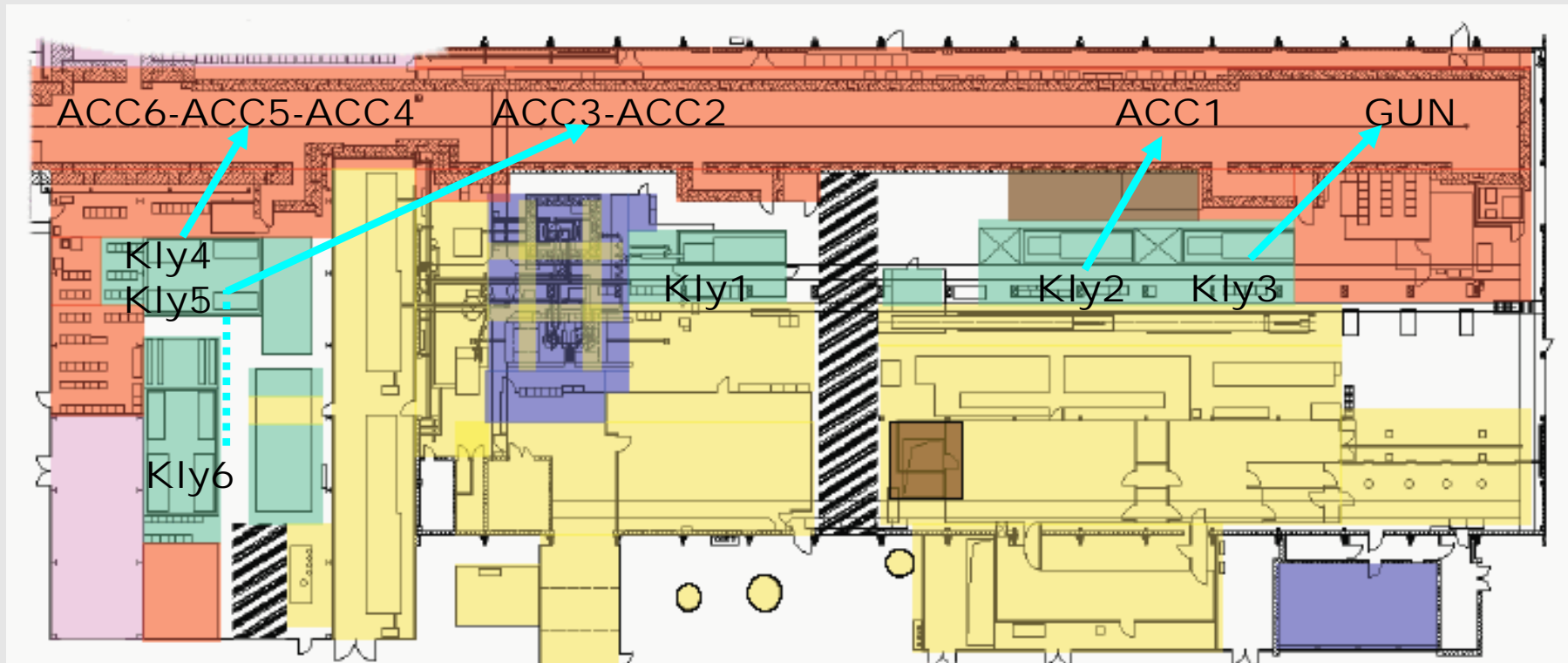
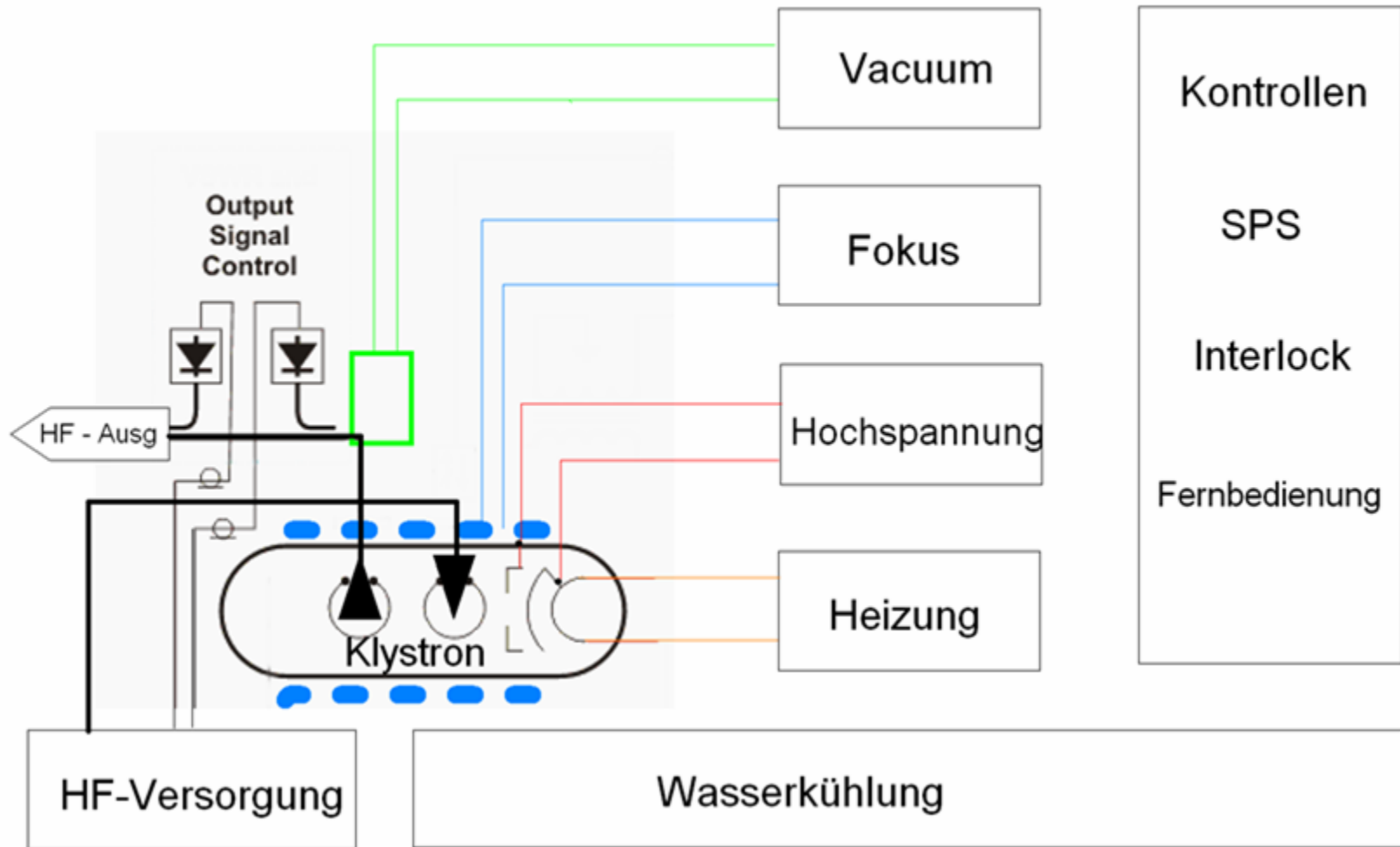


HF-Stationen

Halle 3

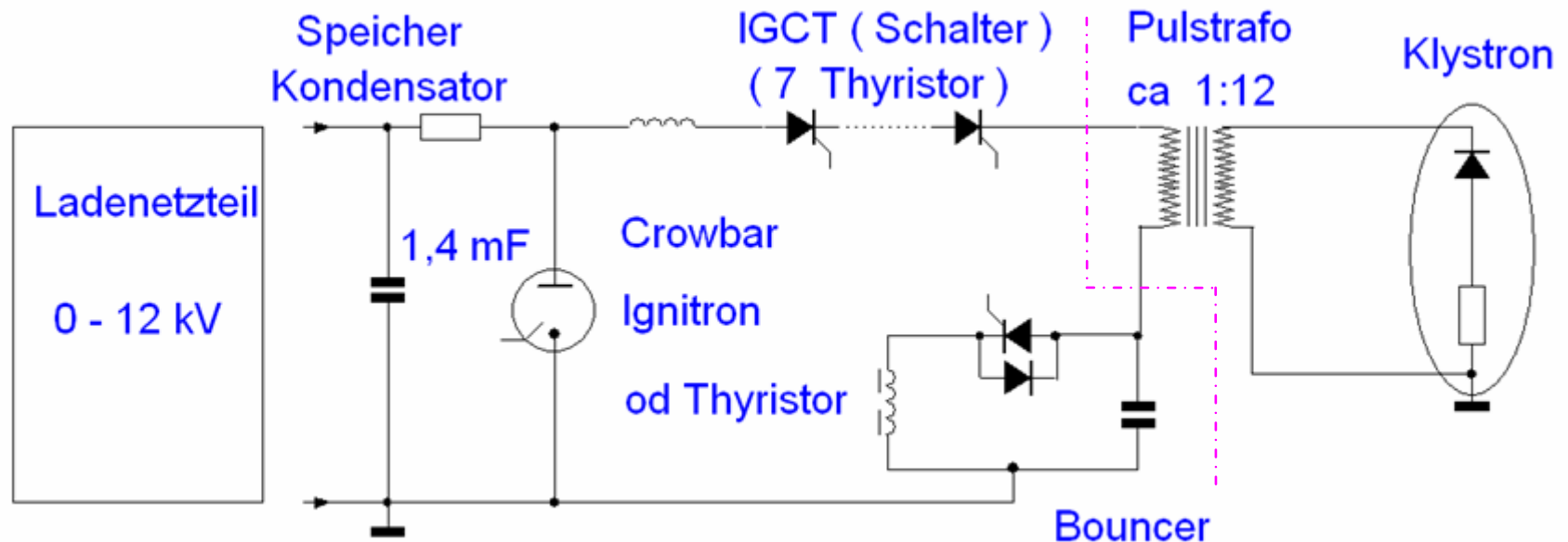


Prinzip der 1,3 GHz Klystron Verstärker



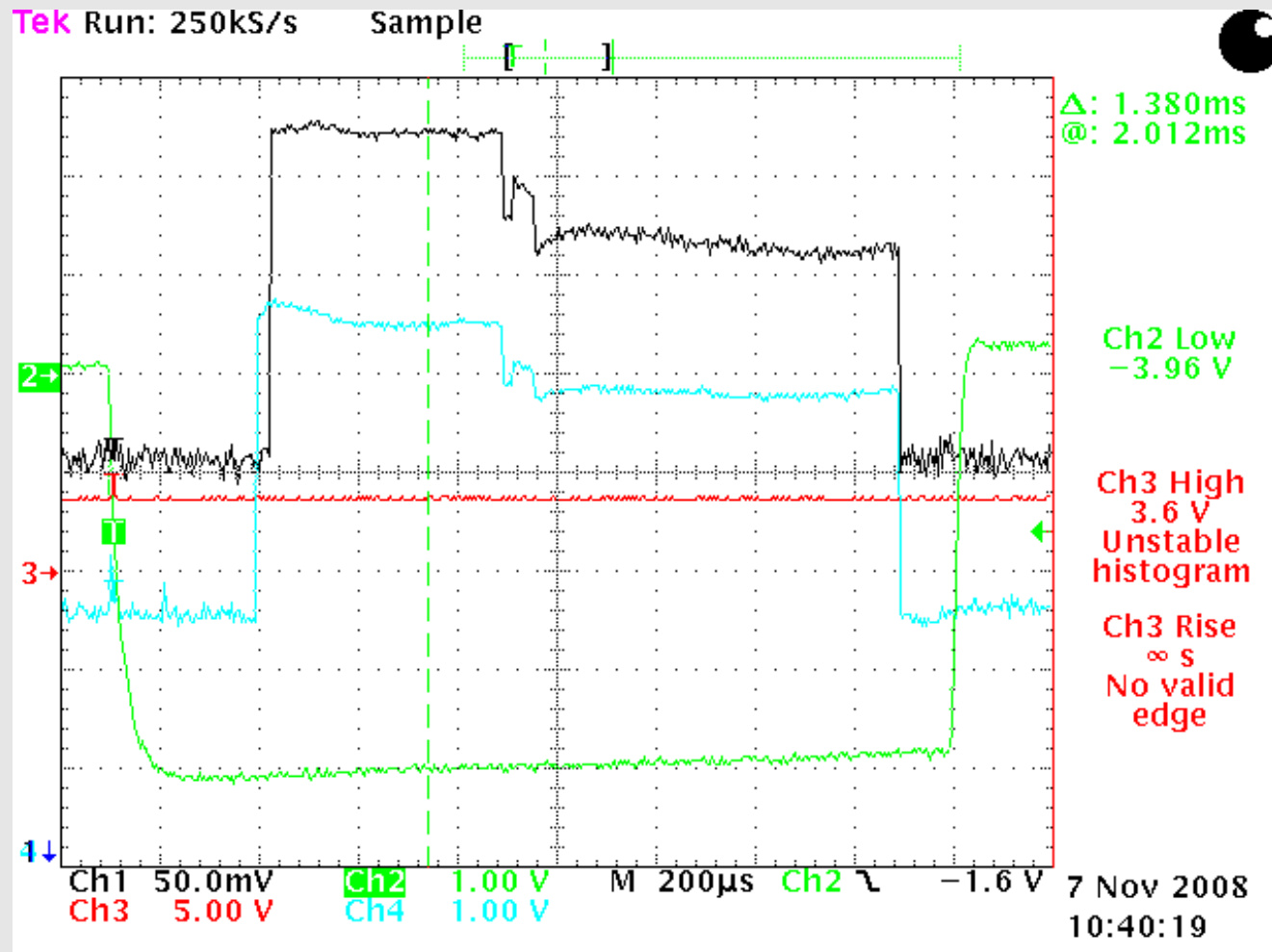
Puls Power Netzteil

(Modulator)



Betriebsdaten : Pulslänge : 0,5 - 1,7 ms
 Wiederholrate 1/2/5/10 Hz
 Spannung : 0 – 12 kV DC
 Strom : 0 – 1,7 kA

Wave Forms



RF3 (GUN) & RF2 (ACC1)



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RF3 (GUN) & RF2 (ACC1)



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RF3 (GUN) & RF2 (ACC1)



1.3 GHz

5 MW

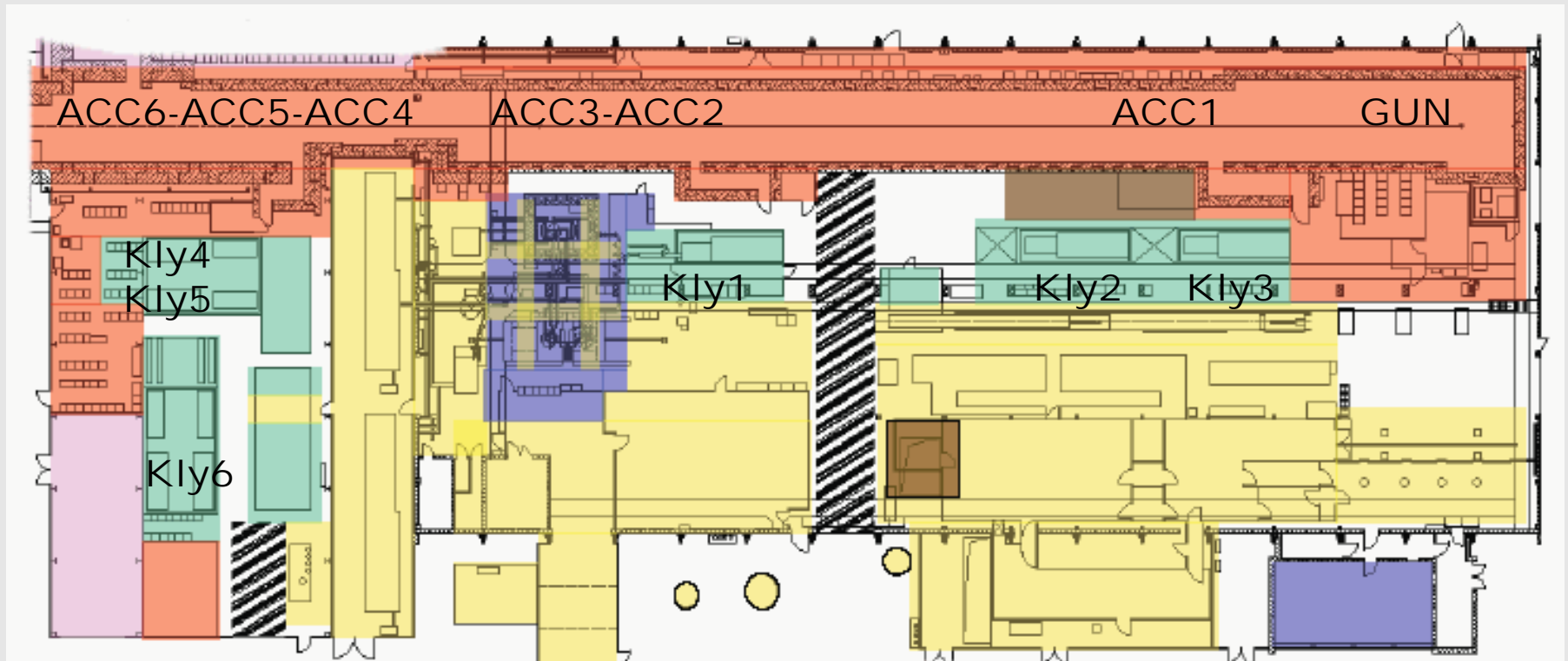
1.7 ms

127 kV

95 A

HF-Stationen

Halle 3



RF5 (ACC2/3) & RF4 (ACC4/5/6)



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RF4 (ACC4/5/6)



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RF4 (ACC4/5/6)



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RF4 (ACC4/5/6)



1.3 GHz

10 MW

1.7 ms

117 kV

140 A

RF4 (ACC4/5/6)



RF5 (ACC2/3)



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RF5 (ACC2/3)



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RF6 (Ersatzstation für RF5)

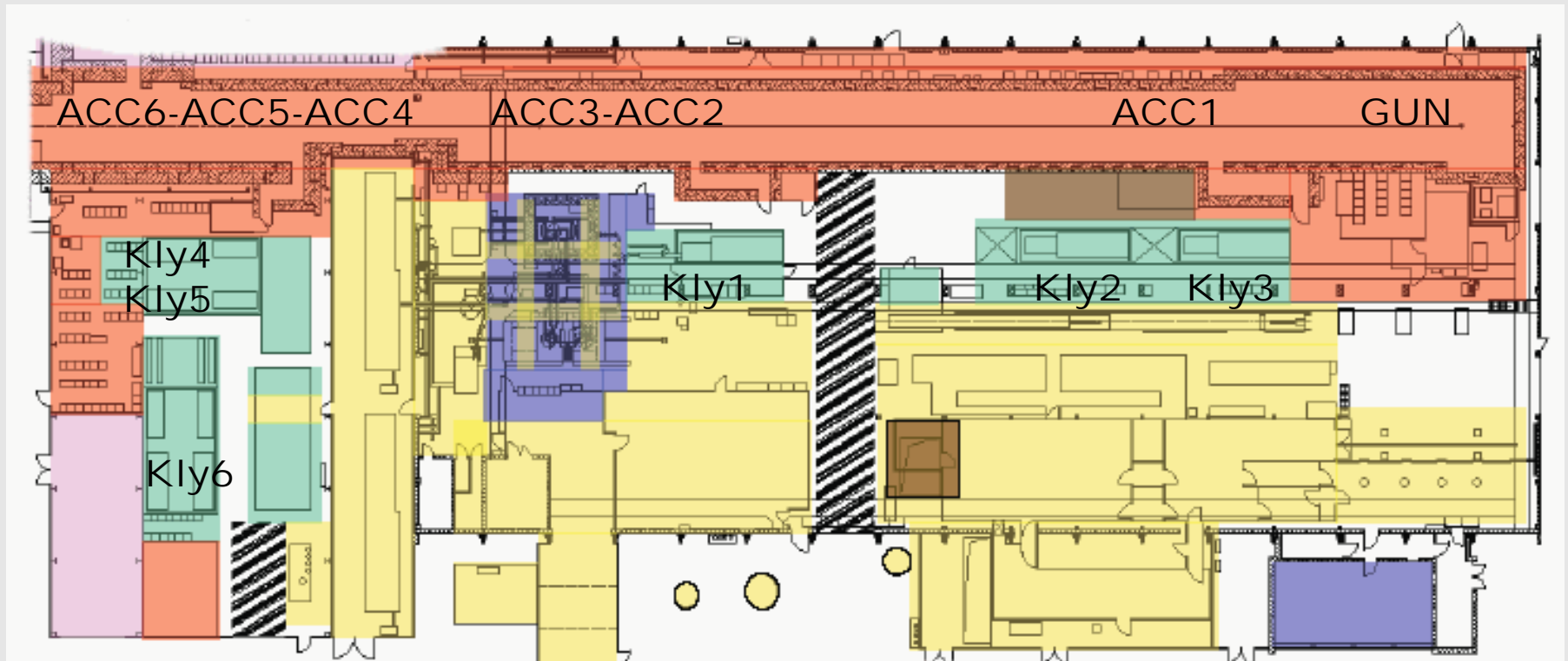


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Wie geht es weiter?

**Tausch der Modulatoren RF2/3
Modifizierung Hohlleiterverteilung**

HF-Stationen in Halle 3

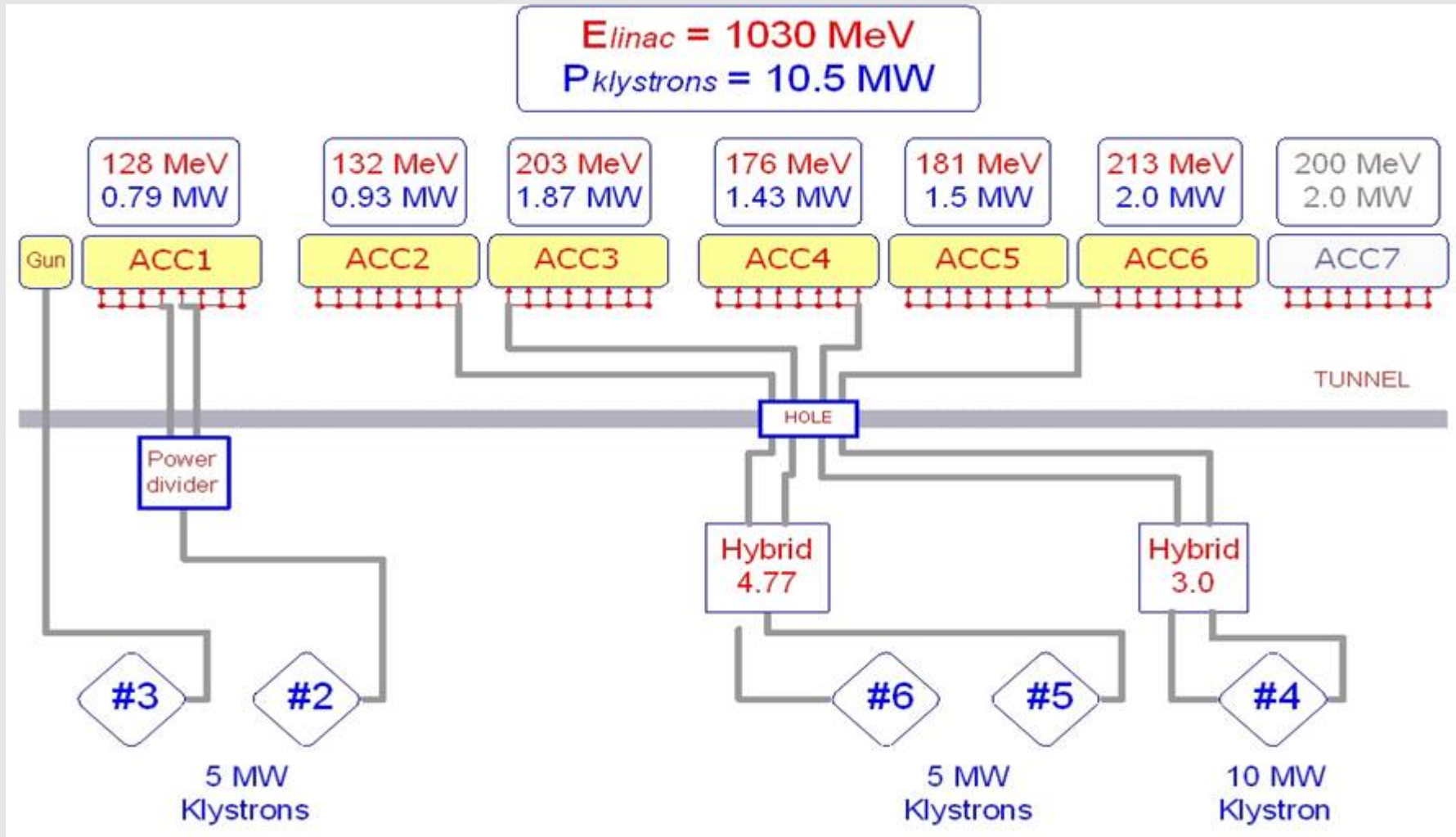


Neue Modulatoren für FLASH

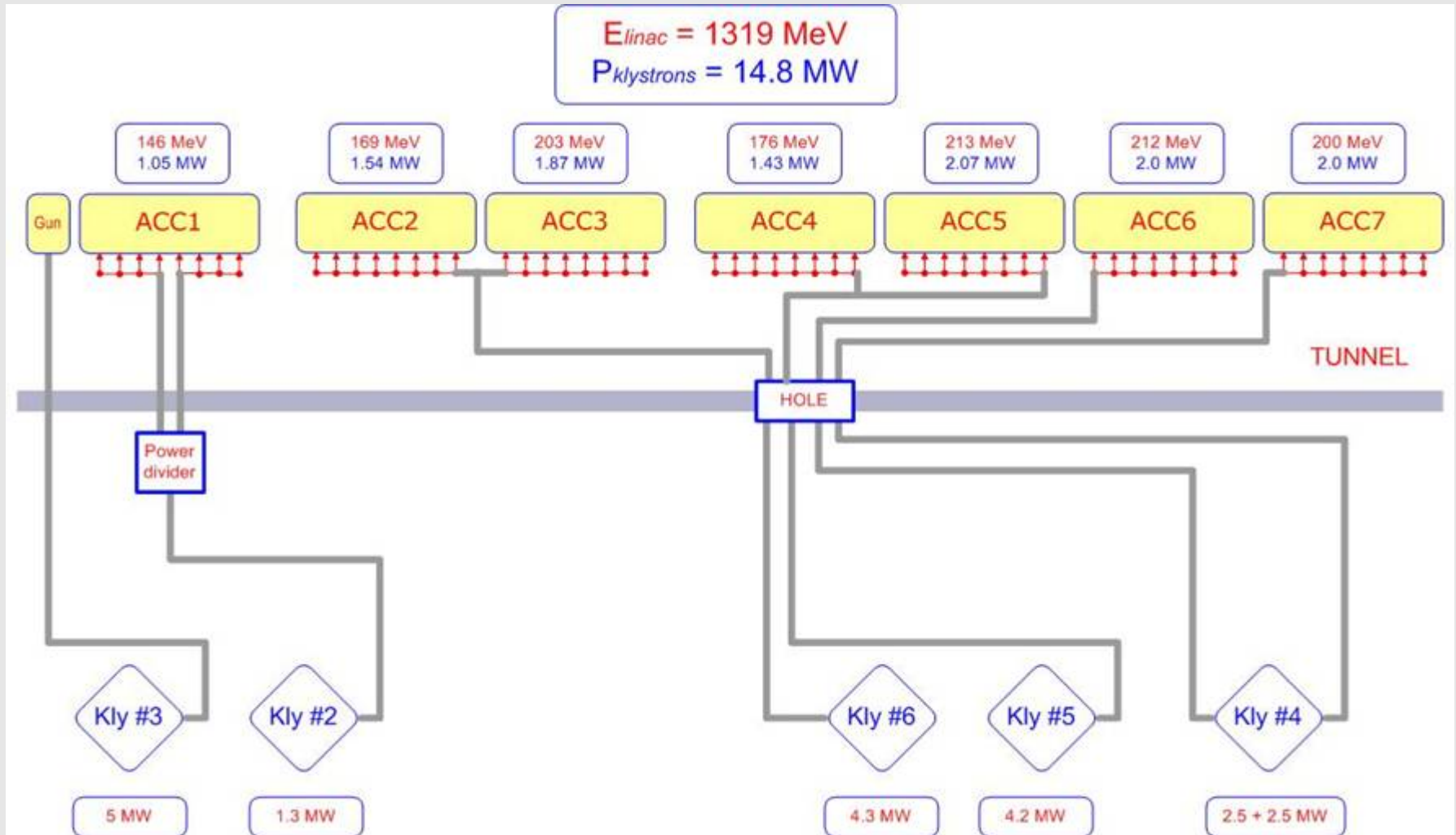


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Hohlleiterverteilung FLASH



Hohlleiterverteilung FLASH neu



Waveguide components for 2009 upgrade

- asymmetric shunt tees 3.5 dB and 3.9 dB
- waveguide distribution for ACC7 (XFEL type)
- HOM filters
- 10 MW 3 dB hybrid
- standard waveguide components (straights, bends, bellow etc)
- phase shifters
- directional couplers
- supporting frame with water cooling system
- sound detectors for ACC7 & ACC6 distributions (with interlock)
- dry air system

MBK-Prototypen



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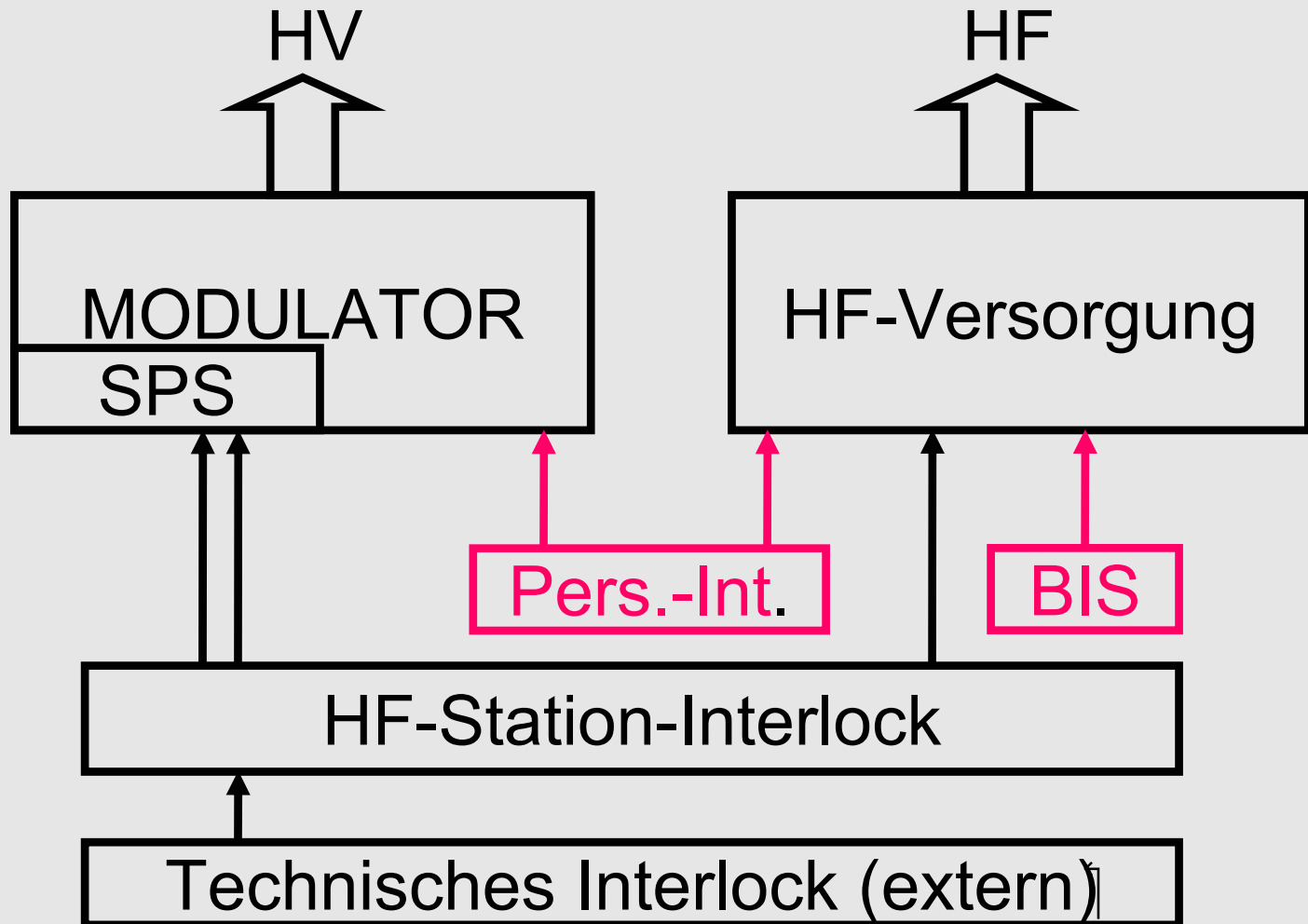
MBK-Prototypen



MHF-p, Grömitz, November 2008

Interlock der HF-Station

HF-Station-Interlock



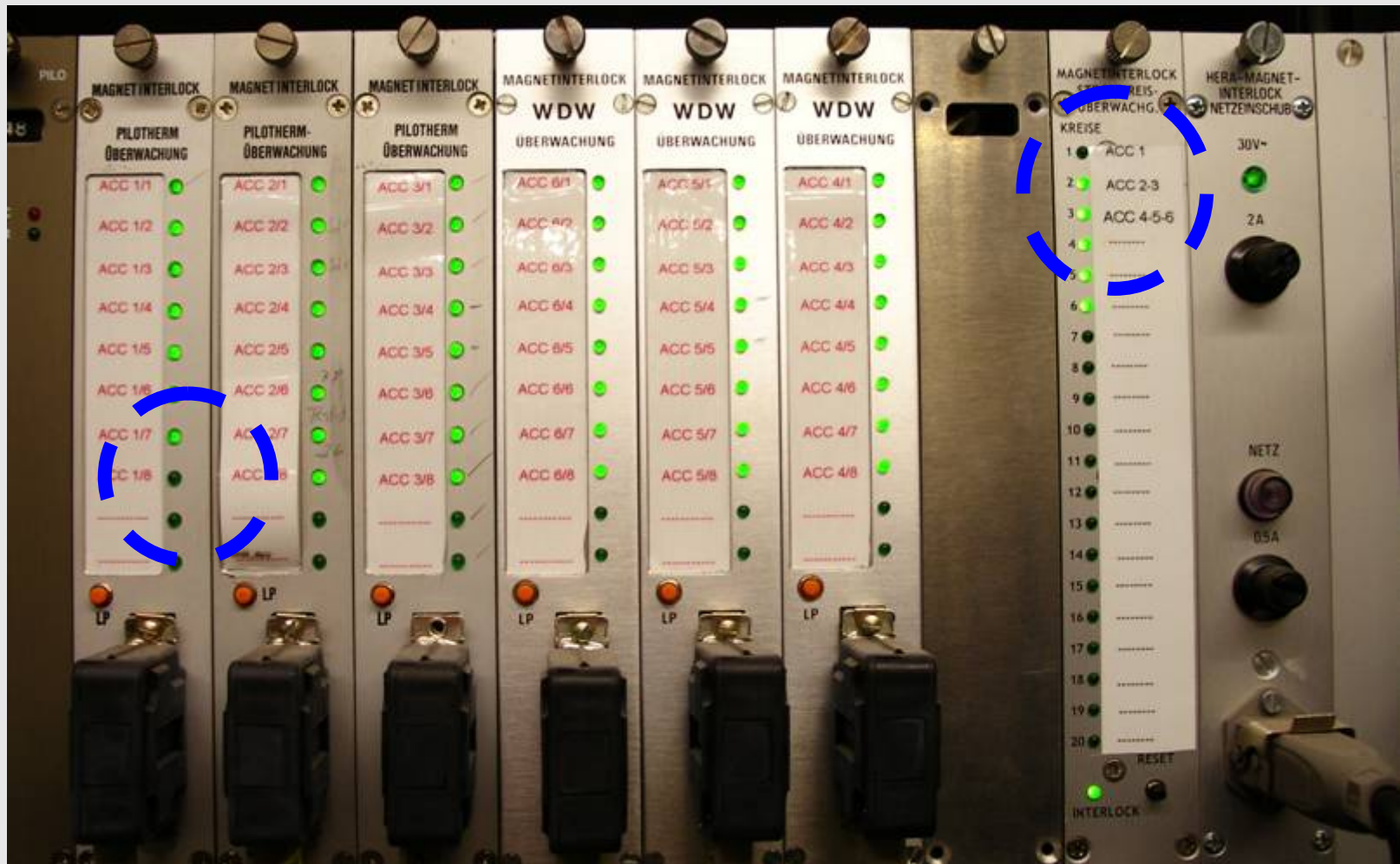
HF-Station-Interlock am Beispiel des Kühlwasserinterlocks der Zirkulatoren im Tunnel

“Wasserschalter” im Linac



Wassermeldung aus Linac

Wo ist dieses Crate? → in Elektronik-Racks RF4 (für alle ACC's)

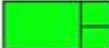
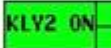
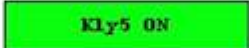

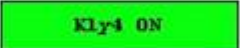





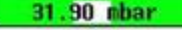


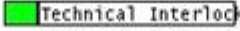



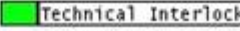








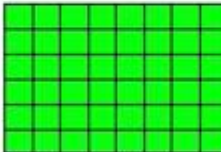
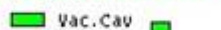
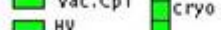

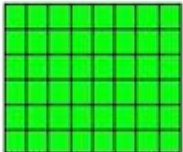
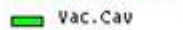


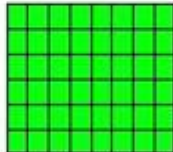
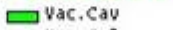


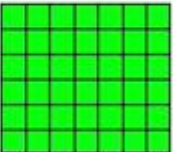



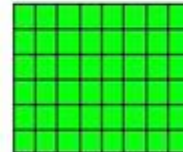
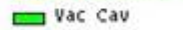


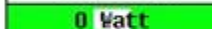
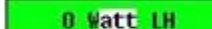




























Wassermeldung aus Linac

Wo ist dieses Crate? → in Elektronik-Racks RF4 (für alle ACC's)



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RF Interlock Summary							
	GUN	ACC1	ACC2	ACC3	ACC4	ACC5	Cryo
V Sum: Klystron	GUN Oper.	ACC1 Oper.	ACC2/3 OPERATION		ACC4/5 OPERATION		Essentials
		123.3 36.2	233.6 MeV	18.7 °	95.8 MeV	-7.5 °	Cold Magnets
	Klystron 3  RESET	Klystron 2  RESET	Klystron 5 		Klystron 4 		
Modulator	Interlock Details	Interlock Details	Interlock Details		Interlock Details		ACC 1
	Safety intlk. 	Safety intlk. 	Modulator 5 118 kV		Modulator 4 115 kV		He fill level:  43.6 %  low high pressure:  31.90 mbar
	Kly. ready 	Kly. ready 	Technical Interlock  RF_INHIBIT_LOCK  Modulator on2  timing enabled 		Technical Interlock  RF_INHIBIT_LOCK  Modulator on2 		ACC 2-5 He fill level:  46.1 %  low high pressure:  31.61 mbar
Couplers Cavities	Interlock Details	Couplers 1	Couplers 2	Couplers 3	Couplers 4	Couplers 5	Cryo load:
	  	   	   	   	   	   	 0 Watt  0 Watt LH  0 Watt
	before reset switch feedback off	 Vac.Cav  Vac.Cp1  HV  HV  cryo FB is ON	 Vac.Cav  Vac.Cp1  HV  HV  cryo IL RESET	 Vac.Cav  Vac.Cp1  HV  HV  cryo IL RESET	 Vac.Cav  Vac.Cp1  HV  HV  cryo IL RESET	 Vac.Cav  Vac.Cp1  HV  HV  cryo IL RESET	SWITCH FB OFF TO RESET

Technisches Interlock

Exceed

kly_intick4: TTF2.RF/KLY.INTERLOCK/KLY4/

Klystron interlock status

KLY4

15	Input water temp. of klystron body	
16	Input water temp. of klystron collector	
45	Output water temp. of the transformer tank	
44	Output water temperature of solenoid	
43	Oil temperature of the transformer tank	
42	Output water temperature of modulator	
41	Output water temp. of klystron body	
40	Output water temp. of klystron collector	
39	Output water temperature of circulator	
38	Input water temperature of absorber-load	
37	Output water temperature of absorber-load	
36	Oil temperature of the klystron tank	
35	Pressure SF6 - Gas system	
34	Bias current	
33	Solenoid current	
32	Heater current	
31	not used	
30	not used	
29	Heater PS on	
28	Solenoid PS off	
27	Technical Interlock	Interlock
26	Personen - Interlock 2 OK	
25	Personen - Interlock 1 OK	
24	RF leakage detector	
23	Spark detector	
22	Modulator (Bouncer) Clock	
21	not used	
20	not used	
19	not used	
18	Preheating of filament	
17	Ion pump current max	
16	Ion pump current attention	
15	Oil level of the klystron tank (attention)	
14	Oil level of the klystron tank is high	
13	Oil level of the klystron tank is low	
12	not used	
11	Oil level of the transformer tank (attention)	
10	Oil level of the transformer tank is high	
09	Oil level of the transformer tank is low	
08	Output water temperature of preamplifier	
07	Preamplifier water flow	
06	Absorber-load water flow	
05	Circulator water flow	
04	Modulator water flow	
03	Solenoid water flow	
02	Body water flow of the klystron	
01	Collector water flow of the klystron	
00	Water flow of the transformer tank	

interlock crate temperature (grd C): 38 event counter: 150529179 LINAC repetition rate: 5

tech_intick_kly_4_5: TTF2.RF/RF.PILO/KLY4/

Interlock Tunnel Water

ACC1	ACC2	ACC3	ACC4	ACC5	ACC6	ACC7	ACC8
C1	C1	C1	C1	C1	C1	C1	C1
C2	C2	C2	C2	C2	C2	C2	C2
C3	C3	C3	C3	C3	C3	C3	C3
C4	C4	C4	C4	C4	C4	C4	C4
C5	C5	C5	C5	C5	C5	C5	C5
C6	C6	C6	C6	C6	C6	C6	C6
C7	C7	C7	C7	C7	C7	C7	C7
C8	C8	C8	C8	C8	C8	C8	C8

KLY2 KLY5 KLY5 KLY4 KLY4

RESET

In case of Technical Interlock
but no Tunnel Water Interlock contact 100F-SL

54	Reflected powermeter 1 (LWL in) Klystron	
53	Reflected powermeter 2 (LWL in) Klystron	
52	Preamplifier Ready-Status (LWL in)	
51	Temp 10MW 4	
50	Temp 10MW 3	
49	Temp 10MW 2	
48	Temp 10MW 1	
47	Enable Preamplifier (LWL out)	
46	Modulator on2	
45	Modulator on1	
44	Solenoid 2 Current	
43	Solenoid 1 Current	
42	not used	
41	not used	

cpu disk ?