New plans for high power RF tests places at CERN

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Scope of the presentation / framework

- A word on the RF/KS section
- Existing infrastructures
- Actual activities

- Upcoming activities
- What is the best we can do (I believe) to take over these activities, and where?

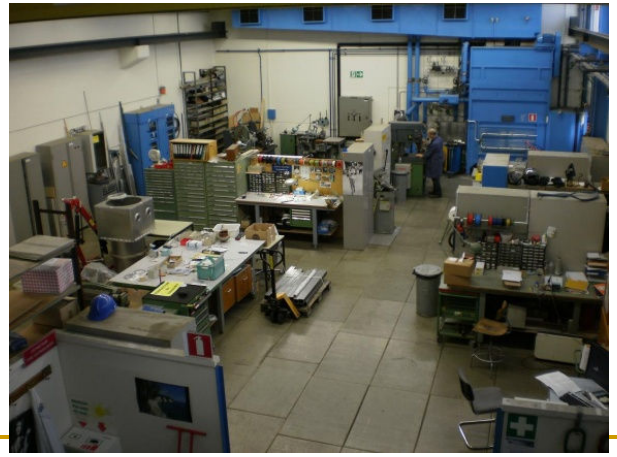
RF /KS activities

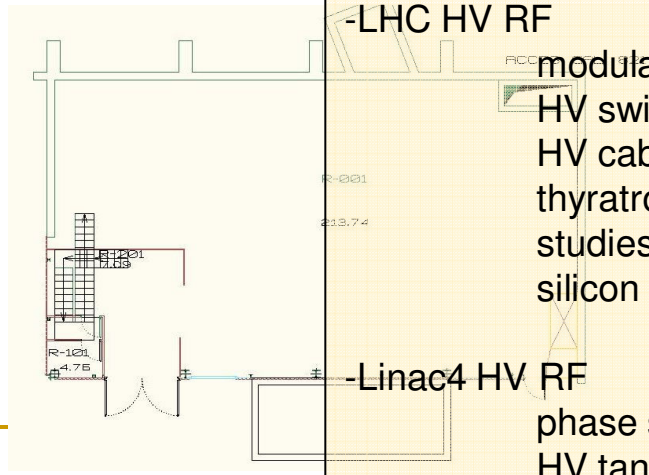
- LHC RF system operation
- RF power
  - LHC
  - Linac4
  - CLIC&CTF3
  - Crab cavities in SPS
  - LEP RF equipment for external requests
  - SPL test stand
- SC cavities & “clean room assembly”
  - LHC (3 spare cavities to be built soon)
  - HIE Isolde
  - SPL (WW’s activities)
  - CLIC & CTF3 structures

- 6 Engineers
- 5 Technicians
- 1 Fellows (Linac 4 -1/12/09) + 1 Fellow (½ SPL, ½ HIE Isolde)

A5 – high voltage test facility

Equipment:
-100kV – 15mA test station
-overhead cranes
-mechanical workshop





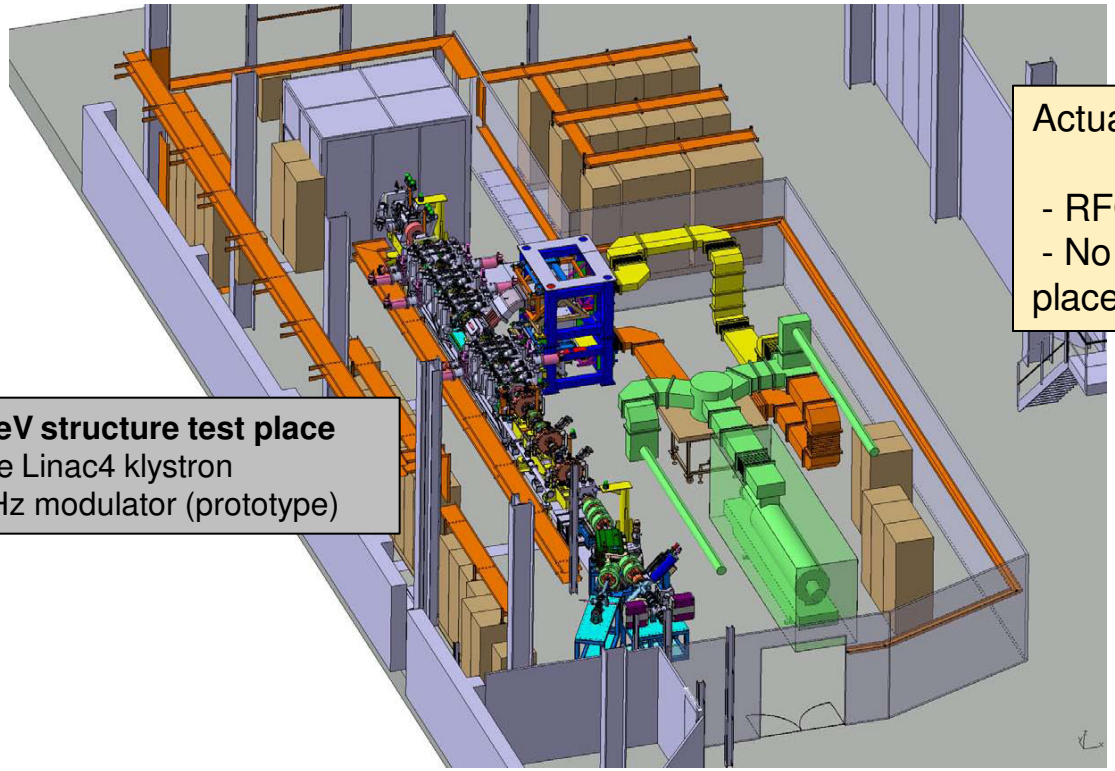
Activities:

-mechanics
-HV controls
-HV tests (low power)

-LHC HV RF
- modulators
- HV switches
- HV cables
- thyratrons
- studies (repl. of tetrode)
- silicon oil comp. tests

-Linac4 HV RF
- phase shifters
- HV tanks

B152 – 3MeV test stand, storage



3MeV structure test place
-one Linac4 klystron
-2 Hz modulator (prototype)

Actual & Future use:

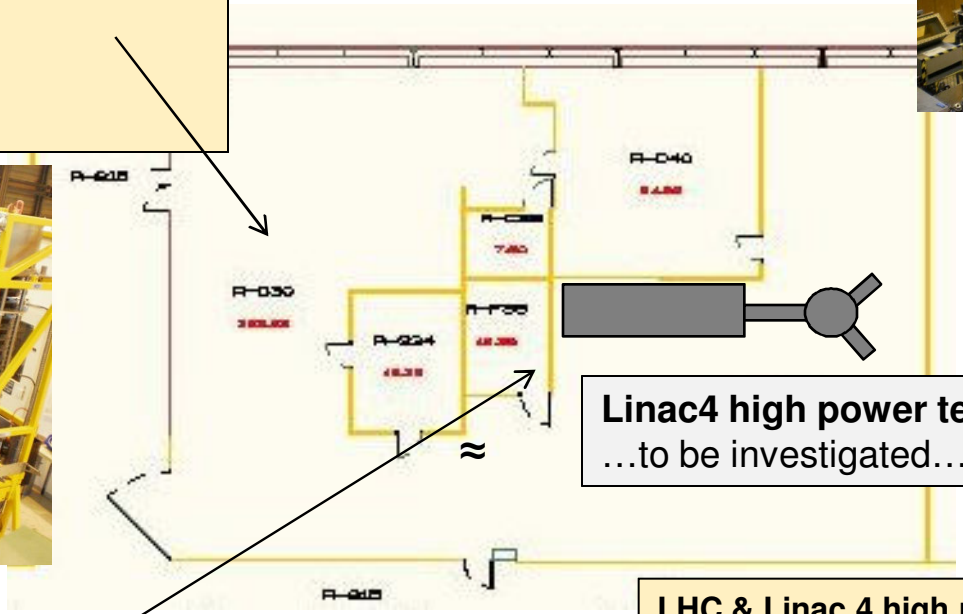
- RFQ tests: 2011 - 2012
- No room for an additional power test place

Storage area
-20 LEP klystrons
-circulators
-WG system

No picture

B112

LHC RF power (preparation and tests)
-klystrons, circulators, RF loads
-Main couplers
-Water cooling
-60kV, 10A power converter

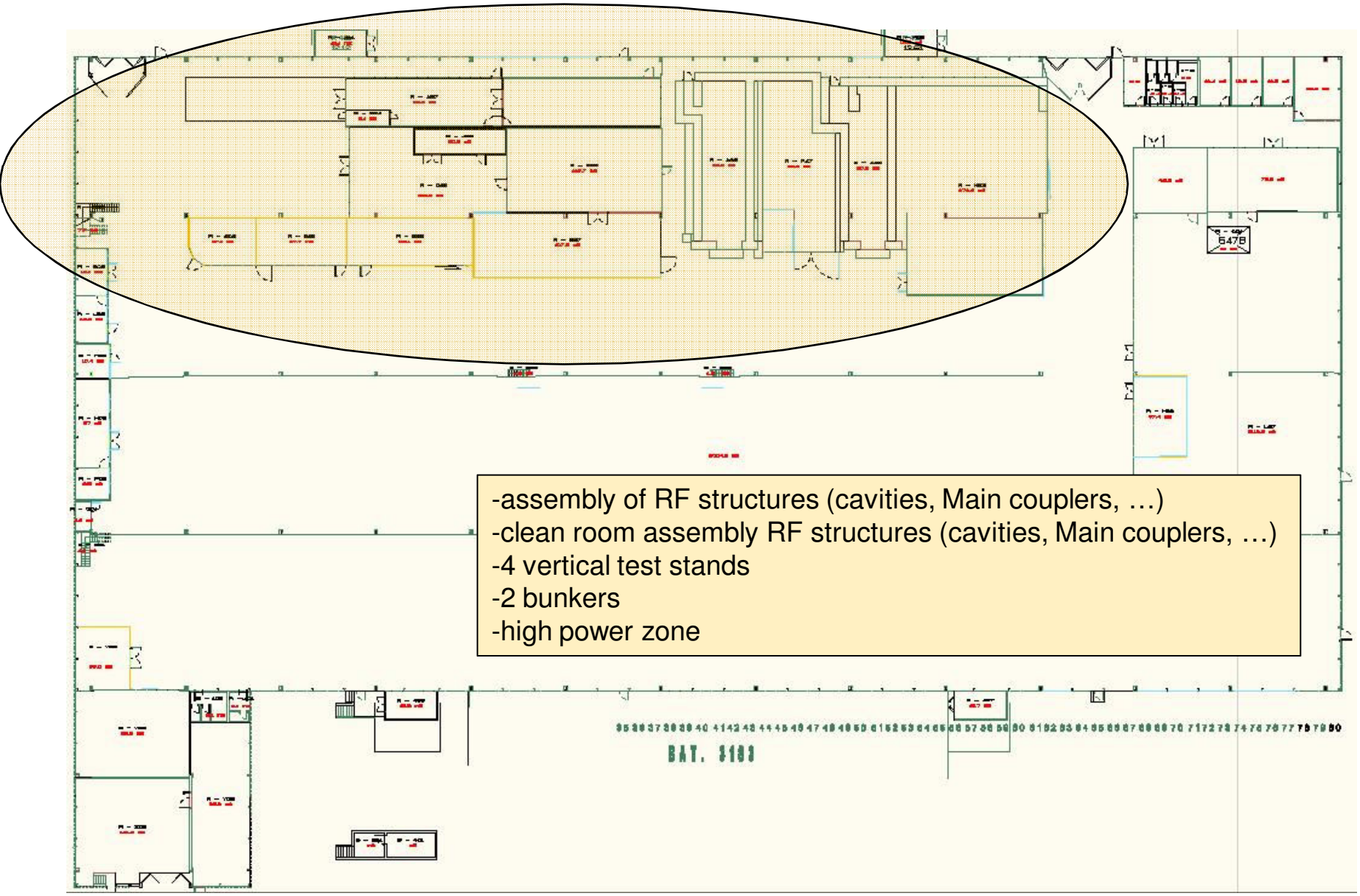


Linac4 high power tests place??
…to be investigated….

LHC & Linac 4 high power (low power tests, modification, prep)
-LEP klystrons
-WG
-Circulators & RF loads
-Chassis
-Water & air cooling systems

-Equipment from storage (klystrons, WG, circulators): B152
-A5
-External firms

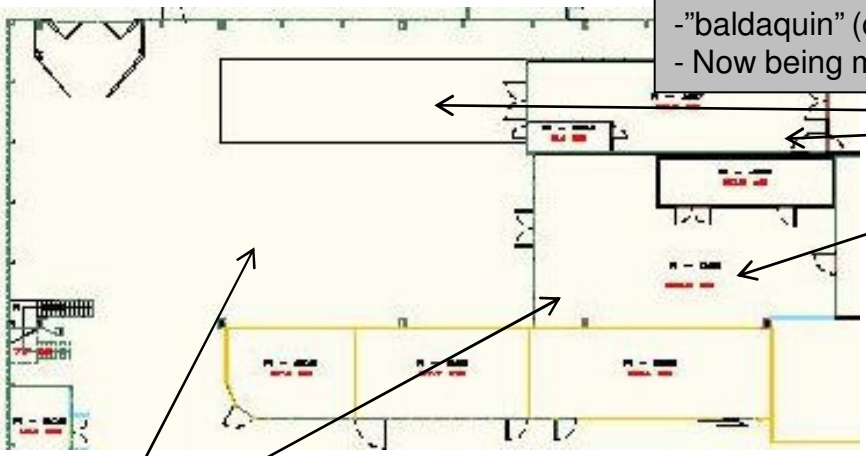
Sm18



-assembly of RF structures (cavities, Main couplers, …)
-clean room assembly RF structures (cavities, Main couplers, …)
-4 vertical test stands
-2 bunkers
-high power zone

Sm18 – assembly of RF structures (incl. clean rooms)

Clean room assembly of RF structures (cavities, Main couplers, …)
-15meters class1000 and class10 clean rooms
-"baldaquin" (clean 100)
- Now being modified for HIE Isolde cavities

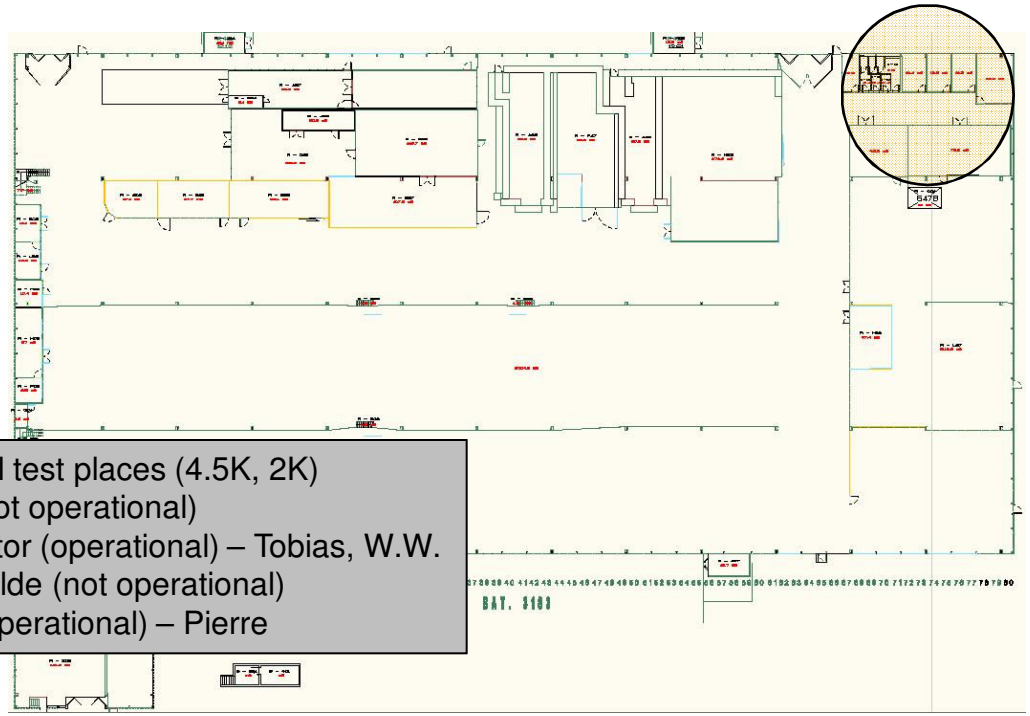


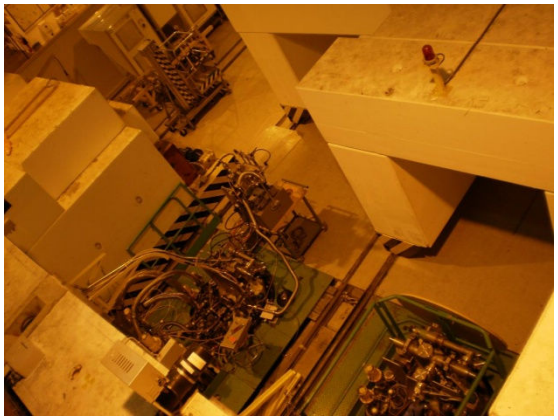
assembly of RF structures (cavities, Main couplers, …)

Actual activities:
-LHC cavities & modules
-LHC main couplers
-CLIC structures
-HIE Isolde cavities

Future (new) activities:
-CTF3 structures?
-HIE Isolde cryomodule?
-SPL cavity or cryomodule?

Sm18 – vertical test stands

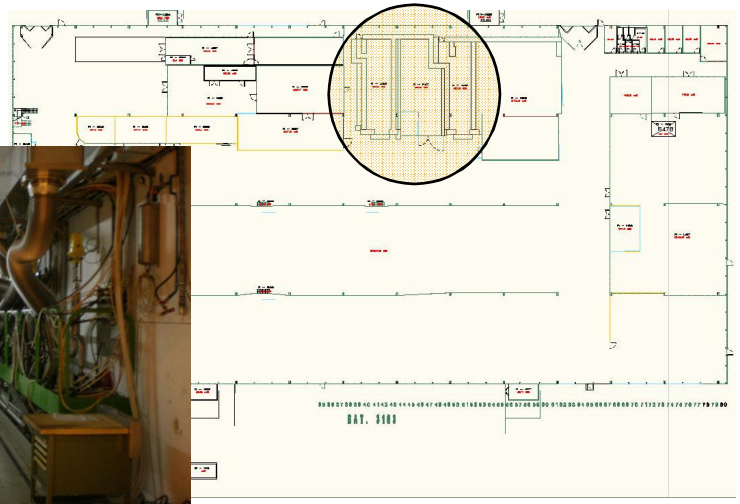


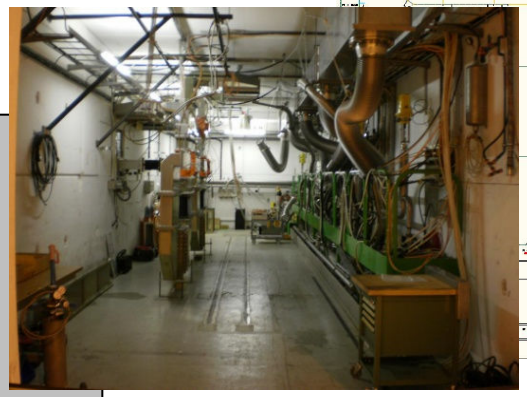


Four vertical test places (4.5K, 2K)
-V3: SPL (not operational)
-V4: resonator (operational) – Tobias, W.W.
-V5: HIE Isolde (not operational)
-V6: LHC (operational) – Pierre

New future plans:
- Upgrade of cryo distribution
-Upgrade V3 and V5 control system
-Construction, installation and test of HIE Isolde cryostat (who?)
-Test HIE Isolde cavities (matteo+fellow?)
-Test SPL cavities (?? + fellow?)

Sm18 – high power tests facility





Two bunkers:
-Bunker A: 352MHz
-Bunker B: 400MHZ
-High power zone
-100kV, 40A modulator
-HV bunker
-352MHz klystron
-400MHz klystron, circulator & RF loads

Bunker B = LHC bunker

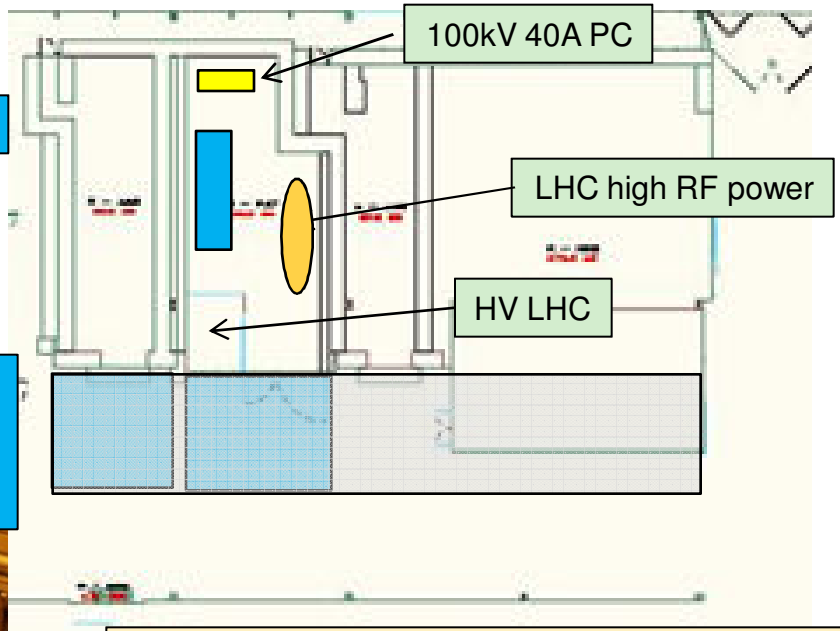
->RF power system will not be moved

-Future Plan: host HIE Isolde modules tests?

-Dimensions (height) to be checked
-Control system to be built
-Powering to be defined
-Manpower required…

Sm18 – high power zone modification

SPL klystron (linac4?)



Actual equipment of Bunker A
-LEP klystron + circulator +WG
-CW operation (max 230kW)

Actual use:
-Linac4 RF structure tests

Extension of RF zone to be requested for SPL:
-Bunker
-HV (50Hz modulator)

Advantages:
-Cryo
-Re-use existing infrastructure (water cooling, bunker, etc)

To be studied:

-Linac 4 High Power test place in B112?
-Extension of the RF zone in SM18

conclusions

- Several activities in parallel –> priorities can change
- B112 would be, a good place to host the Linac4 high power equipment (providing it can be installed there!)
  - Requires minimum hardware modification
  - Makes best share of the existing infrastructure
- Would leave the possibility to install a dedicated high power RF test place in SM18 for SPL
  - Requires extending the existing RF zone
    - Bunker
    - High power zone
- To do list:
  - Feasibility study of the Linac 4 test place in B112
    - Will be installed in SM18 if not possible (also to be studied)
  - Detailed integration of the modification required in SM18 for the SPL high power tests (+Linac4 evt.)
    - 50Hz modulator footprint
    - Modulator – klystron cabling & max distance
    - Circulator, RF load, WG system
    - Control system
    - Extension of bunker
  - Request for additional space