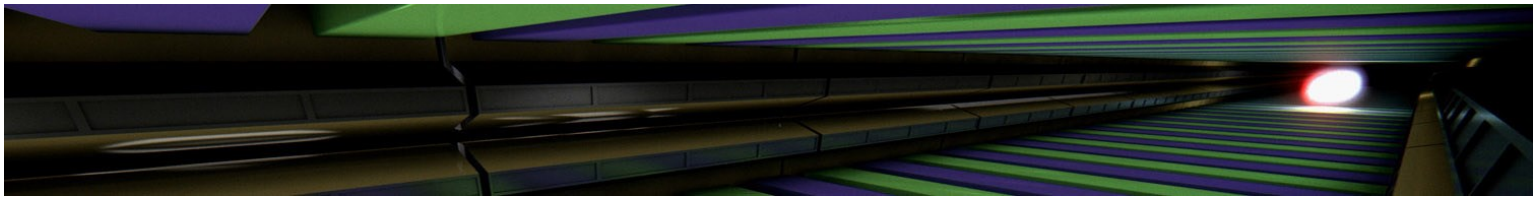


Cabling work and module installation plan for the injector

F.Brinker, DESY

General remarks

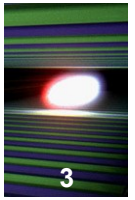
As everybody knows a clean and well documented cabling is crucial for the reliable operation of every larger system.

Nevertheless the effort is often underestimated.

At DESY the work is mostly done by companies with a fixed long term contract providing technicians with a lot of experiences with the kind of work at DESY.

Tools have been developed to provide a thorough documentation of all cables which are installed.

European XFEL — Tool for Infrastructure : “Raumbuch”



D	E	F	G	H	I	J	K	L	M	N	O	P	R	
Raum	Zweck	Positionen im Tunnel (ca.)	Anzahl (St.)	Anschlussart	Nennspannung	Sonderspannung	Leistungsbedarf der Verbr	Gleichzeitigkeitsfaktor [%]	Leistungsbedarf [VA]	Not-Aus	Notstromversorgung	USV	Verantwortlicher	Workpackage
008	Special Diag.	26	1	Festanschluss	Drehstrom 400 V		3000	100	3000	Nein	Nein	Nein	Wojciech Wierba / MSK	WP02
008	Special Diag.	26	1	Festanschluss	Drehstrom 400 V		3000	100	3000	Nein	Nein	Nein	Wojciech Wierba / MSK	WP02
008	Kicker	24	2	Festanschluss	Wechselstrom 230 V		**100**	100	200	Ja (Personer	Nein	Nein	Obier	WP02
008	Kicker	53	3	Festanschluss	Wechselstrom 230 V		**100**	100	300	Ja (Personer	Nein	Nein	Obier	WP02
008	Kicker	55	3	Festanschluss	Wechselstrom 230 V		**100**	100	300	Ja (Personer	Nein	Nein	Obier	WP02
008	Kryoracks	45	1	Festanschluss	Wechselstrom 230 V		2000	100	2000	Nein	Ja	Ja	WP13, O. Korth	WP13
008	Meßgeräte	45	5	Schuko 230 V, 16 A	Wechselstrom 230 V		200	100	1000	Nein	Nein		WP13, D.Sellmann	WP13
008	Geräte wie Laptop, Lecksucher, Heißlu	45	5	Schuko 230 V, 16 A	Wechselstrom 230 V		2000	20	2000	Nein	Nein		WP13, D.Sellmann	WP13
008	Schweißgerät bei Montage u. Reparatu	45	2	CEE 400 V, 16 A	Drehstrom 400 V		16000	10	3200	Nein	Nein		WP13, D.Sellmann	WP13
008	Schweißgerät bei Montage u. Reparatu	45	1	CEE 400 V, 32 A	Drehstrom 400 V		32000	5	1600	Nein	Nein		WP13, D.Sellmann	WP13
008	Vakuumpumpstand bei Montage u. Rep	45	2	CEE 400 V, 16 A	Drehstrom 400 V		4000	40	3200	Nein	Nein		WP13, D.Sellmann	WP13
008	INJ-Dump Temp.-Mess.	64	2	Schuko 230 V, 16 A	Wechselstrom 230 V		500	100	1000	Nein	Ja	Nein	M. Schmitz	WP20
008	INJ-Dump Strahldiagnose	64	2	Schuko 230 V, 16 A	Wechselstrom 230 V		500	100	1000	Nein	Nein	Nein	M. Schmitz, K. Wittenburg	WP20,
008	**Vakuum CATH1**	23	4	Schuko 230 V, 16 A	Wechselstrom 230 V		5000	100	20000				D.Hoppe	WP08
008	**Vakuum GUN1**	25	6	Schuko 230 V, 16 A	Wechselstrom 230 V		4500	50	13500				D.Hoppe	WP08
008	**Vakuum Modul1**	26	4	Schuko 230 V, 16 A	Wechselstrom 230 V		5000	50	10000				D.Hoppe	WP08
008	**Vakuum Modul1**	28	3	CEE 400 V, 16 A	Drehstrom 400 V		5000	100	15000				D.Hoppe	WP08
008	**Vakuum 13xQuad,MSPEC, Diag**	46-74	13	Schuko 230 V, 16 A	Wechselstrom 230 V		7100	50	46150				D.Hoppe	WP08
008	**Vakuum 13xQuad,MSPEC, Diag**	46	2	CEE 400 V, 16 A	Drehstrom 400 V		3000	100	6000				D.Hoppe	WP08
008	**Vakuum 13xQuad,MSPEC, Diag**	?	1	Schuko 230 V, 16 A	Wechselstrom 230 V		300	100	300			Ja	D.Hoppe	WP08
008	Kompressor, Fahrzeuge	64	1	CEE 400 V, 63 A	Drehstrom 400 V		25000	1	250	Nein	Nein	Nein	N. Meyners	WP33
008	Dumpwechselfahrzeug	64	1	CEE 400 V, 32 A	Drehstrom 400 V		10000	1	100	Ja (Anlagens	Ja	Nein	M. Schmitz	WP20
008	Messgeräte Gunbereich	20	5	Schuko 230 V, 16 A	Wechselstrom 230 V		200	100	1000	Nein		Nein	Hüning	WP14
008	Messgeräte Laserheater	49	5	Schuko 230 V, 16 A	Wechselstrom 230 V		200	100	1000	Nein		Nein	Hüning	WP14
008	Messgeräte Dump	64	5	Schuko 230 V, 16 A	Wechselstrom 230 V		200	100	1000	Nein		Nein	Schmitz	WP14
008	**5 Modular bpm Units + 1 TCA in eine**	55	1	**Festanschluss**	**Wechselstrom 230 V**		**2000**	**100**	2000	**Nein**	**Nein**		**D. Nölle**	**WP 17**
* (alle)	Betrieb von Vermessungsinstrumenten	49	1	Schuko 230 V, 16 A	Wechselstrom 230 V		100	0	0	Nein	Nein	Nein	G. Neubauer, MEA	WP32

Räume | **Stromversorgung** | Elektranten Inj | Klima, Lueftung, Heizung | Telefone | IT-Netzwerk | Wasser | Druckluft und N2 | Sicherheit | Raumkataster | Konfig | 20 ° Wasserbedarf | HF-Verluste | Schränke 4. Stock

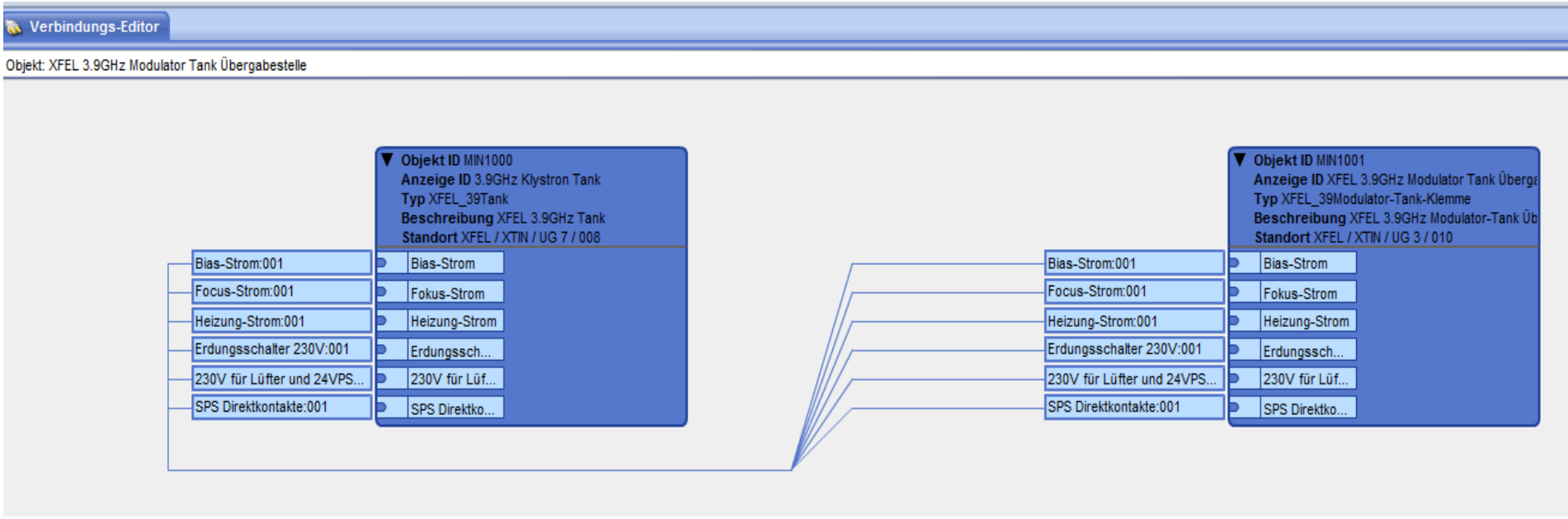
Handling of all requests for electricity, water, IT-network, climatization etc.

Tool for signal cables: Cable documentation system

All signal cables have to be requested over the KDS-system from which the order to the cable companies is automatically produced.

Example for a cable description:

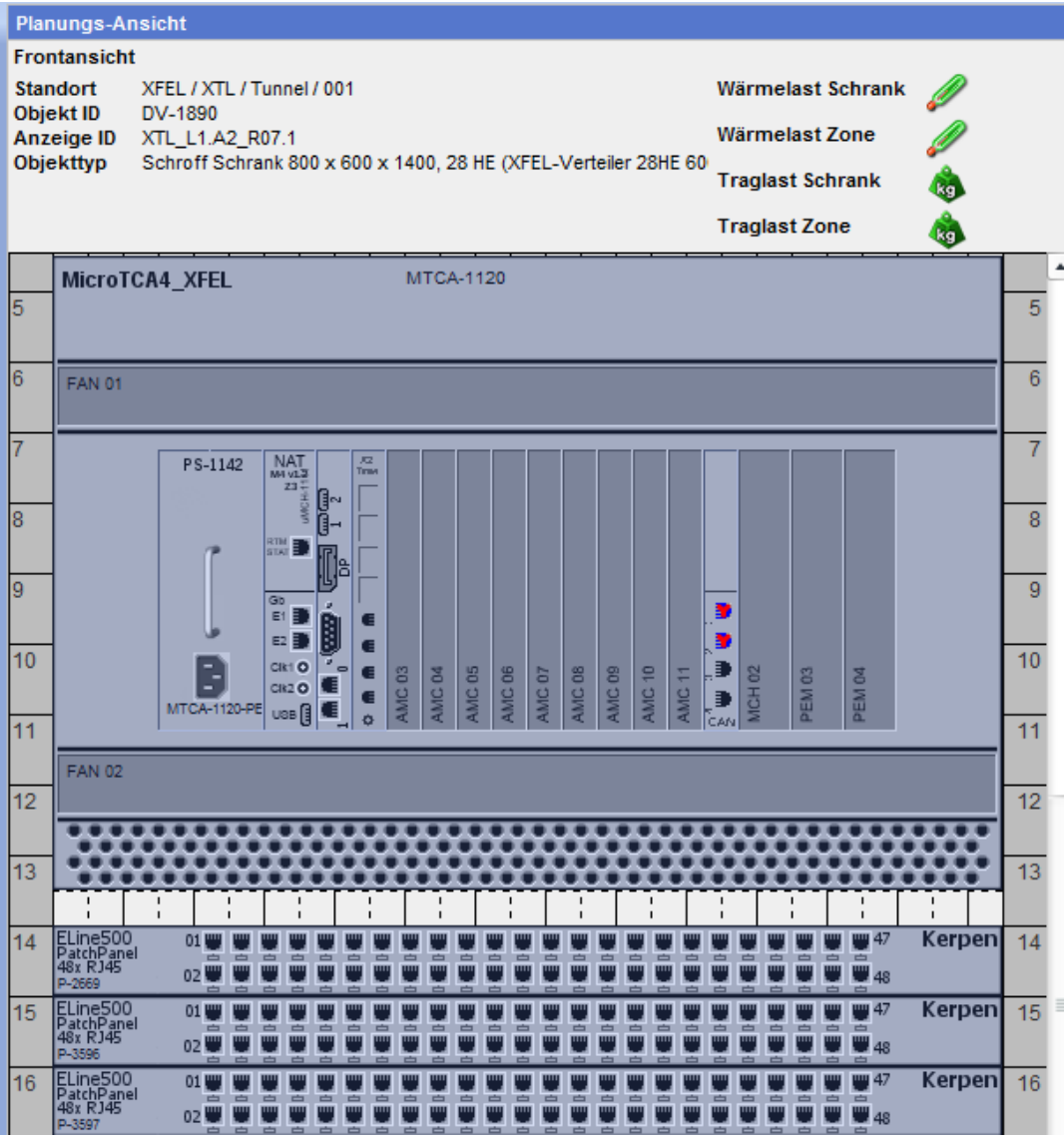
- What are the endpoints?
- Type of cable
- Type of plugs
- Descriptive text for the signals



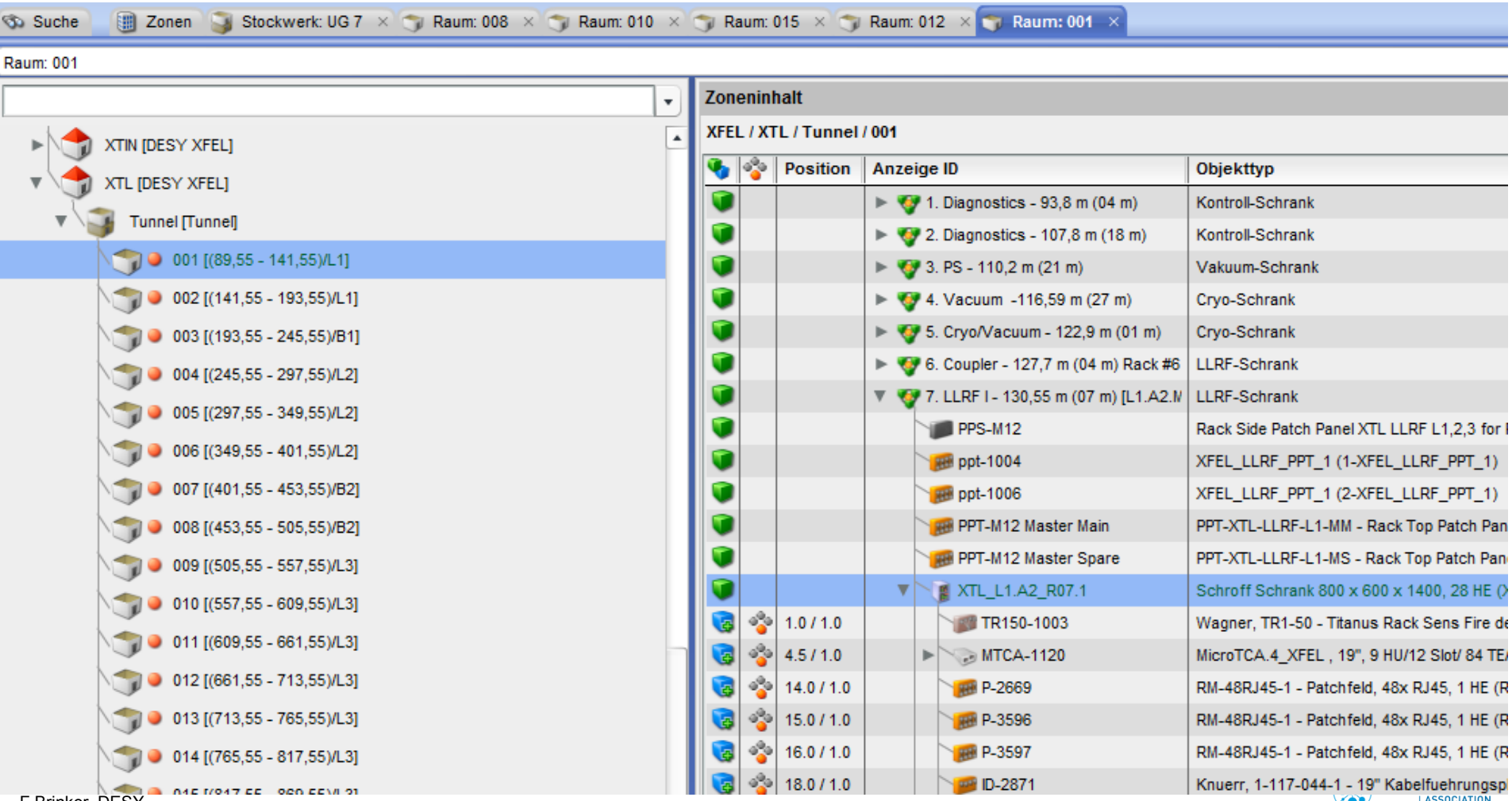
Description of the endpoints (Racks, devices, patch panels …)

- Auswahl Schaltschränke
  - XTL_L1.A2_R07.1 (DV-1890)
    - Frontansicht (16)
    - Rückansicht (4)
    - Boden (0)
    - Seitenansicht (0)

For standard components graphical views are available

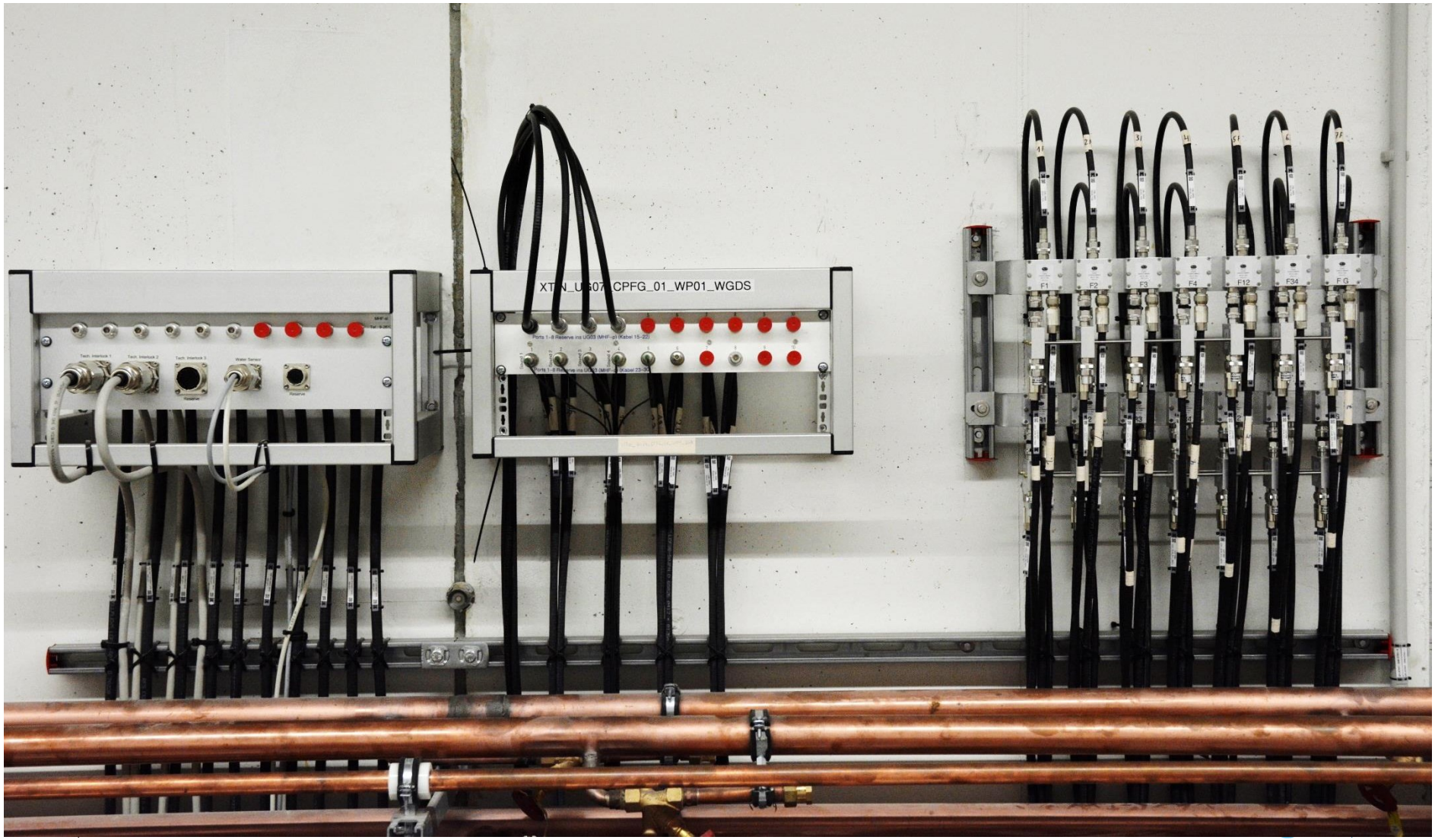


Different views answer questions like : what's in this room?



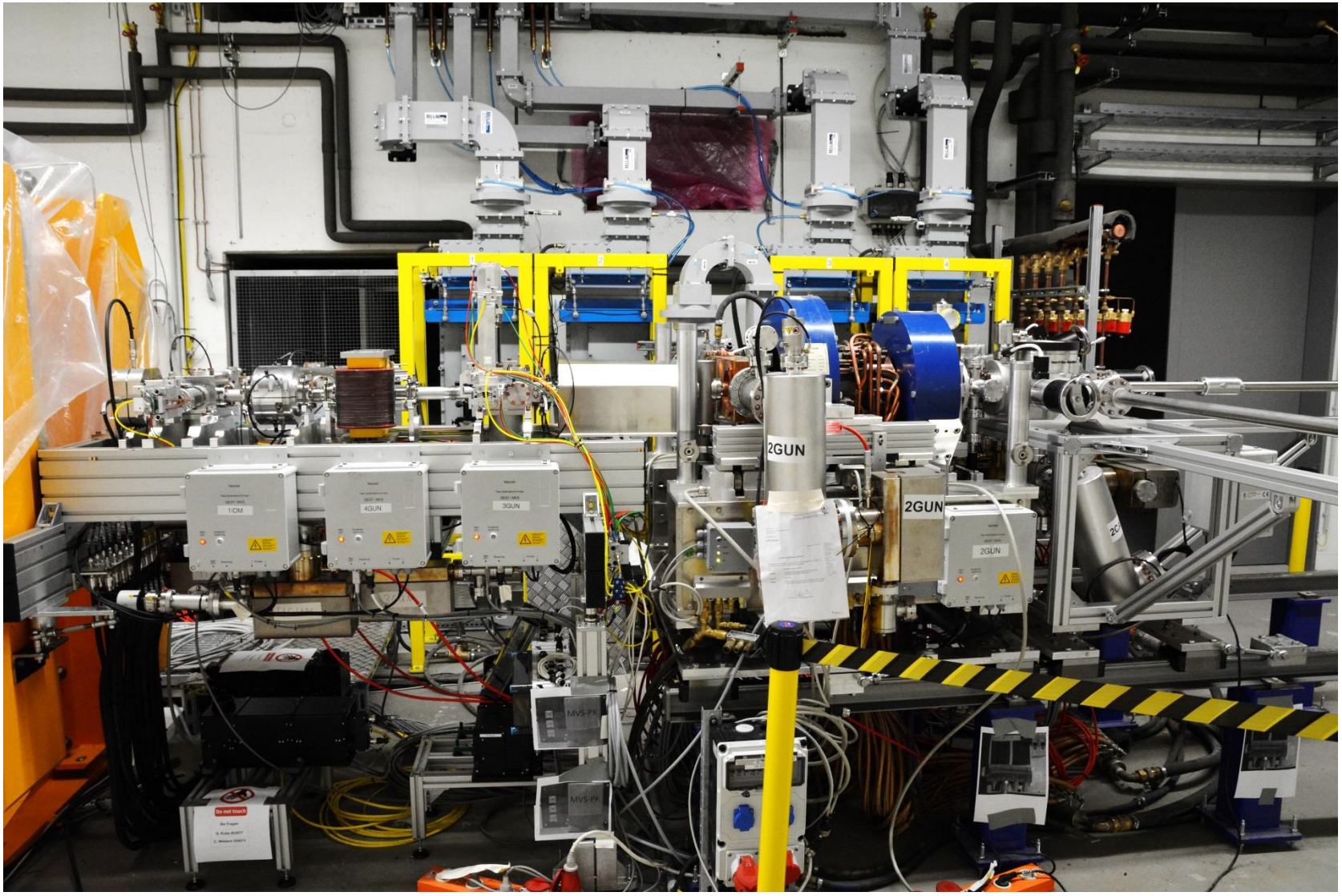
European XFEL

Whats already finished ? (only injector)
RF- and Interlock cables for the XFEL-Gun

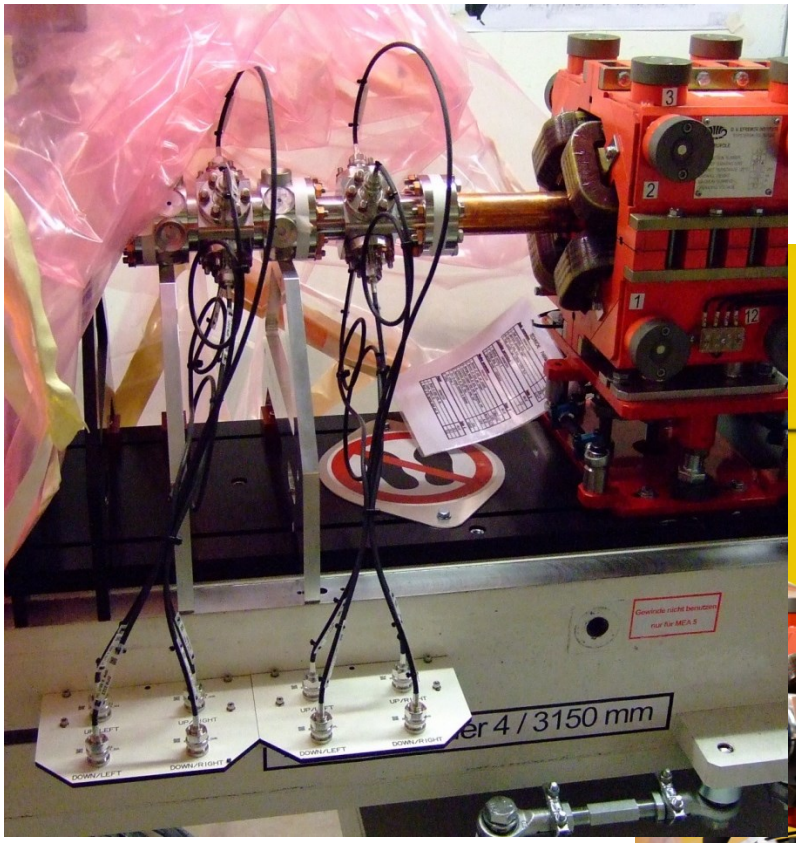


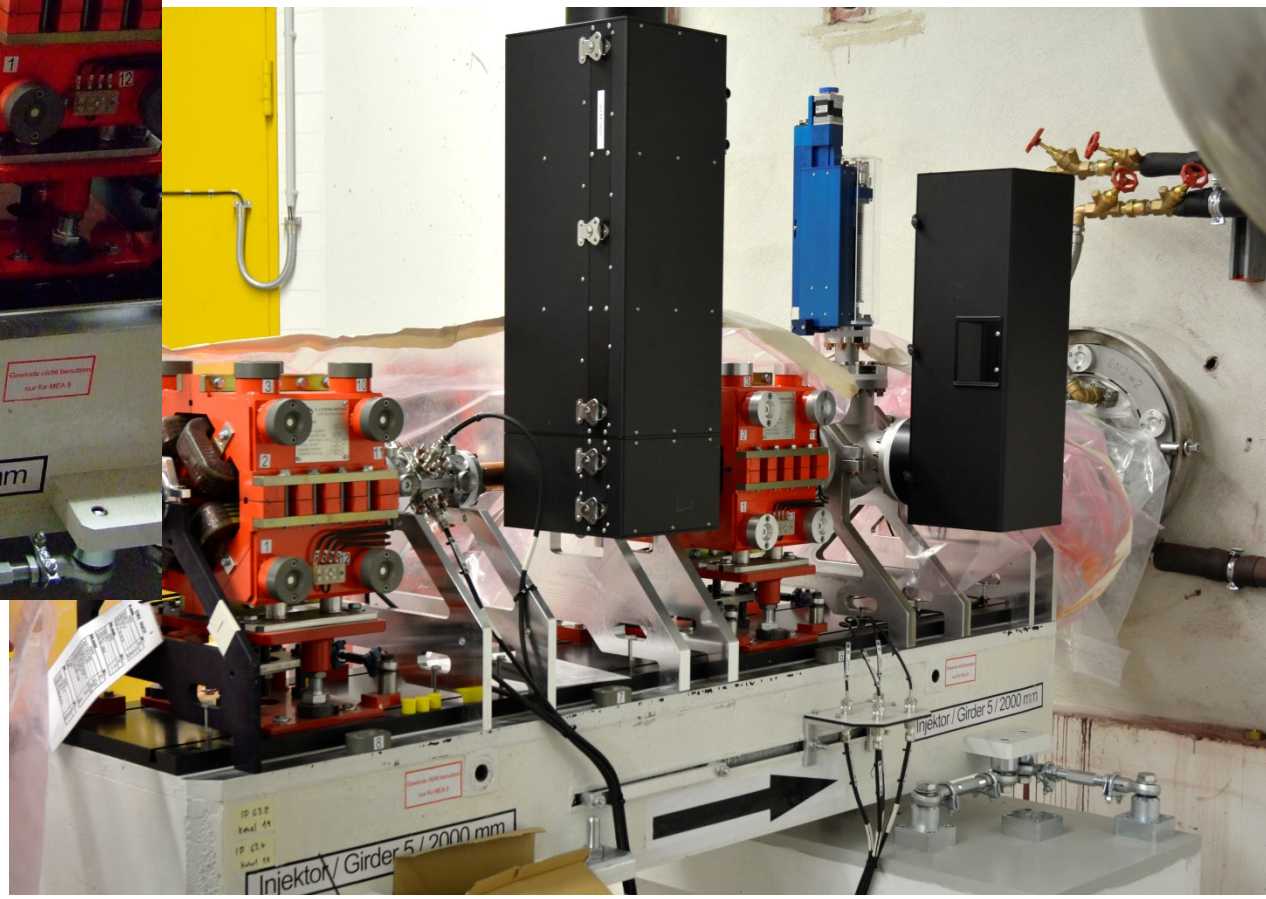
Gun RF-cables to the LLRF rack

Complete gun instrumentation incl. UV-laser beamline



Cables from diagnostics to patch panels finished for most devices

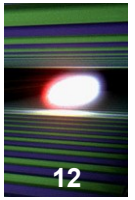




European XFEL

Racks ready for installation

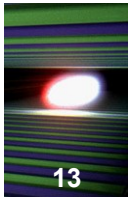
What's left to be done ?



- Magnet cabling
- Power and IT connections to the diagnostic racks
- Connection of diagnostic cables from patch panels to the racks
- Cabling for special beam diagnostics (kickers, screens, cameras …)
- Cabling of 1.3 GHz module
  - RF-cables for LLRF
  - Tuner motors
  - Cold diagnostics
  - Cold magnets
  - Interlock signals
  - Vacuum signals

- Cabling of 3.9 GHz module (like 1.3 GHz)
- Cabling for 3.9 RF-station (modulator and klystron)

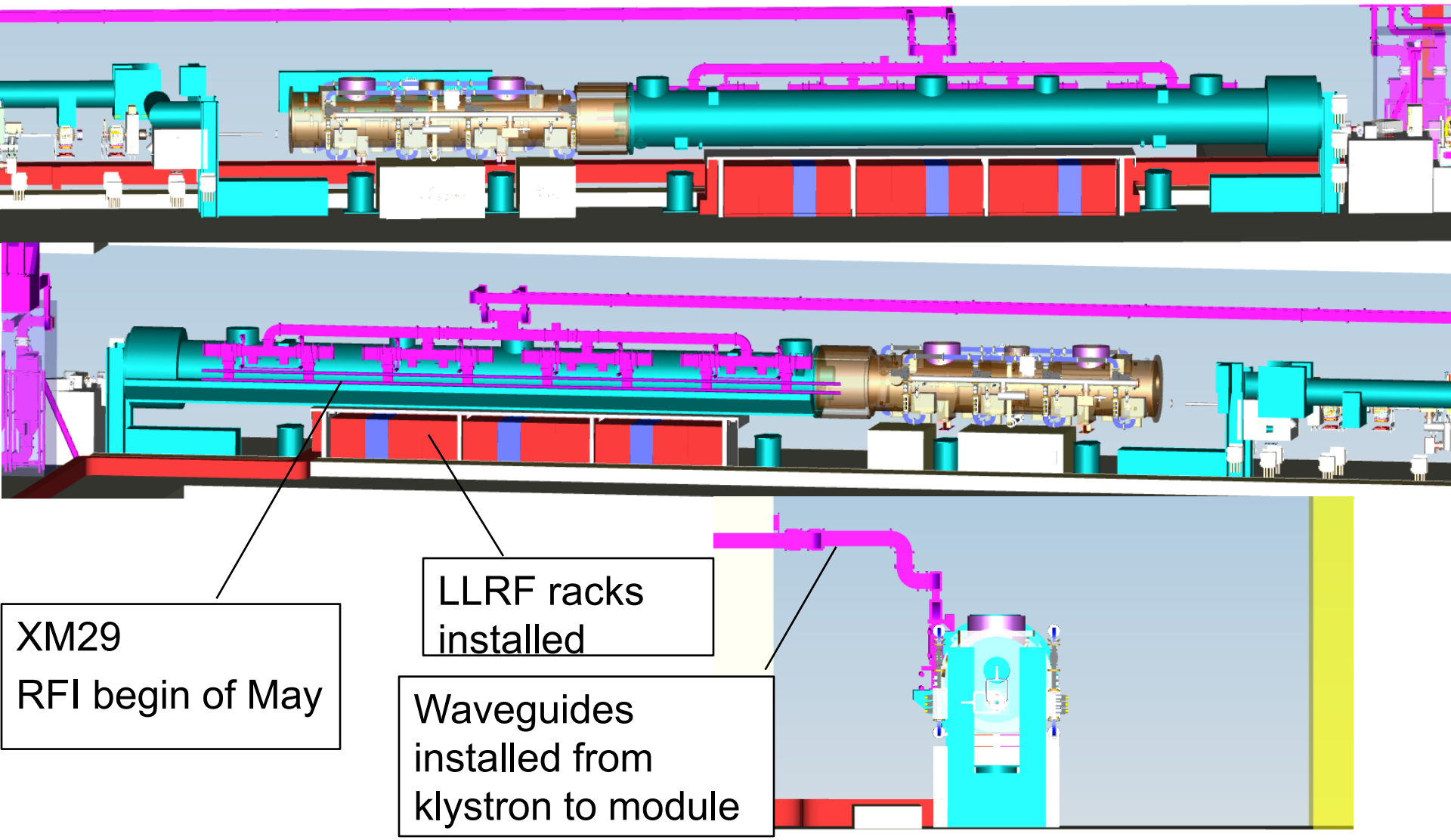
Time schedule for the next shutdowns



Shutdown May – July	**9 weeks**
• Electric power and IT to the new racks	2.5 weeks
• Completion of diagnostics cables	3 weeks
• 1.3 GHz module cabling	3 weeks
• Personal interlock	3 weeks
Shutdown August - October	**8 weeks**
• 3.9 GHz module cabling	3 weeks

Partially in parallel

A few words to the SC-module installation



XM29
RFI begin of May

LLRF racks installed

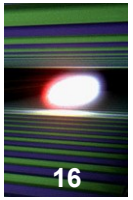
Waveguides installed from klystron to module

Shutdown from May 11th until mid of July: Installation of the 1.3GHz Module XM29

- Final work on the endcap by BINP
- Installation and alignment of the module
- Connection of waveguides
- Vacuum connection to the gun
- Complete cabling
- Radiation shielding of the racks
- Technical tests

Since the module is standing on its supports instead of hanging, two rails for 5 to each have been mounted

3.9 GHz module



New schedule:

week 22: preparation of string assembly in hall 3 clean room

week 22: **last coupler pair arrives at DESY**

week 23 and 24: string assembly with roll out at June 12th

week 25 and 26: assembly of tuner and magnetic shields

week 27 to 31: attaching cold mass to return pipe, survey, thermal shields,
cabling, cold mass into other module vessel, etc.

week 32 and 33: warm coupler assembly

August 17th: 3.9 GHz module ready for tunnel installation

Shutdown from August 17th until end of October

Duration determined by the cryogenics and vacuum connections –

time estimation : 8 weeks

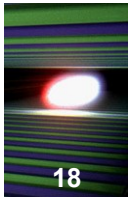
For details about the work on cryo connections see talk from S. Barbanotti – next session

Installation of RF-station, waveguide connection and cabling can be done in parallel

Afterwards 1 week of warm conditioning will follow

After that we are ready for cool down.

Summary



- The start of the complete injector commissioning will be clearly delayed by about 4 months
- The risk of any further delays is small – starting significantly earlier is not excluded but also not likely
- Part of it can be compensated by using the beam from the gun (April/May and July/August) since most of the diagnostic is already in use there
- We have to reschedule the commissioning plan and will adapt it to the final schedule of the main linac.