



# PETS and Accelerating Structure Developments

I. Syrathev for the 2BTS team



## Two beam test stand objectives

- RF power generation from the drive beam
- Demonstration of the two beam acceleration
- Sophisticated beam diagnostics

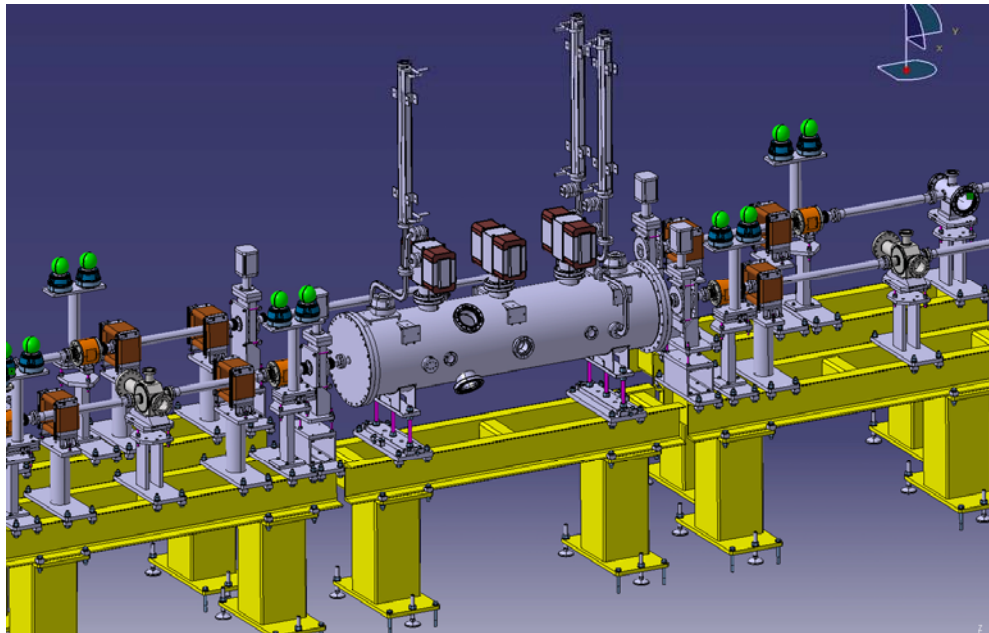
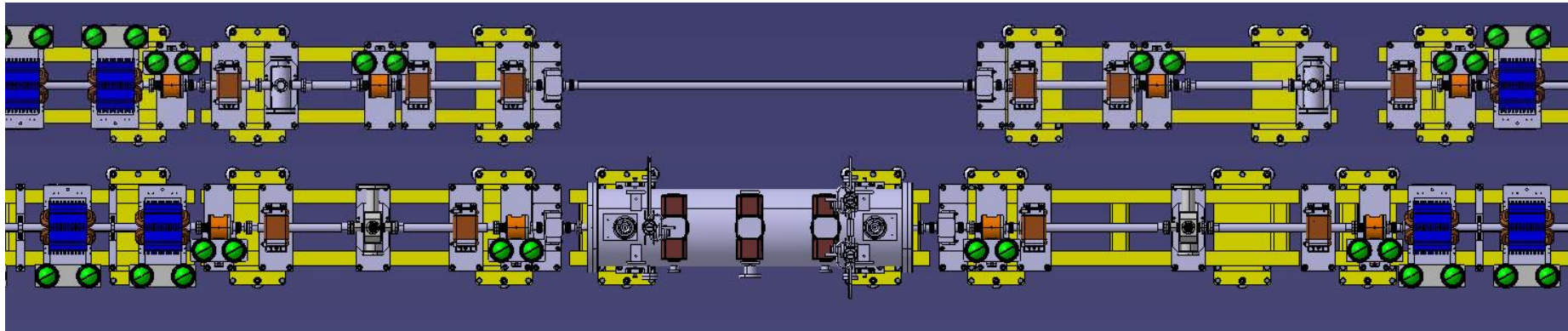
2008...
2009
2008...



PETS target is to generate reliably 136 MW x 250 ns RF pulses

		Test areas in 2008		
		X-band klystron test stand at SLAC	Two beam test stand CLEX, CERN	Test beam line CLEX, CERN
		Access to the high power and full pulse length: 250 ns x 300 MW. High rep. rate. RF source driven.	Access to the high power (~200 MW) Pulse length limited to <u>140 ns</u> . Low rep. rate. Beam driven.	
Objectives	The ultimate PETS high RF power performance			
	RF power generation from the drive beam			
	Demonstration of the ON/OFF capability			
	Study/benchmarking of the beam dynamic in decelerator			
	Testing of the special RF components			
PETS design specifics		Scaled (12->11.424) CLIC PETS. Active length 0.23m Two couplers.	CLIC PETS. Active length 1.0m. Two couplers	CLIC PETS. Active length 0.8m. One coupler
Origin and availability		CERN, spring 2008.	CERN, summer 2008.	CIEMAT, Spain, autumn 2008.
				See details in S. Doebert dedicated talk

Integration layout for the phase I - PETS power production tests.

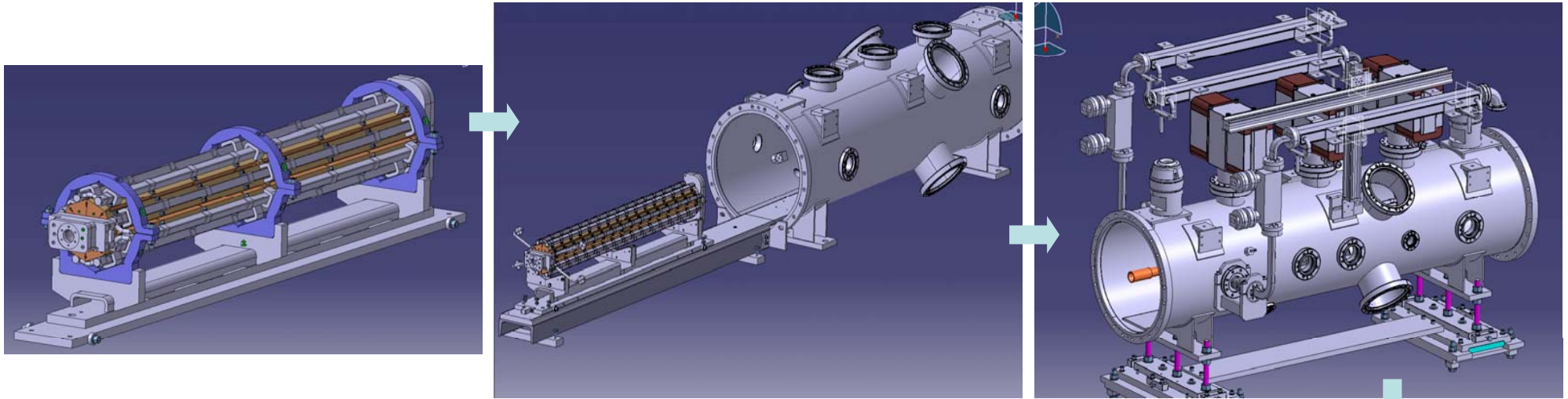


CLEX 2BTS:

Drive beam: 12GHz, 140ns, 30 A (max)  
 CLIC PETS, active length 1.0 m,  
 135 MW will be produced with 20.8 A  
 beam.  
 Access to 270 MW (30 A)

Number of tests:

- #1. PETS/ no damping material
- #2. PETS/ with damping material
- #3. PETS with recirculation (access to the full pulse length)
- #4. On/Off demonstration (slow)



Last update: 14.01.2008

Year	2007												2008											
Month	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D		
<b>CLEX 2bts (12 GHz)</b>																								
Tank PETS																								
Tank AS																								
RF Components (phase 1)																								
RF Components (phase 2)																								
on-off mechanism prototype																								
Couplers (x6)																								
PETS sample																								
PETS prototype bar																								
PETS assembly test																								
PETS (no damping material)																								
PETS (with damping material)																								
PETS (on/off mechanism)																								

milestone for tech. spec.  
milestone for RF input



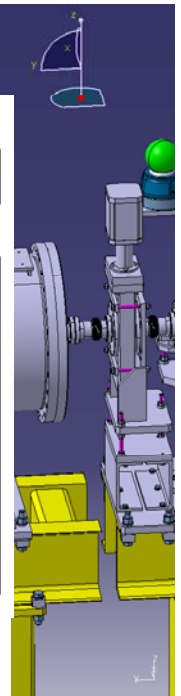
mechanical design  
fabrication



available for test  
test request

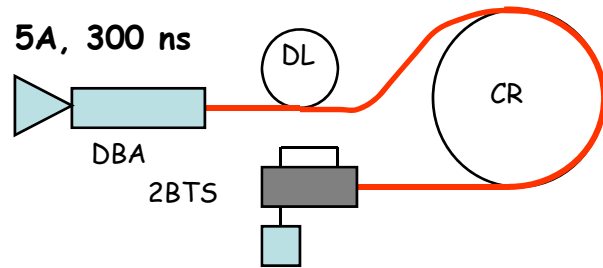


today

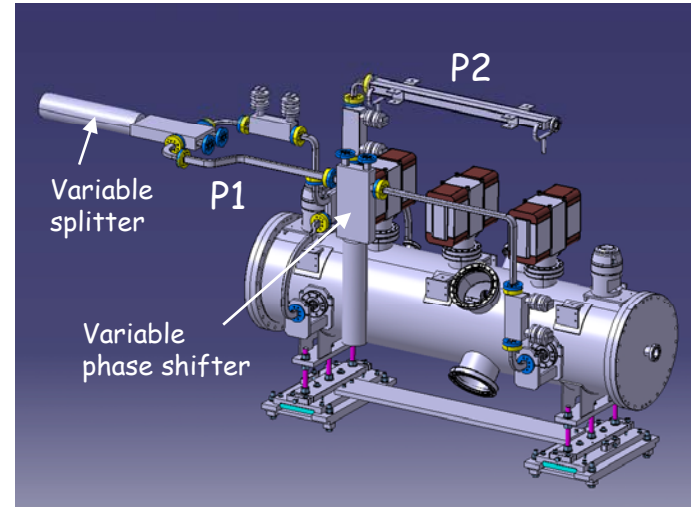
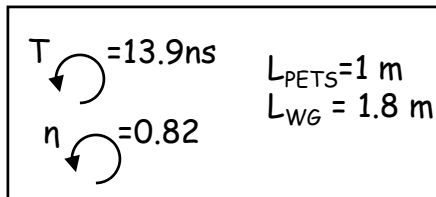
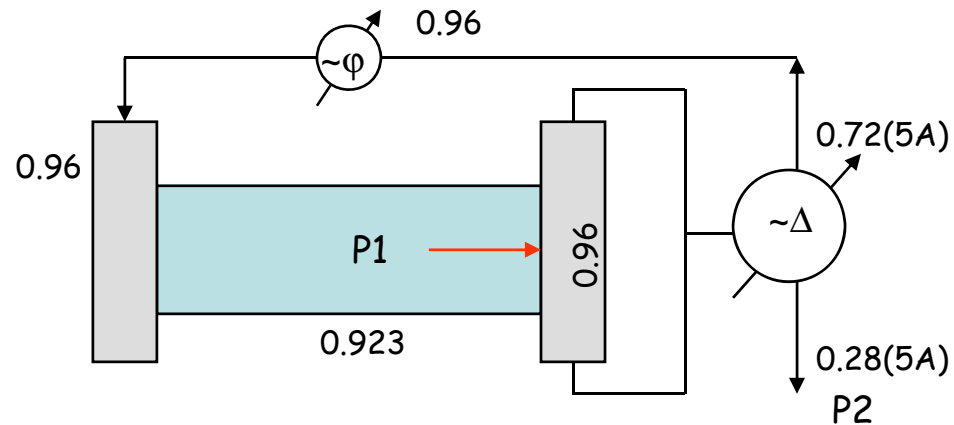




In the CTF3 the PETS high power mode (high current) is limited in the pulse length by 140 ns. The re-circulation is a method to increase significantly power production and thus the drive beam current can be used directly from DBA ( $\geq 5A$ , 3GHz). In this case current pulse can be increased up to 300-400 ns.



PETS with recirculation schematic:



Optimized (coupling) RF pulse shapes

