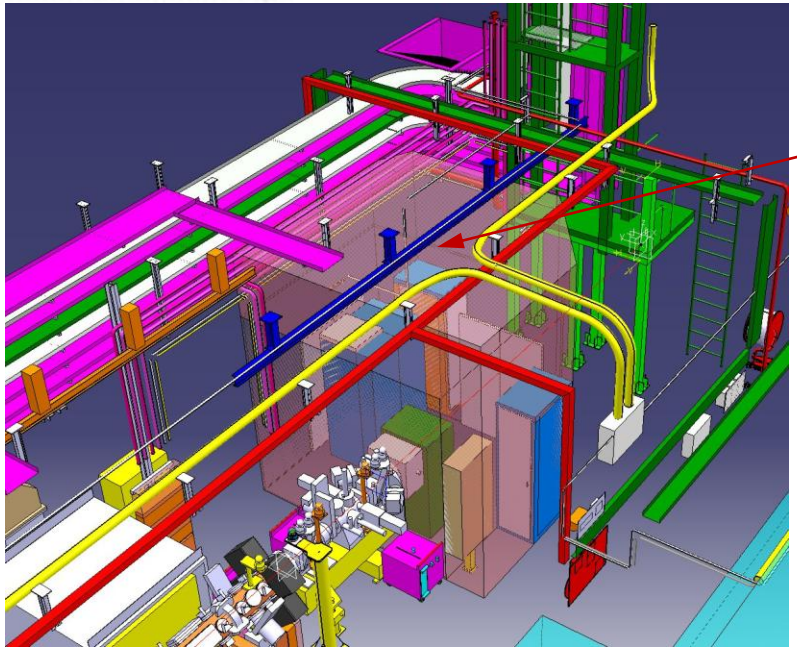
New LINAC4 Faraday cage 2/3





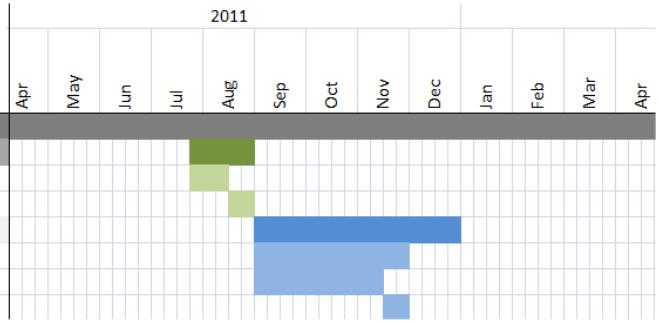
Lifting and manipulation systems 500 Kg

New LINAC4 Faraday cage 3/3

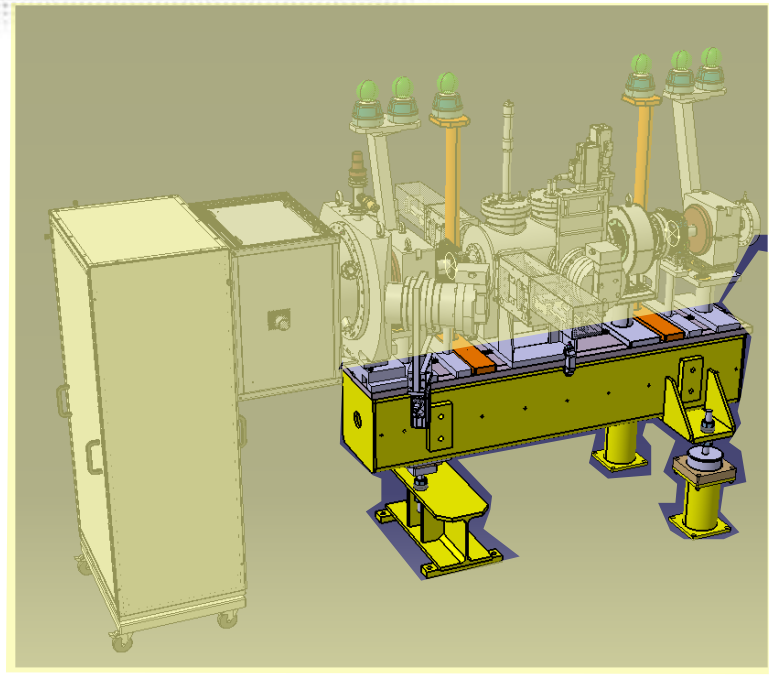


Lifting and manipulation systems 500 Kg

Linac4-tunnel							
New Faraday cage Tunnel			**113**		**25-Jul-11**	**2-Sep-11**	
Design			20	8320	25-Jul-11	19-Aug-11	YC
drawings, Procurement			10	4160	22-Aug-11	2-Sep-11	PM
Production			**83**		**5-Sep-11**	**28-Dec-11**	**GF**
	Faraday cage		20		5-Sep-11	30-Nov-11	
	Lifting and manipulation systems		30		5-Sep-11	14-Nov-11	
	Installation		20		1-Dec-11	28-Dec-11	



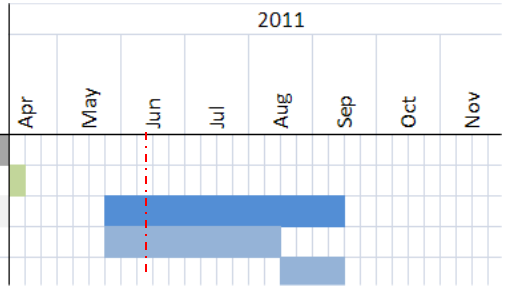
LEBT + Diagnostic Support for B357



New LEBT Support:

- **Design from LINAC4**
- **Delivery during the summer**
- **Installation in Sept. 2011**

For Diagnostic Components see R.Scriven & U.Raich Presentation.

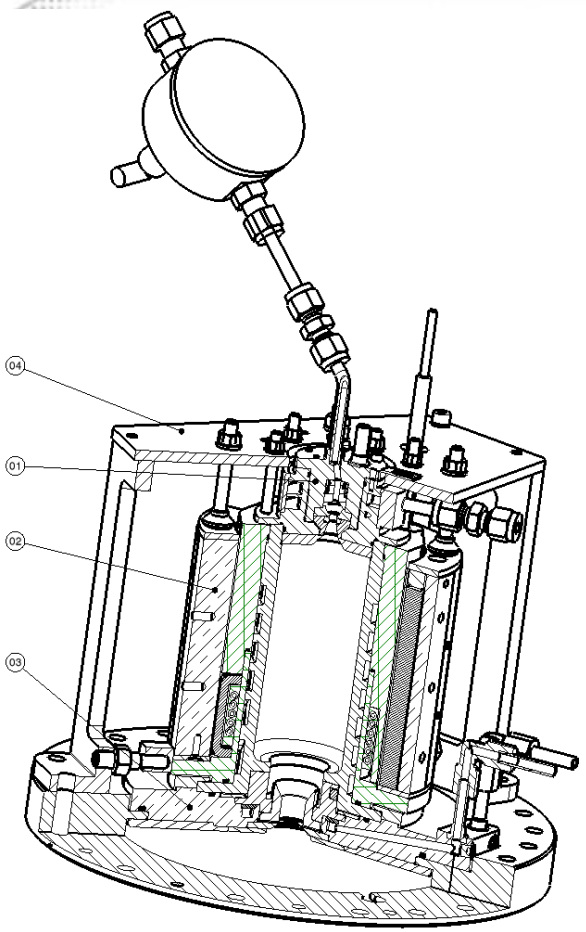


LEBT support							
Procurement			10	4160	1-Apr-11	14-Apr-11	PM
Production			**50**		**24-May-11**	**14-Sep-11**	
	LEBT Support		40		24-May-11	15-Aug-11	GF
	Installation		10		1-Sep-11	14-Sep-11	

LEBT + Diagnostic Support for B357

	Linac4			Source Test stand			
	Drawing Modifications required for Linac4	Qnty for Linac4	Delivered to contact	New drawings required for Source Test Stand (b357)	# Source Test stand	Delivered to contact	Main Workshop production - comments
Solenoid	Yes	2	5/1/2012	Yes	2	7/1/2012	Feet, alignment arms, vacuum chamber
Steeers				No	2	7/1/2012	Feet
Faraday Cup				No	1	6/1/2012	Yes
SEMGrid profile monitor				Yes (very small)	1	6/1/2012	Yes - Modifications to polarisation may impact on drawings
Diagnostic tank	Yes (modify old tank)	1	5/1/2012	Yes	1	6/1/2012	Yes
Pre-Chopper	Yes	1	5/1/2012	Yes	1	7/1/2012	Yes
Beam Current Transformer				No	1	6/1/2012	Yes
Ion Trapping electrodes	Yes	1	5/1/2012	Yes	1	7/1/2012	Yes
Emittance Meter				Yes (some)	1	4/1/2012	Yes - Modification of slit actuators
Girder				No	1		Yes - already launched

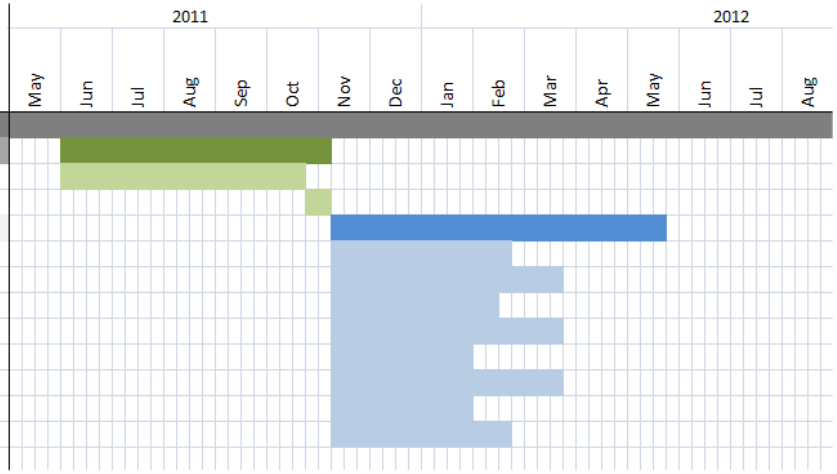
LINAC4 SPL Plasma generator + 2 Cesium oven 1/2



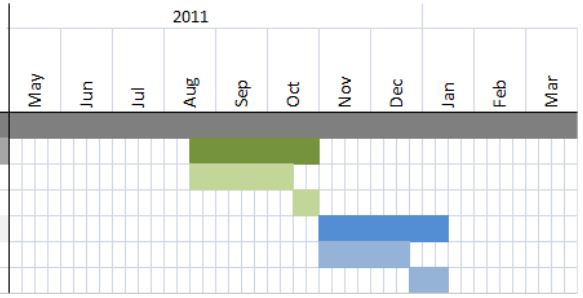
Modification of existing SPL Design
Plasma Generator
+ Cesium Injection

LINAC4 SPL Plasma generator + 2 Cesium oven 2/2

RF driven Plasma Generators							
Plasma Generator sLHC + Cesiation 2Hz		**260**		**30-May-11**	**11-Nov-11**		
design		100	41600	30-May-11	14-Oct-11	EC	
Procurement		20	8320	17-Oct-11	11-Nov-11	PM	
Production		**110**		**12-Nov-11**	**25-May-12**	**GF**	
	Cooled antenna	40		12-Nov-11	17-Feb-12		
	Magnet cusp and ferrites	60		12-Nov-11	16-Mar-12		
	Cs-chromate oven	30		12-Nov-11	3-Feb-12		
	plasma chamber	60		12-Nov-11	16-Mar-12		
	ignition system	20		12-Nov-11	20-Jan-12		
	Collar and plasma electrodes	60		12-Nov-11	16-Mar-12		
	Plasma diagnostics OES & light on	20		12-Nov-11	20-Jan-12		
	Matching circuit: C-L block + test re	40		12-Nov-11	17-Feb-12		



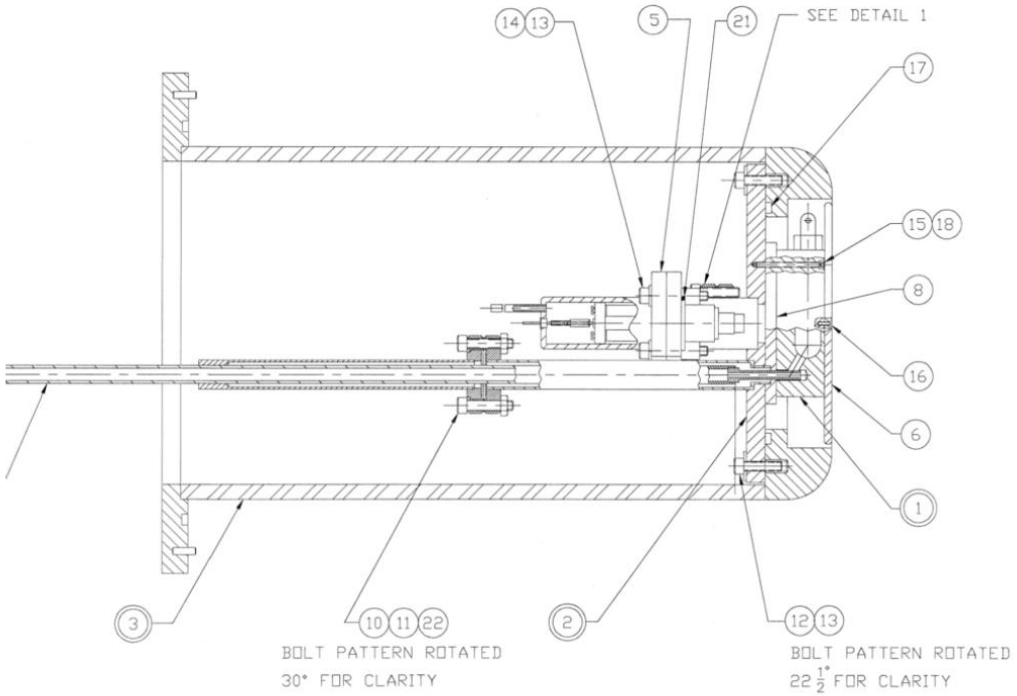
Cs-Oven test stand 357							
Test Cs-Oven vacuum Chamber		**50**		**22-Aug-11**	**28-Oct-11**		
integration, Design		40	16640	22-Aug-11	14-Oct-11	EC	
Procurement		10	4160	17-Oct-11	28-Oct-11	PM	
Production		**45**		**31-Oct-11**	**13-Jan-12**	**GF**	
	Test Cs-Oven vacuum Chamber	40		31-Oct-11	23-Dec-11		
	Installation	5		3-Jan-12	13-Jan-12		



Plasma Generator BNL 1/2

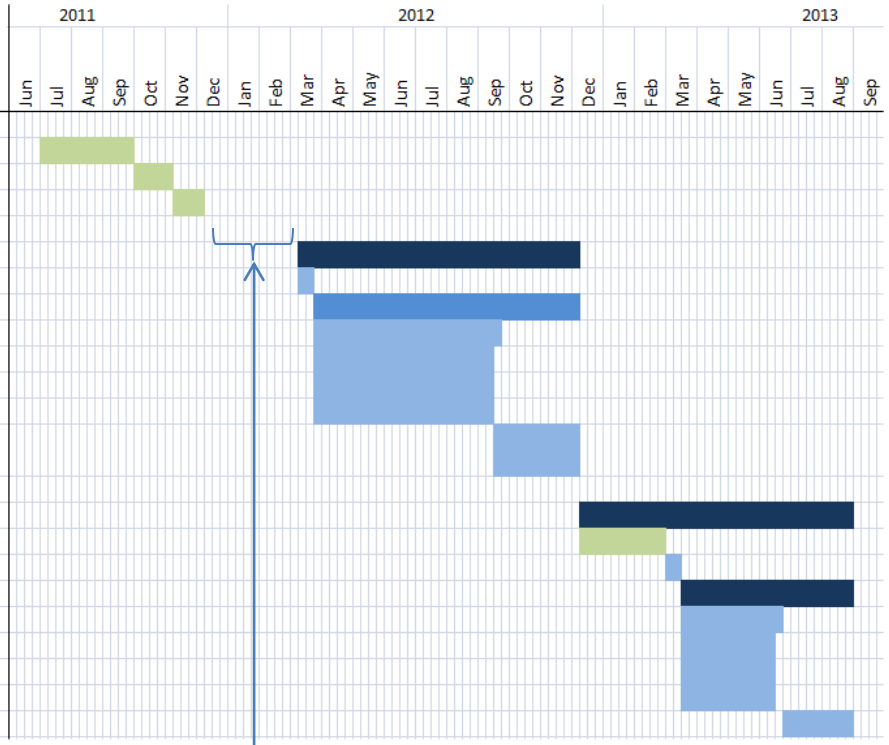
- **3D models from BNL Drawings**
- **Modification for LINAC4 fitting**
- **New drawing**
- **Production**
- **Test**

BNL Magnetron – Source Layout



Plasma Generator BNL 2/2

Magnetron source BNL			**576**		**4-Jul-11**	**31-May-13**
	3D model from BNL drawing		60	24960	4-Jul-11	23-Sep-11
	Metallurgy, Cs-Mo,H2 (samples form old ISI and BNL anod		30	12480	26-Sep-11	4-Nov-11
	Drafting		20	8320	7-Nov-11	2-Dec-11
Plasma Generator BNL 01			**130**		**3-Dec-12**	**7-Sep-12**
	Procurement		10	4160	3-Dec-12	14-Dec-12
	Production		**70**		**26-Mar-12**	**7-Sep-12**
		heating circuit	70		26-Mar-12	29-Jun-12
		Cs-Metal oven	60		26-Mar-12	15-Jun-12
		Anode -cathode plasma chamber	60		26-Mar-12	15-Jun-12
		Permanent magnets	60		26-Mar-12	15-Jun-12
		Plasma diagnostics (discharge parameters)	60		18-Jun-12	7-Sep-12
Plasma Generator BNL 02			**190**		**10-Sep-12**	**31-May-13**
	design		60	24960	10-Sep-12	30-Nov-12
	Procurement		10	4160	3-Dec-12	14-Dec-12
	Production		**70**		**17-Dec-12**	**31-May-13**
		heating circuit	70		17-Dec-12	22-Mar-13
		Cs-Metal oven	60		17-Dec-12	8-Mar-13
		Anode -cathode plasma chamber	60		17-Dec-12	8-Mar-13
		Permanent magnets	60		17-Dec-12	8-Mar-13
		Plasma diagnostics (discharge para	60		11-Mar-13	31-May-13



New Plasma Generator (2011 – 2014)

First Estimation for Design and Manufacturing

Design of new plasma generator + Modification of extraction

	Design	Production	
Plasma Generator proto 01	Jan- May 2012	Nov 2012	*30 mA*
Plasma Generator proto 02	Nov 2012	May 2013	*30 mA*
Plasma Generator proto 03	May 2013	Nov 2013	*50 mA*
Plasma Generator proto 04	Nov 2013	May 2014	*50 mA*

Summary

First Estimation: Tight but feasible depending on technical choices

	Design		Manufacturing
New LINAC4 Front End Chamber	Apr-11	Dec-11	Jun-12
New LINAC4 Faraday Cage	Jul-11	Sep-11	Dec-11
LEBT + Diagnostic Support for B357		Apr-11	Sep-11
Diagnostic Components		*Under Investigation*	
LINAC4 SPL Plasma generator + 2 Cesium oven	Jun-11	Nov-11	May-12
Plasma Generator BNL	Jun-11	Dec-11	Sep-12
Plasma Generator BNL (Spare)	Sep-12	Nov-12	Jun-13
Developments (2011 – 2014):			
Plasma Generator proto 01	Dec-11	May-12	Nov-12
Plasma Generator proto 02	May-12	Nov-12	May-13
Plasma Generator proto 03	Nov-12	May-13	Nov-13
Plasma Generator proto 04	May-13	Nov-13	May-14

0.8 FTE/Year (CERN Staff)
+
650 kChF Design Office Support

1.5 FTE/Year (CERN Staff)
+
650 kChF Manufacturing

500 kChF Design Office Support + Manufacturing
Awaiting confirmation