



Coupler Test Stand



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EIFast-XFEL Workshop 9/10 May 2006

Denis Kostin, MHF/sl DESY

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RF input

Coupler Test Infrastructure at LAL



Coupler Test Infrastructure at LAL



Assembly and treatment

- Coupler cold parts are assembled in the class 10 clean room, then couplers are assembled in a mobile clean room class 100.
- ★ All coupler vacuum parts are stored under dry nitrogen gas (in N₂ cabinets, N₂ filled caps used on the cold ceramic windows).
- ★ Time when coupler vacuum system parts being exposed to the air is minimized.
- ★ Warm and cold ceramic windows are protected during the assembly and transport (protecting caps are used).
- ★ Before RF test on the test stand couplers are baked for about 3 days at the temperature of 150°C.

Better handling issue

- ★ All coupler parts are stored under dry nitrogen (N₂ cabinets).
- Warm side of the cold ceramic window is now always under dry nitrogen (sealing cap).
- Time when coupler vacuum system parts being exposed to the air is minimized.





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Test Procedure

Coupler Test Stand (TW) and Horizontal Test Stand (SW, OFF resonance):

Pulse Length [µs]	20	50	100	200	400	800	1300
Peak Pulsed Power [kW]		500					

After: power sweep @ 1.3 ms pulse, 50..500 kW

Horizontal Test Stand (SW, ON resonance):

Pulse type	Rectangular					"Flat Top" * 500 μs +…			
Pulse Length [µs]	20	50	100	200	400	100	200	400	800
Peak Pulsed Power [kW]	1000				330	250			

After: power sweep @ 1.3 ms = 500 ms + 800 ms flat top pulse, 50..250kW









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Conditioning: Horizontal Cryostat



Conditioning: LAL, Orsay



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Conclusions

- 26 TTF III couplers successfully tested at the coupler test stand at DESY showed very good performance for maximum pulsed power up to 1 MW and 1.3 ms pulse length at 2 Hz repetition rate.
- 24 TTF III couplers successfully tested at the coupler test stand at LAL, Orsay.
- 10 TTF III couplers successfully tested at the Superstructure module (2) and Module 5 (8) in the VUV FEL Linac. All TTF III couplers in the VUV FEL Linac could be operated up to the cavity performance limits.
- 21 TTF III couplers successfully tested at the horizontal cavity test stand (28 tests). TTF III couplers are tested together with cavities at gradients of 35 MV/m (600 kW) 5 Hz without degradation of cavity or coupler.
- Better handling of the coupler parts shortens the conditioning time.