

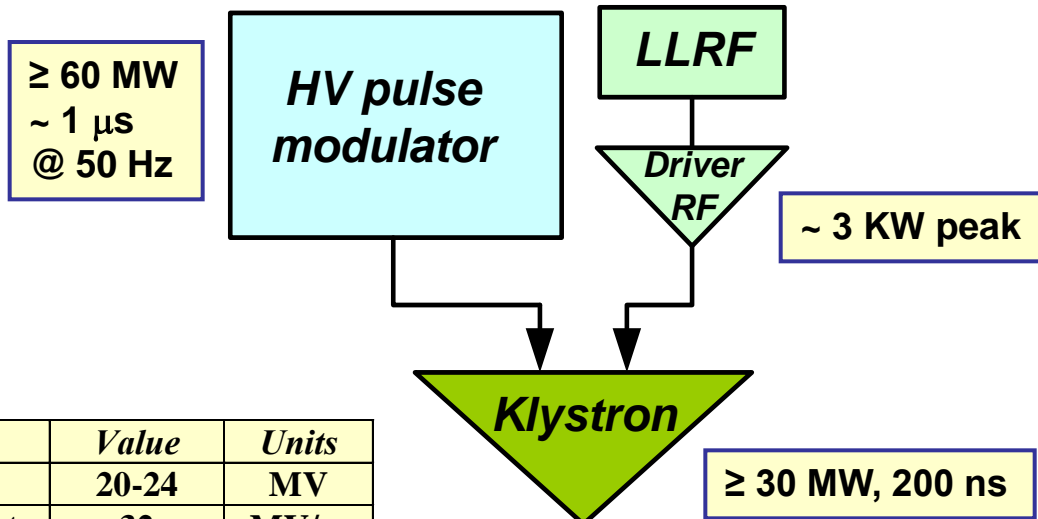
CLIC Collaboration Meeting

CERN, November 3-4, 2011

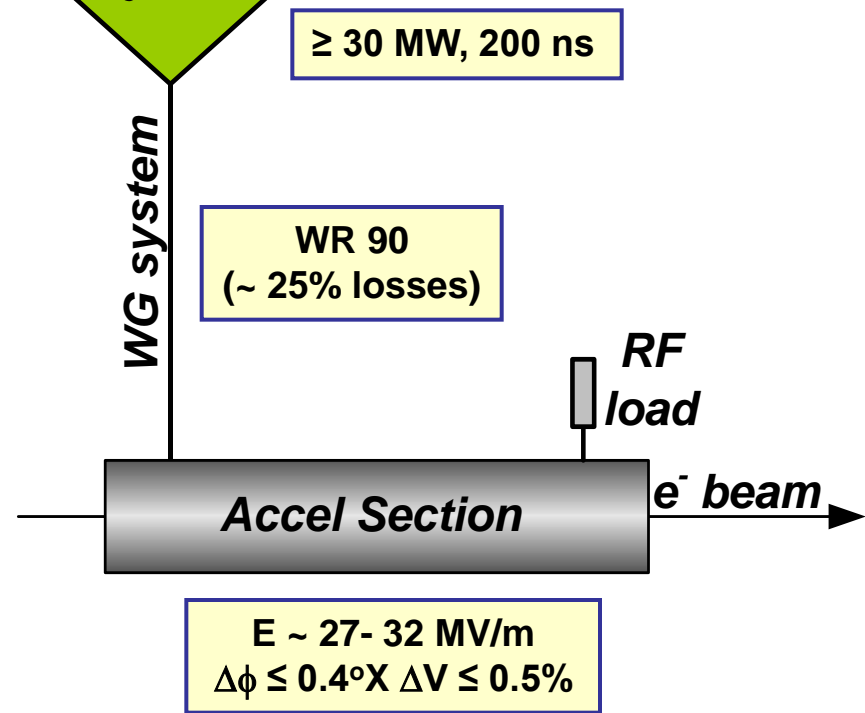
X-band activities at Sincrotrone Trieste

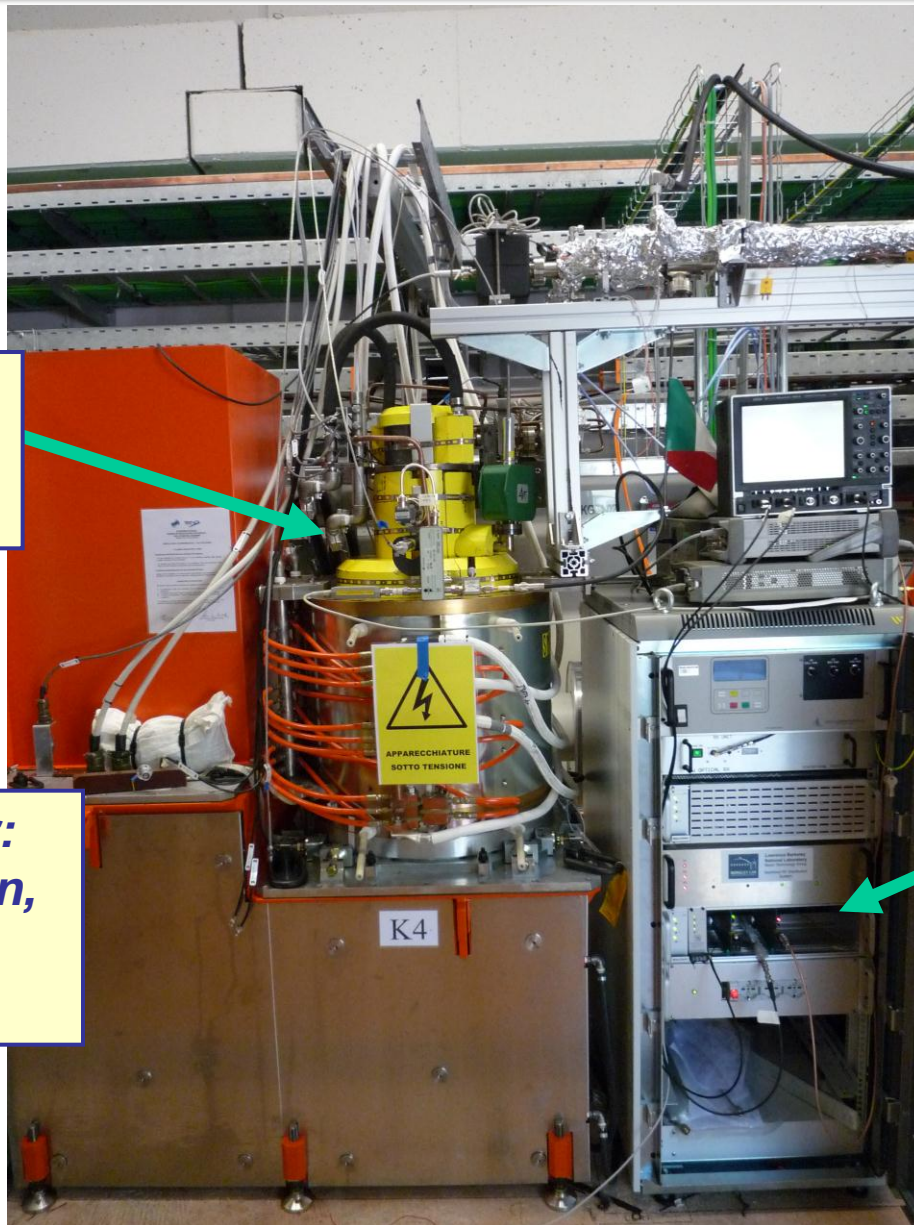
Presented by

Gerardo D'Auria



Parameter	Value	Units
Nominal voltage @1.5 GeV	20-24	MV
Maximum operating gradient	32	MV/m
RF power at the structure	13-19	MW _{pk}
RF pulse length	200	ns
Electron pulse length (FW)	5-15	ps
Max pulse repetition rate	50	Hz
Average RF power	300	W
RF phase	-180	deg
Acc. field phase stability (rms)	0.4	X-deg
Acc. field ampl. stability (rms)	0.5	%

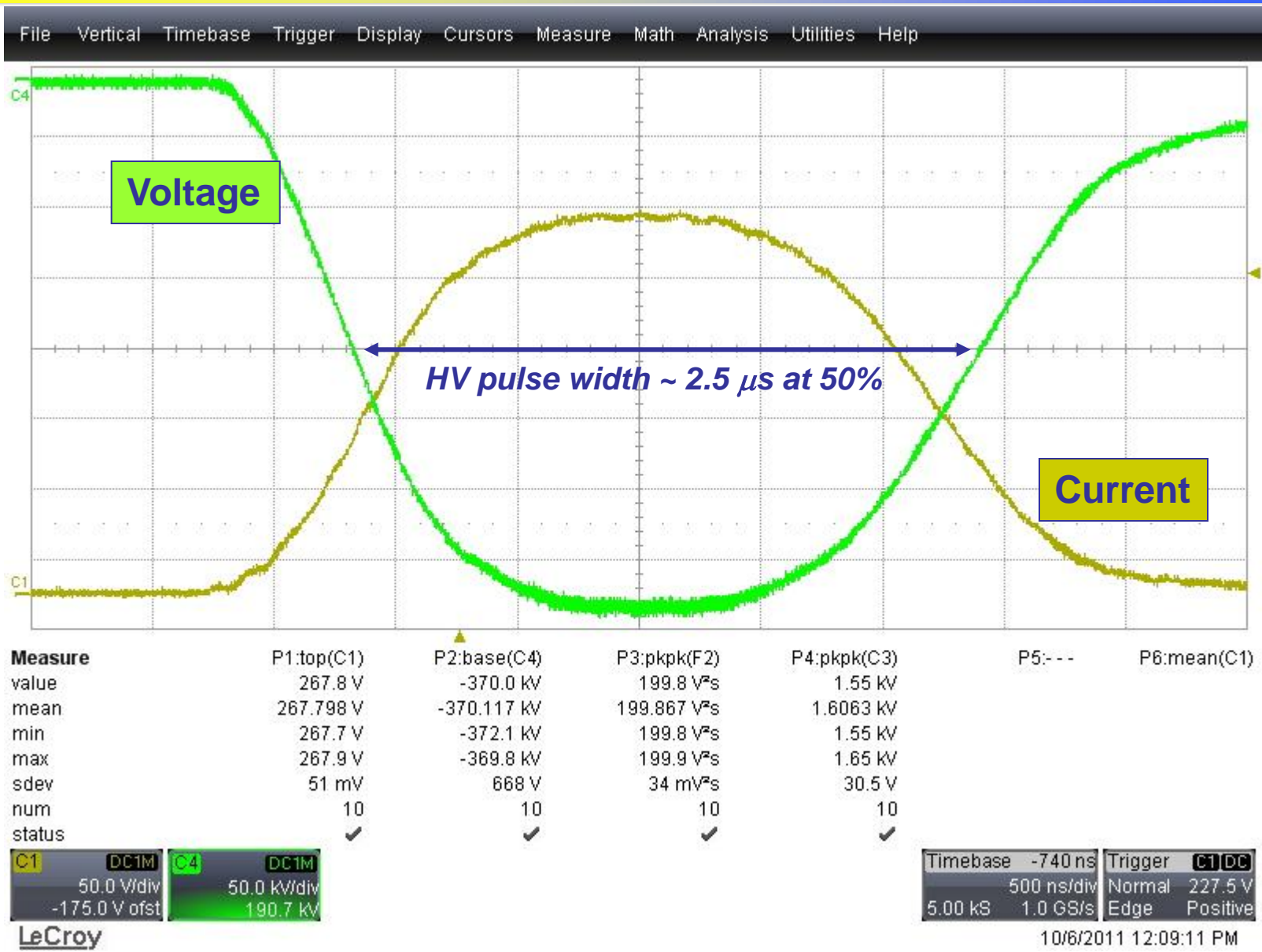




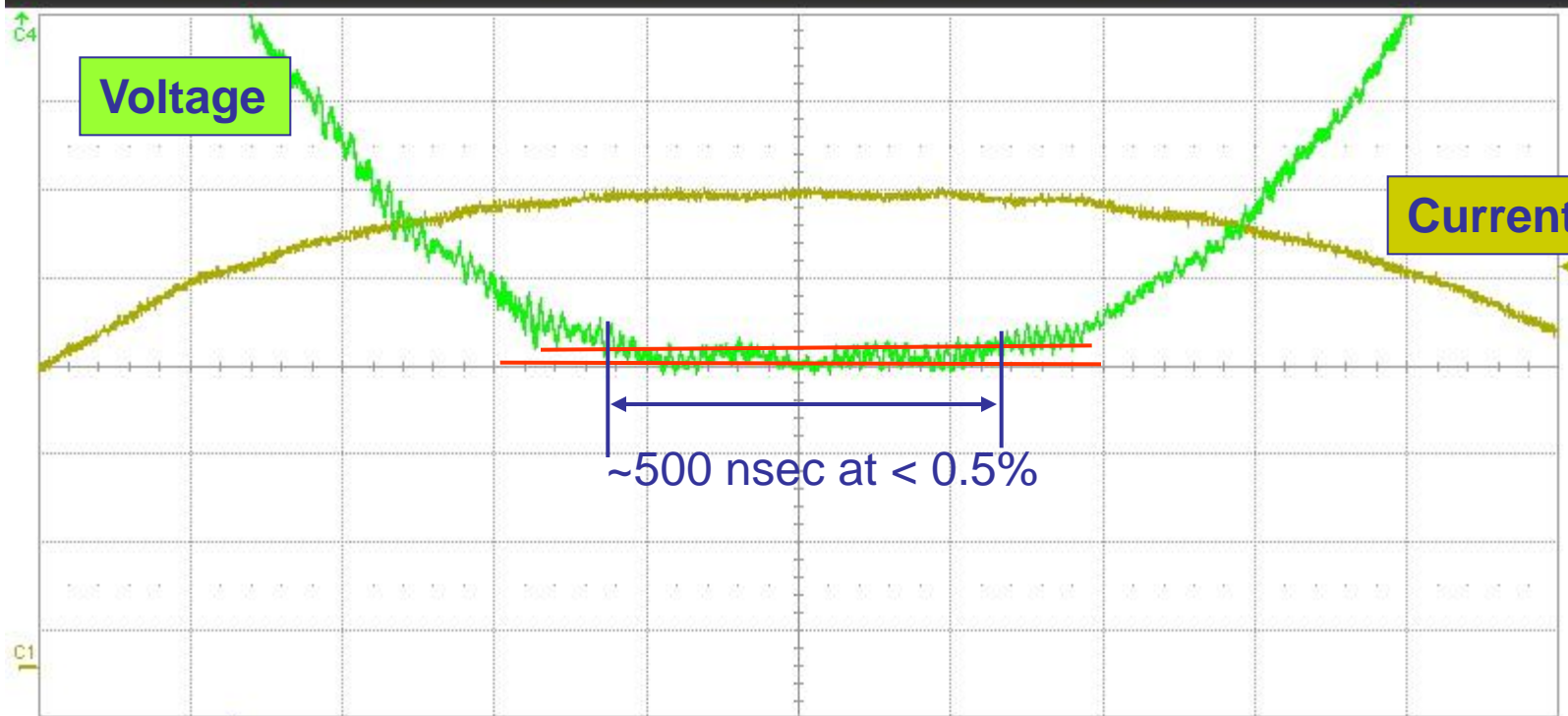
XL5 Klystron developed by SLAC

HV modulator: PFN + thyatron, developed in house

LLRF system: based on the present S-band system (developed in house) + X-band front-end, 3-12 GHz up/down conversion chassis, supplied by industry.



File Vertical Timebase Trigger Display Cursors Measure Math Analysis Utilities Help



Measure	P1:top(C1)	P2:base(C4)	P3:pkpk(F2)	P4:pkpk(C3)	P5:---	P6:mean(C1)
value	272 V	-375.02 kV	174.9 V ² s	960 V		
mean	273.17 V	-375.6687 kV	174.883 V ² s	958.1 V		
min	272 V	-377.26 kV	174.6 V ² s	896 V		
max	277 V	-372.34 kV	175.0 V ² s	1.07 kV		
sdev	1.08 V	693.8 V	87 mV ² s	49.2 V		
num	42	42	42	42		
status	⌘	⌘↑	✓	✓		

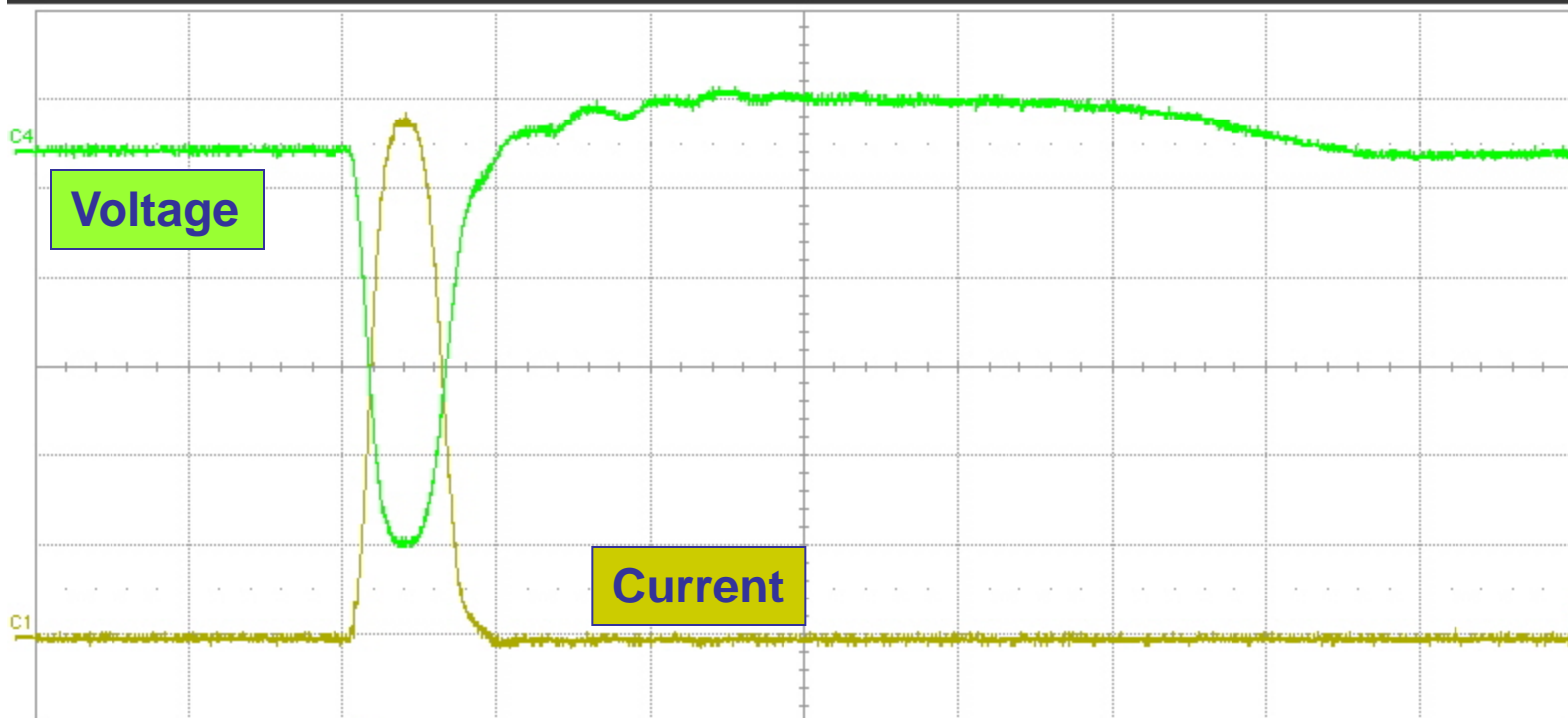
C1	DC1M	C4	DC1M
	50.0 V/div		10.0 kV/div
	-171.0 V ofst		374.06 kV

Timebase	-744 ns	Trigger	C1 DC
	200 ns/div	Stop	227.5 V
5.00 kS	2.5 GS/s	Edge	Positive

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File Vertical Timebase Trigger Display Cursors Measure Math Analysis Utilities Help



Measure	P1:top(C1)	P2:base(C4)	P3:max(C1)	P4:max(C2)	P5:max(C4)	P6:mean(C1)
value	289.6 V	-391.7 kV	295 V	66.6 V	65 kV	
mean	289.676 V	-392.348 kV	292.59 V	66.440 V	65.60 kV	
min	289.2 V	-392.9 kV	292 V	66.0 V	65 kV	
max	289.9 V	-391.7 kV	295 V	66.6 V	68 kV	
sdev	214 mV	518 V	1.06 V	277 mV	952 V	
num	8	8	8	8	8	
status	✓	✓	✓	✓	✓	

C1 DC1M 50.0 V/div -153.0 V ofst
C4 DC1M 90 kV/div 217.0 kV

Timebase -14.6 μ s 5.00 μ s/div 5.00 kS 100 MS/s
 Trigger C1 DC Normal 16.5 V Edge Positive

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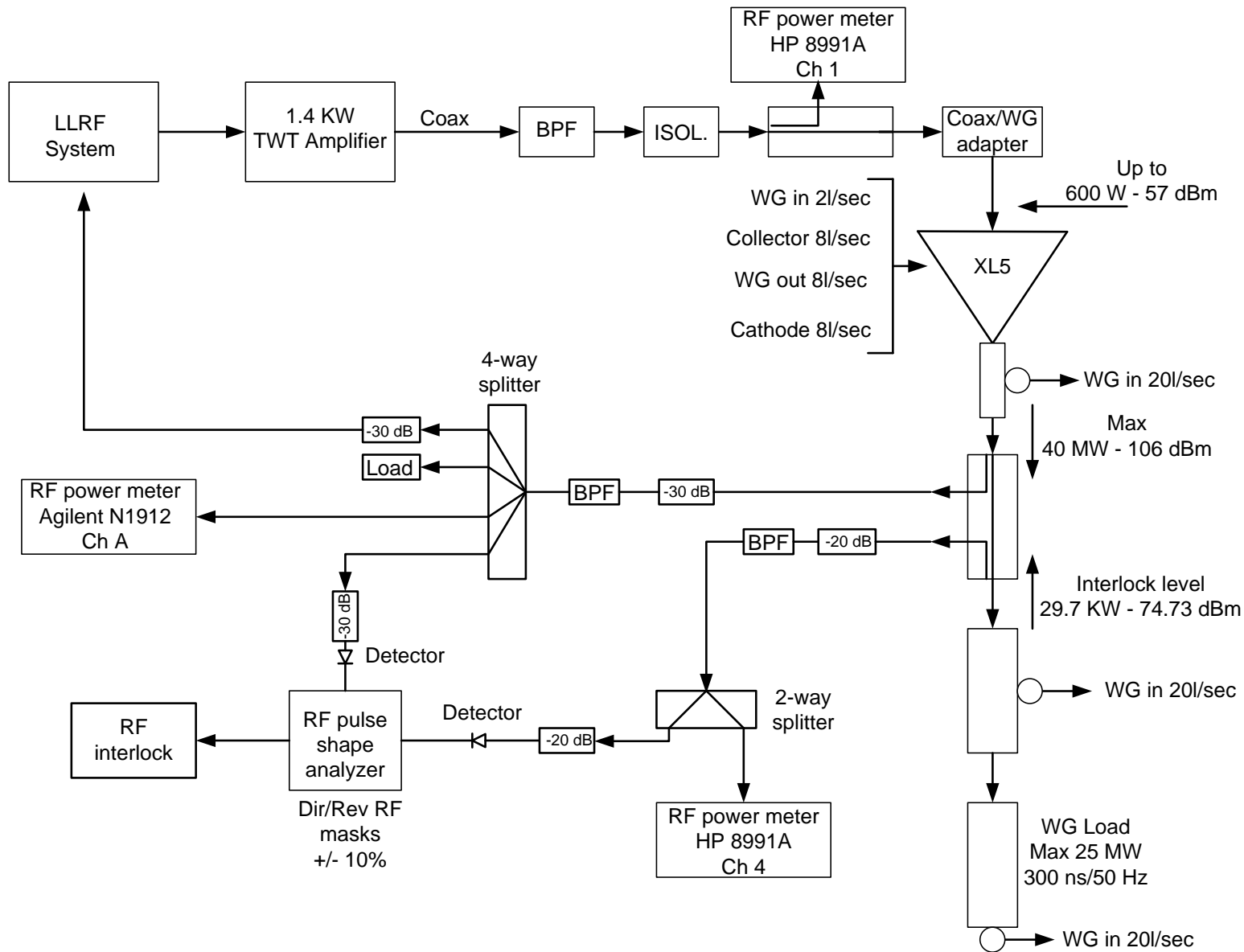
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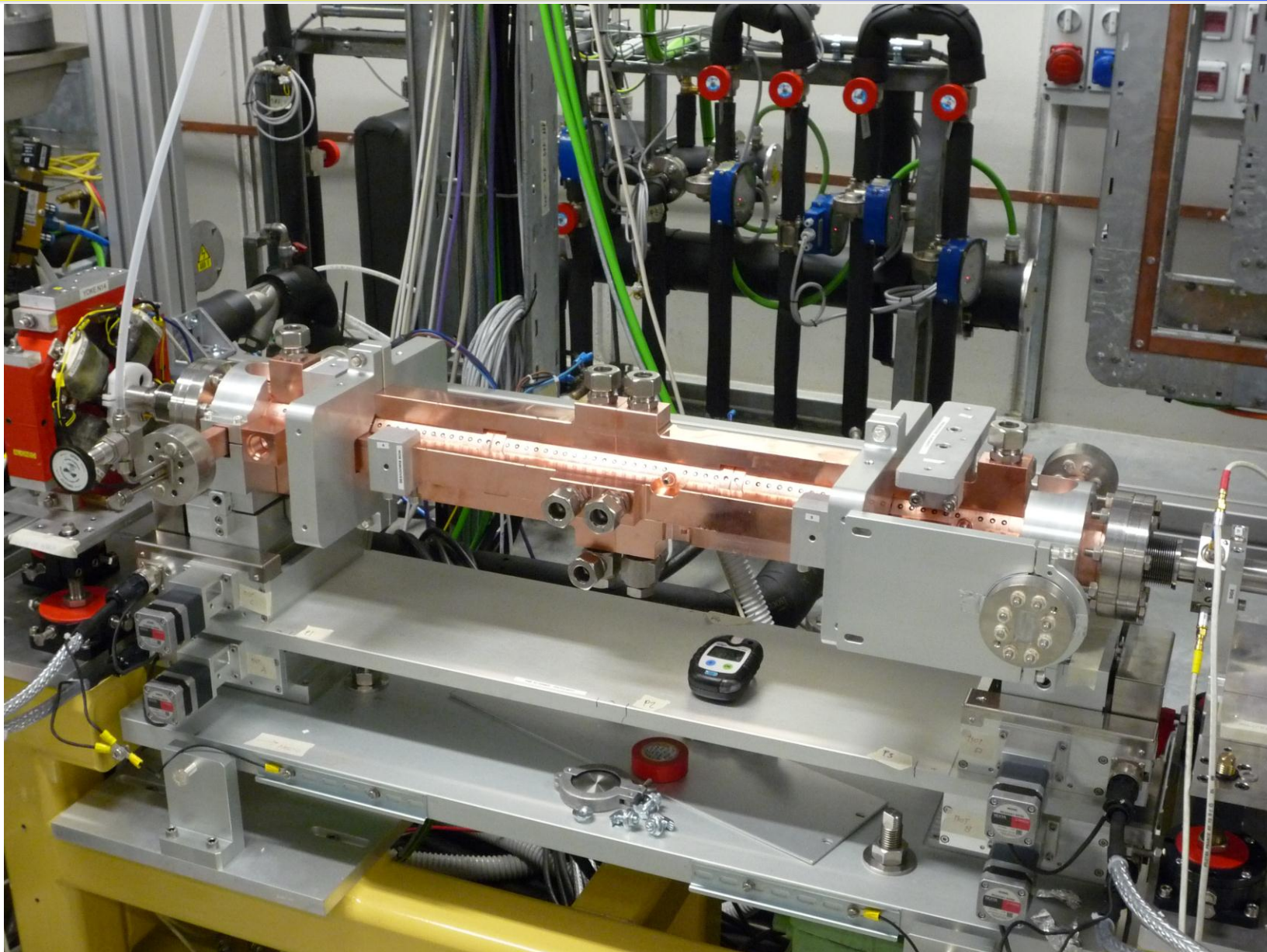
Trieste XL5_1B test report 06-10-2011

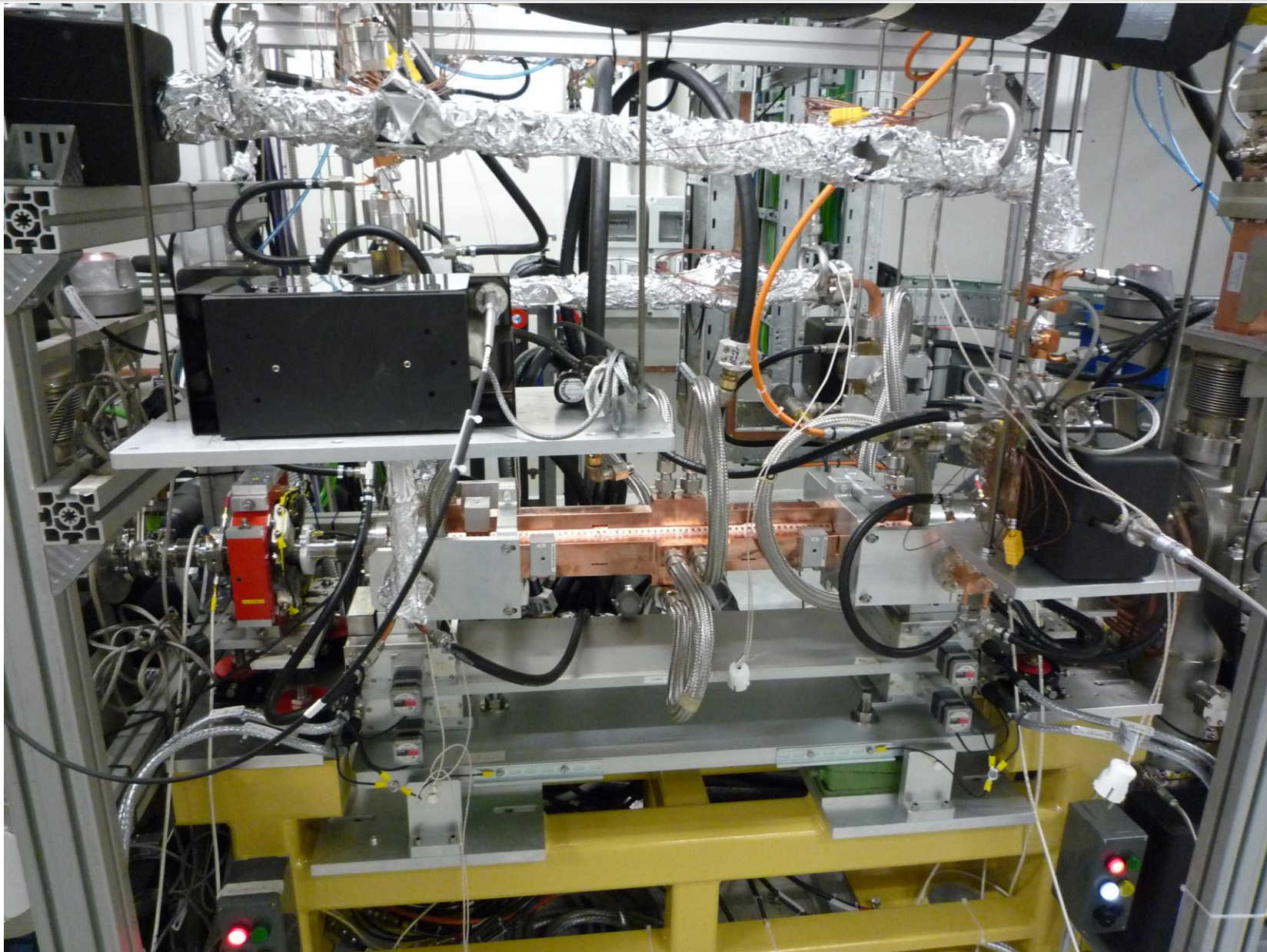
					Calorimetric measurements			
Charging voltage	Anodic Voltage	Anodic current	Micro Perveance	Cathode ion pump voltage ripple	Body power	Collector power*	Beam losses	Transm. efficiency
$V_{Fug} (V)$	$V_k (V)$	$I_k (A)$	μP	$V_{CIP} (KV)$	$B_P (W)$	$C_P (W)$	$B_L (\%)$	$\eta_{eb} (\%)$
3.22E+04	3.36E+05	2.32E+02	1.19E-06	1.4E+03	16	1,585	1.009	98.991
3.34E+04	3.46E+05	2.41E+02	1.18E-06		17	1,727	0.984	99.016
3.46E+04	3.54E+05	2.50E+02	1.19E-06	1.5E+03	20	1,835	1.090	98.910
3.58E+04	3.66E+05	2.63E+02	1.19E-06		20	1,970	1.015	98.985
3.64E+04	3.70E+05	2.68E+02	1.19E-06		21	2,025	1.037	98.963
3.76E+04	3.82E+05	2.78E+02	1.18E-06	1.6E+03	22	2,160	1.019	98.981

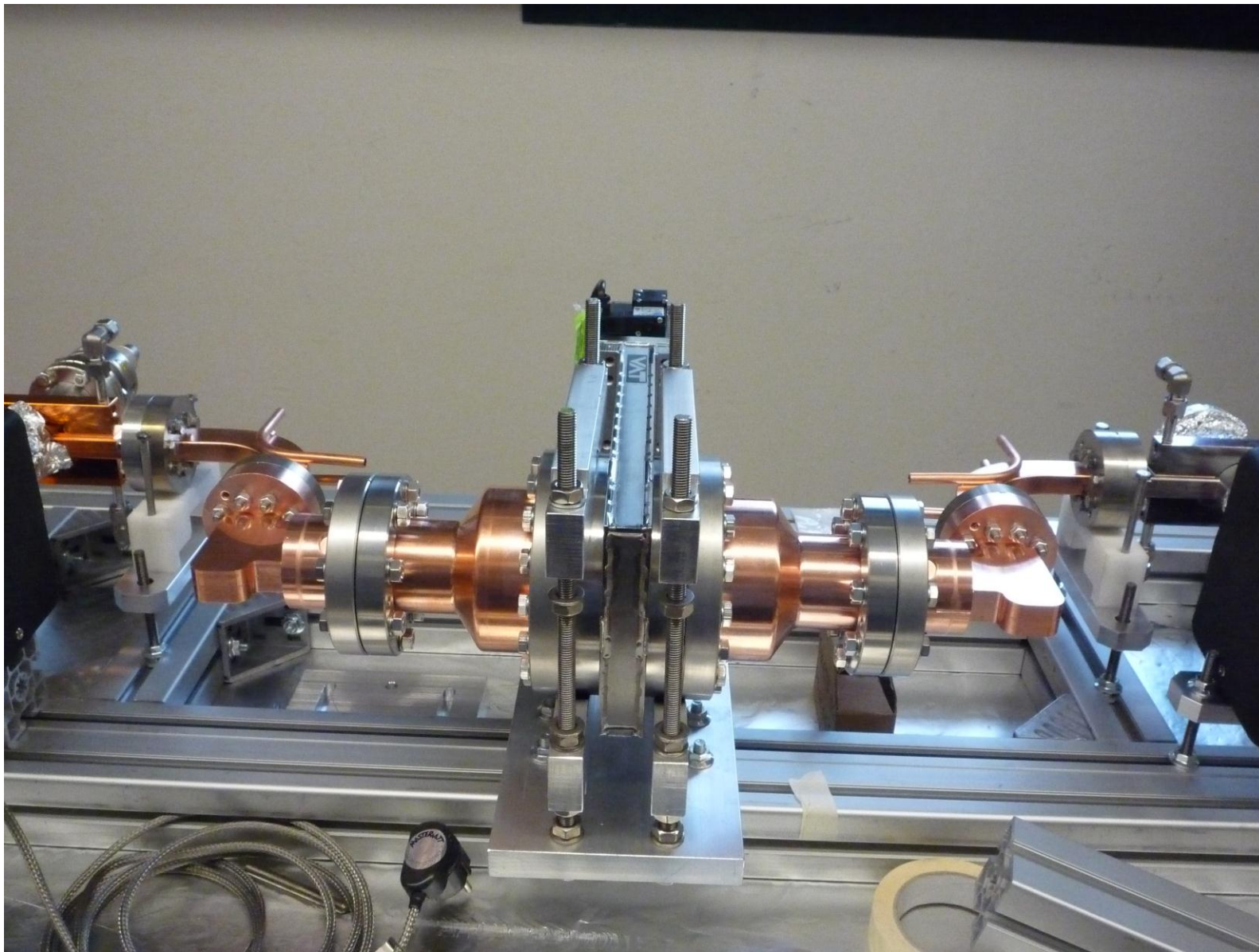
* The collector power has been calculated in two different modes with almost the same results:

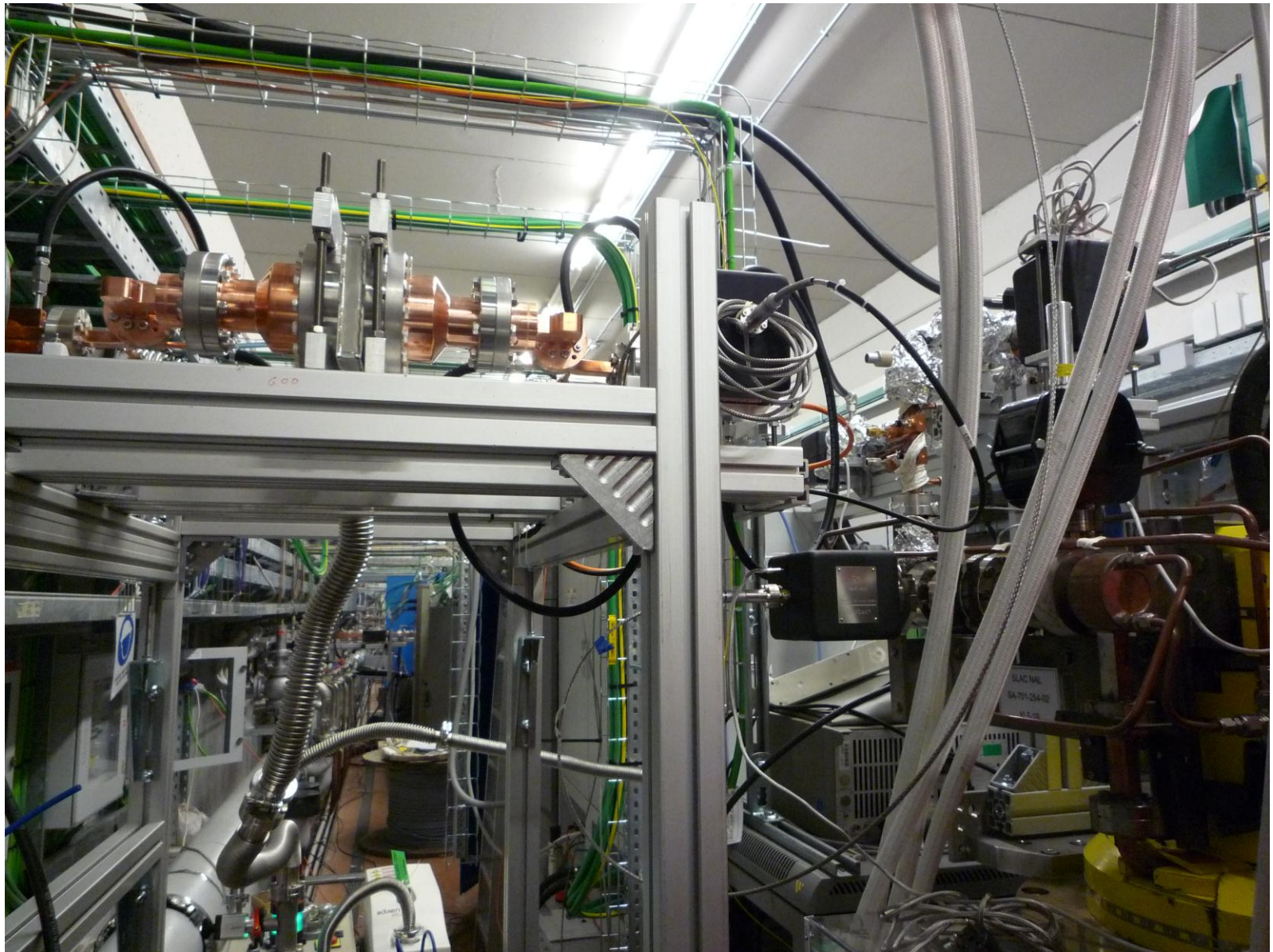
- a) calorimetric measurements;
- b) considering the V and I pulse integrals.











RF station:

- XL5 klystron fully tested in diode mode up to 390 KV (@ 10 Hz) and 350 KV (@ 50Hz).
- RF activation of the tube just started.
- RF power measurements made with:
 - a. direct power measurements (bi-directional coupler/power meter);
 - b. calorimetric measurements.

Accelerating structure and WG circuit:

- The accelerating structure and the waveguide system are installed.
- Their RF conditioning is expected for the second half of November.

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