

The HITRAP-facility: Status report

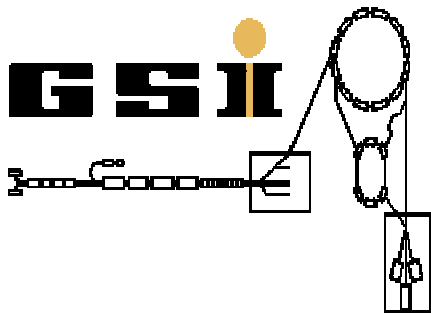
Oliver Kester, GSI, Atomic Physics Division

Outline:

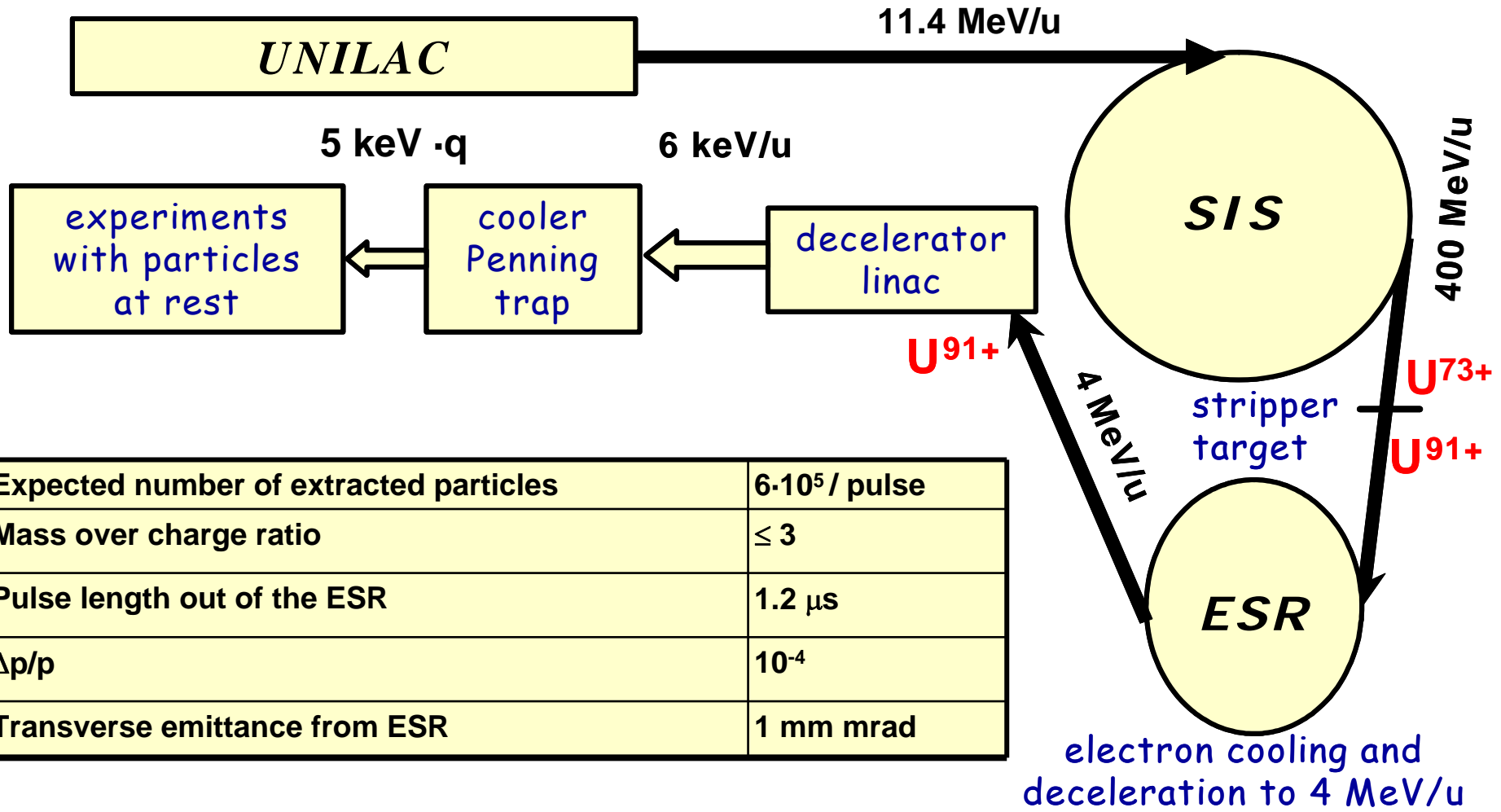
- **HITRAP overview and infrastructure**
- **The HITRAP LINAC**
- **Low energy beam transport and the cooler trap**
- **Schedule and planned commissioning**

People working on the facility construction

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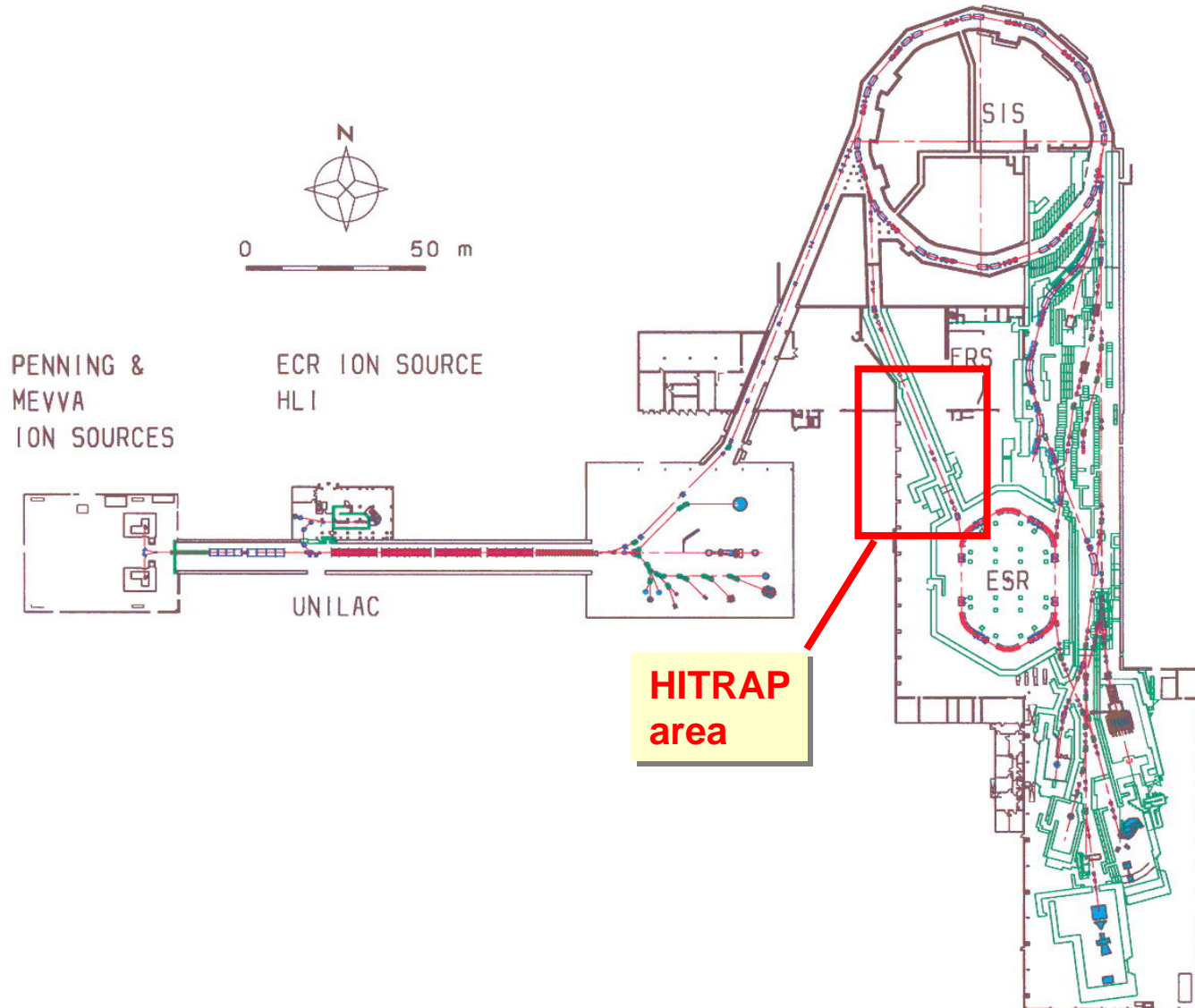


HITRAP overview

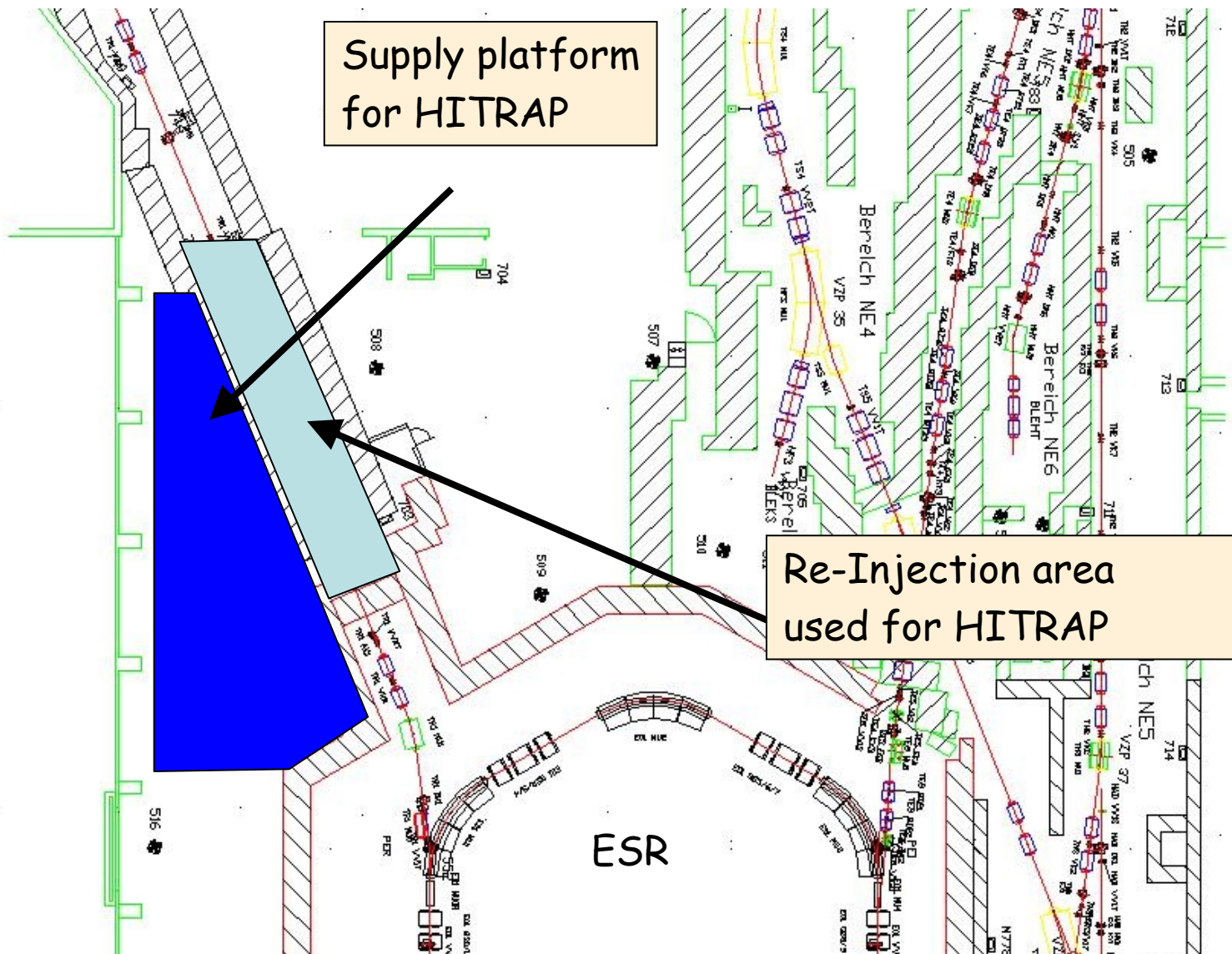


| | |
|--|------------------------|
| Expected number of extracted particles | $6 \cdot 10^5$ / pulse |
| Mass over charge ratio | ≤ 3 |
| Pulse length out of the ESR | 1.2 μ s |
| $\Delta p/p$ | 10^{-4} |
| Transverse emittance from ESR | 1 mm mrad |

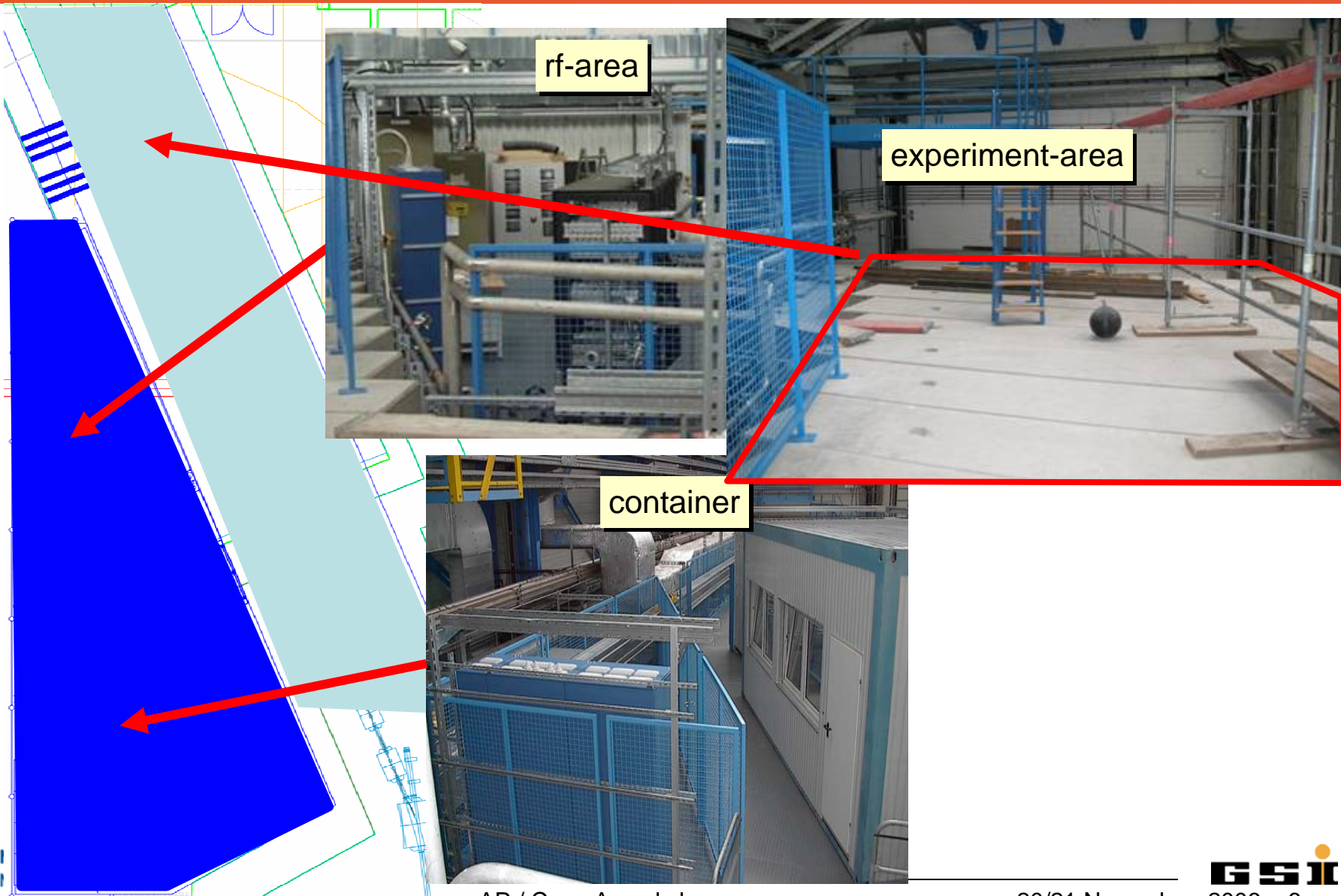
HITRAP in the re-injection channel



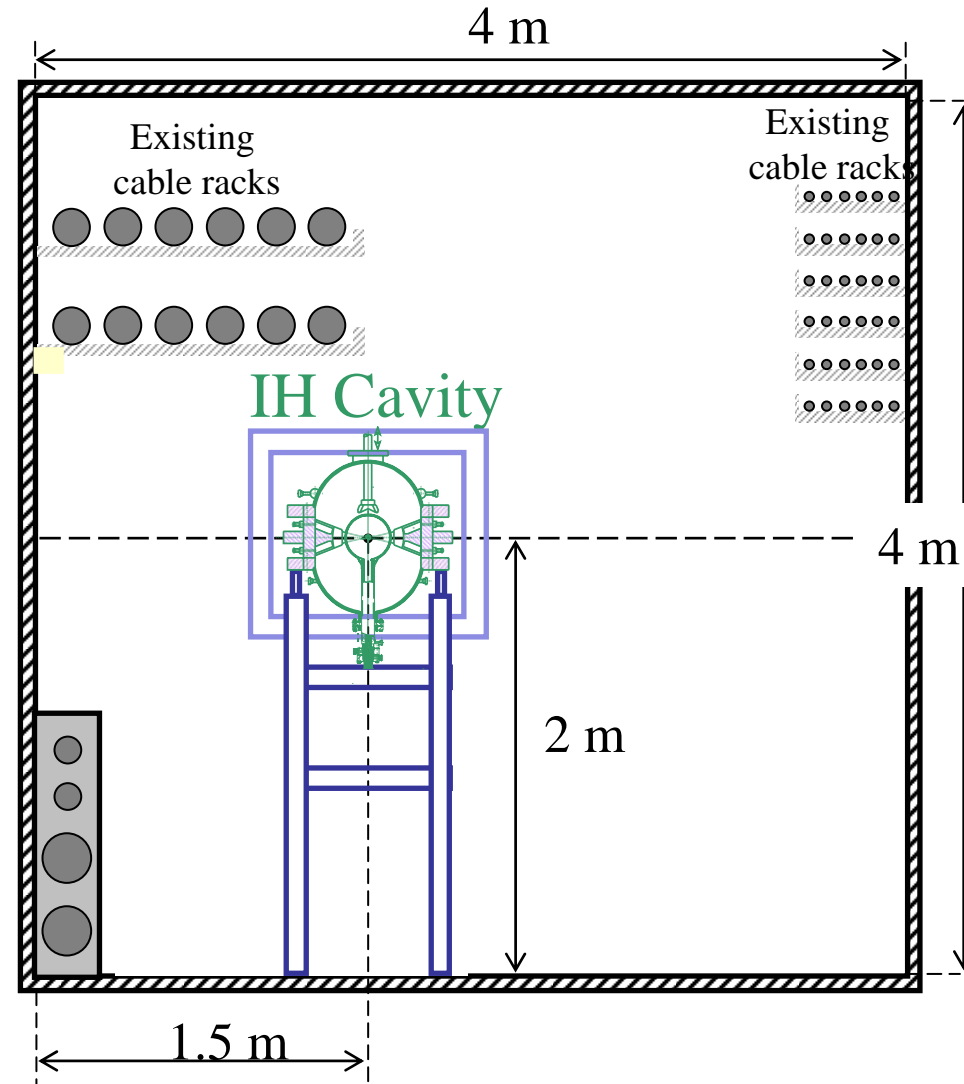
HITRAP in the re-injection channel



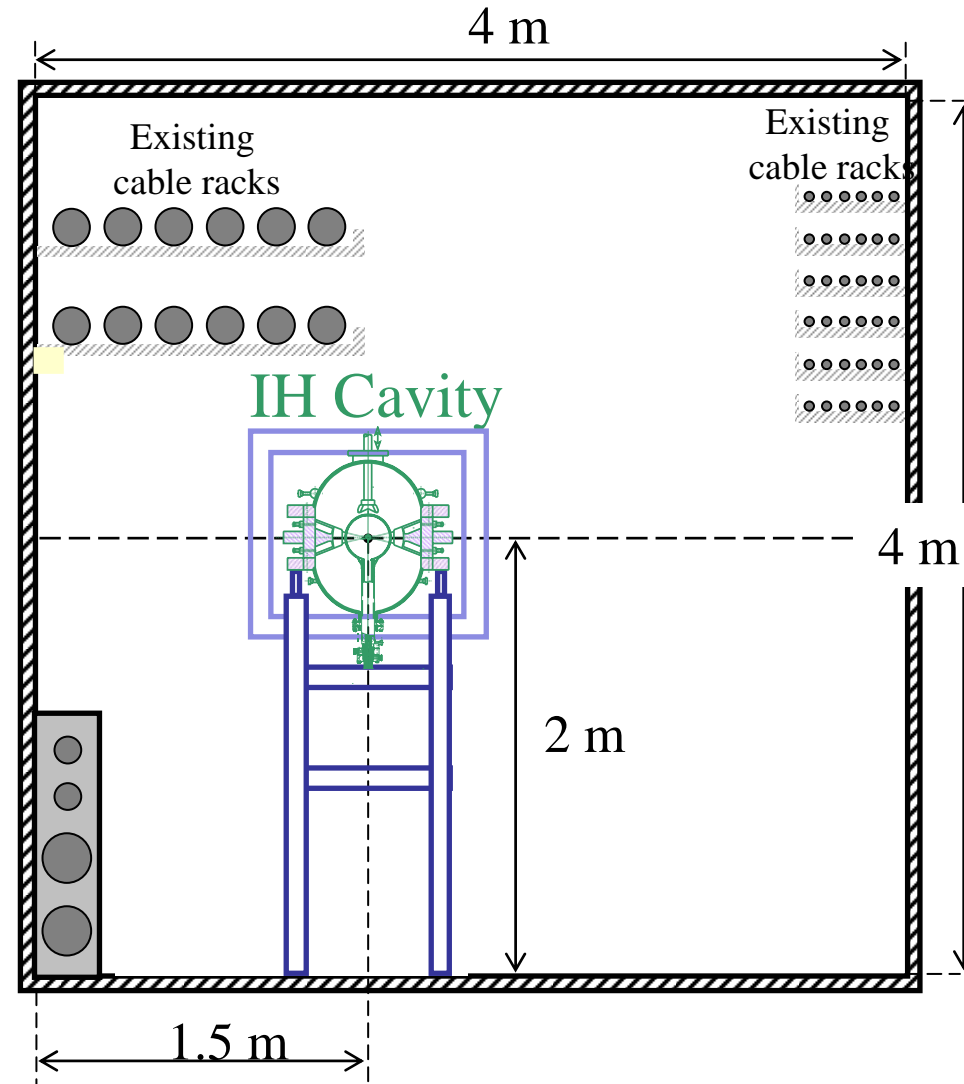
Infrastructure at the supply platform



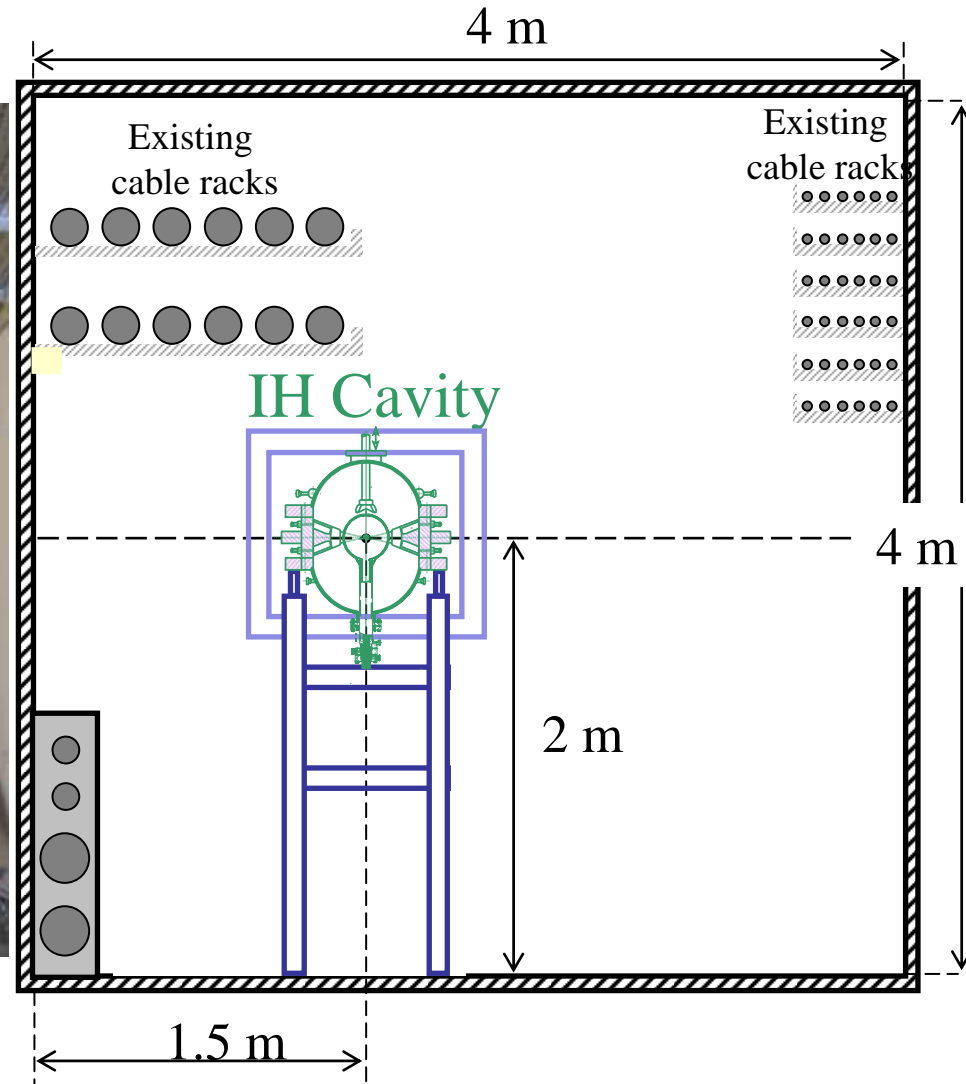
The re-injection channel



The re-injection channel



The re-injection channel

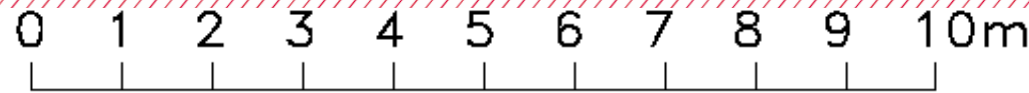


Overview HITRAP beam line

| | |
|---------------------------|---|
| Linac operation frequency | 108.408 MHz |
| Max. duty cycle | 0.5% |
| IH-deceleration gain | 4 MeV/u \rightarrow 0.5 MeV/u (10.5 MV) |
| RFQ-deceleration gain | 0.5 MeV/u \rightarrow 6 keV/u (1.5 MV) |

Other experimental setups

g-factor trap



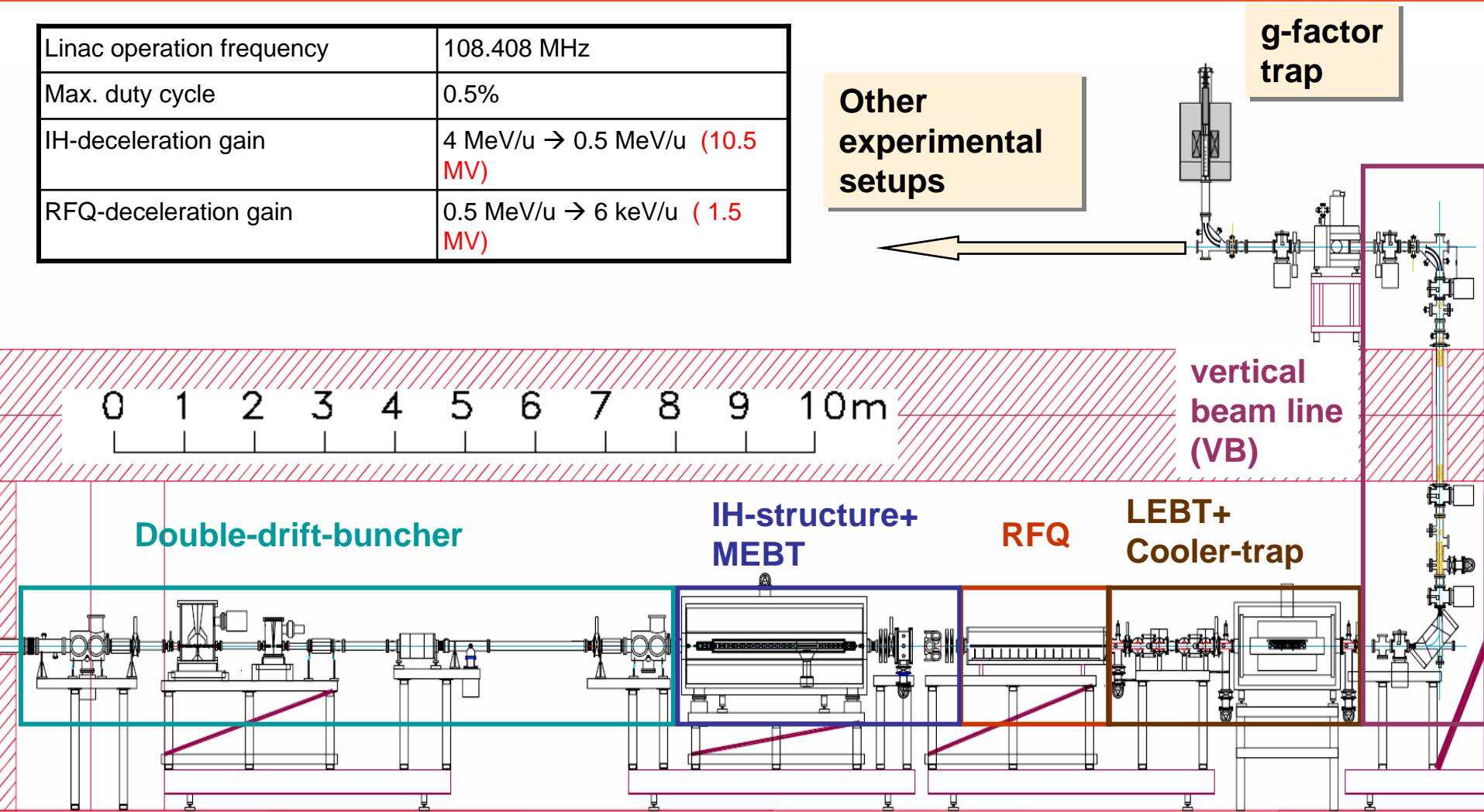
vertical beam line (VB)

Double-drift-buncher

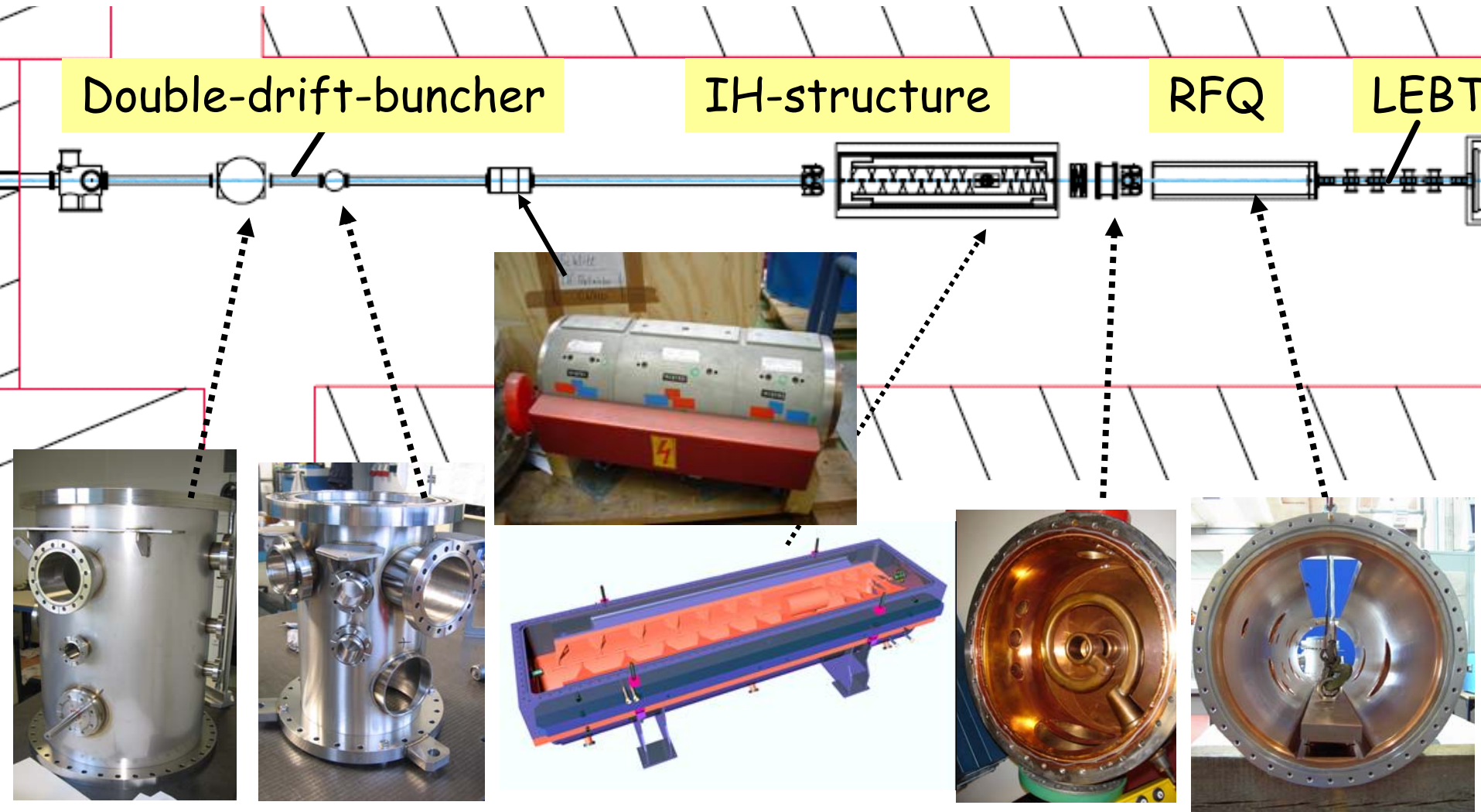
IH-structure+
MEBT

RFQ

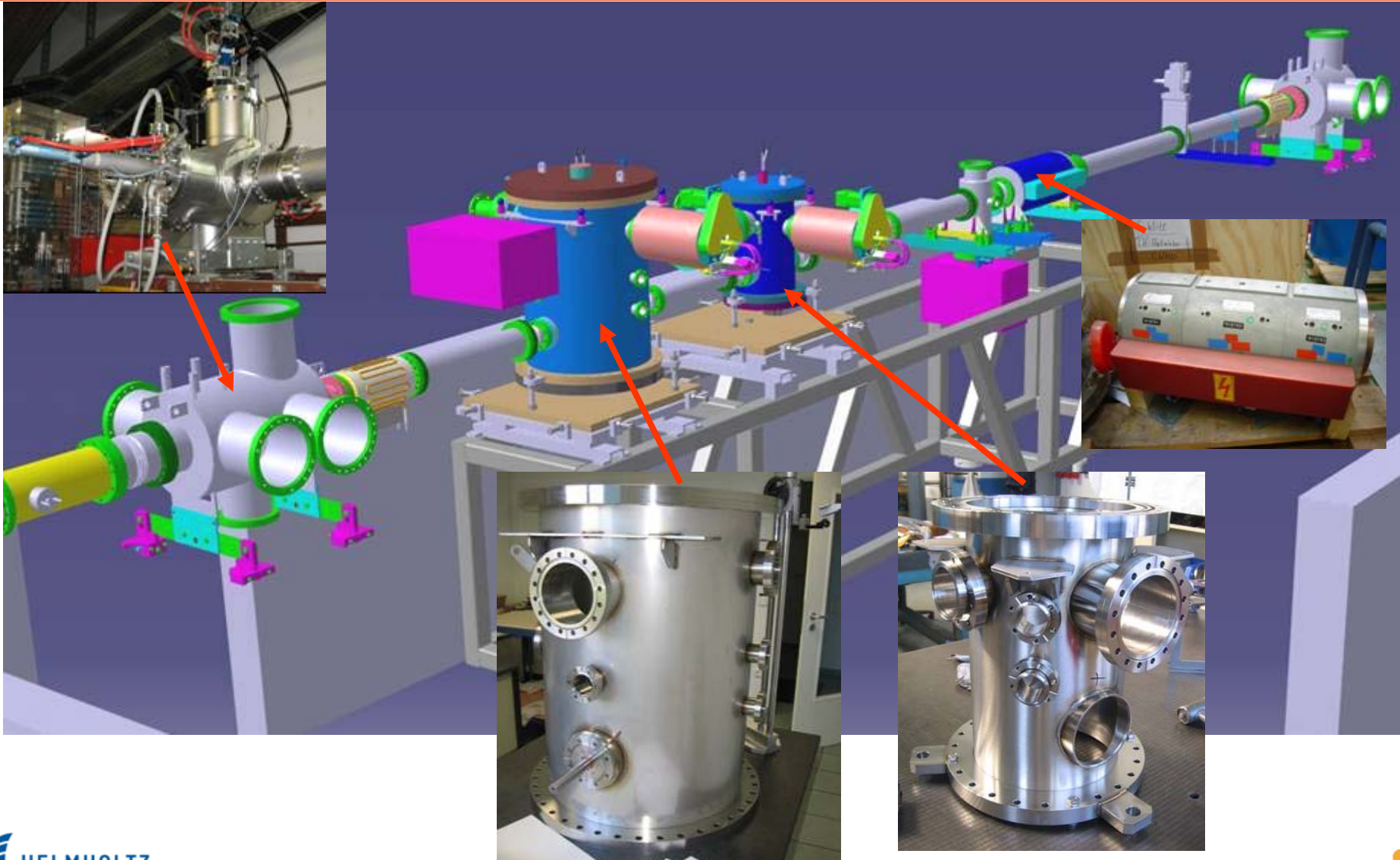
LEBT+
Cooler-trap



Linac components



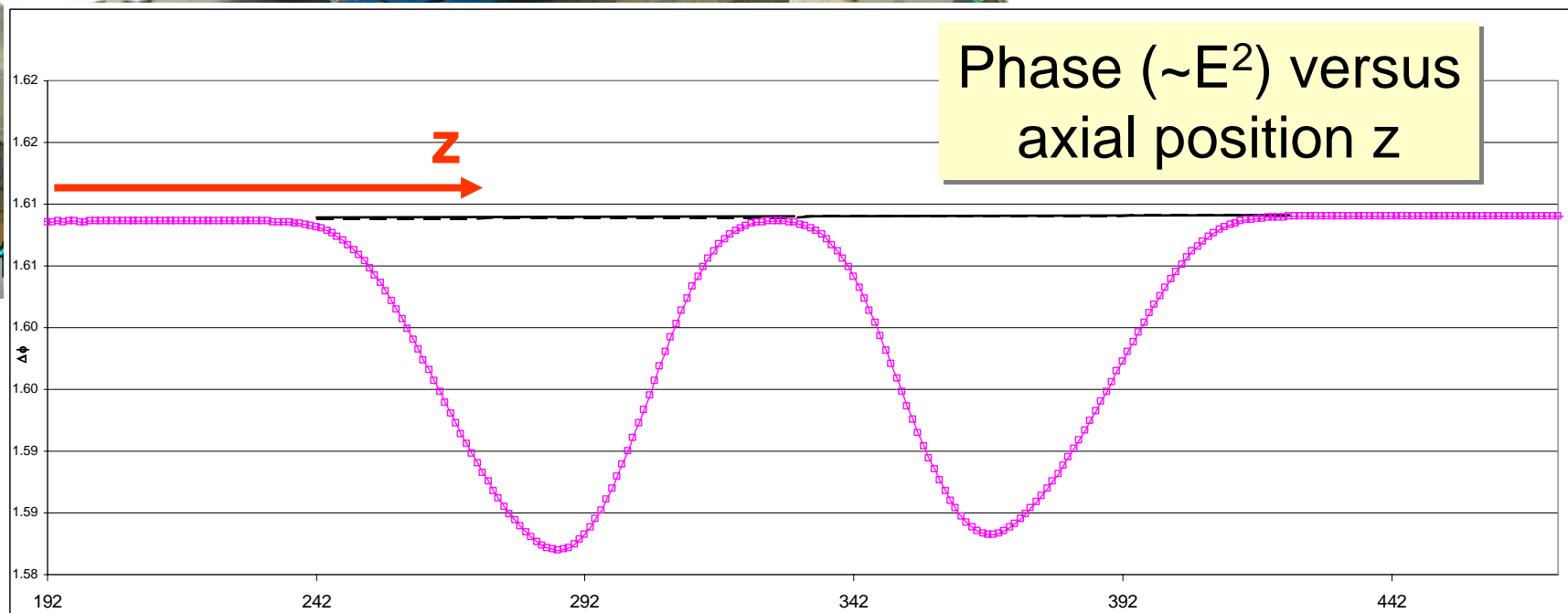
The DDB section of the HITRAP-linac



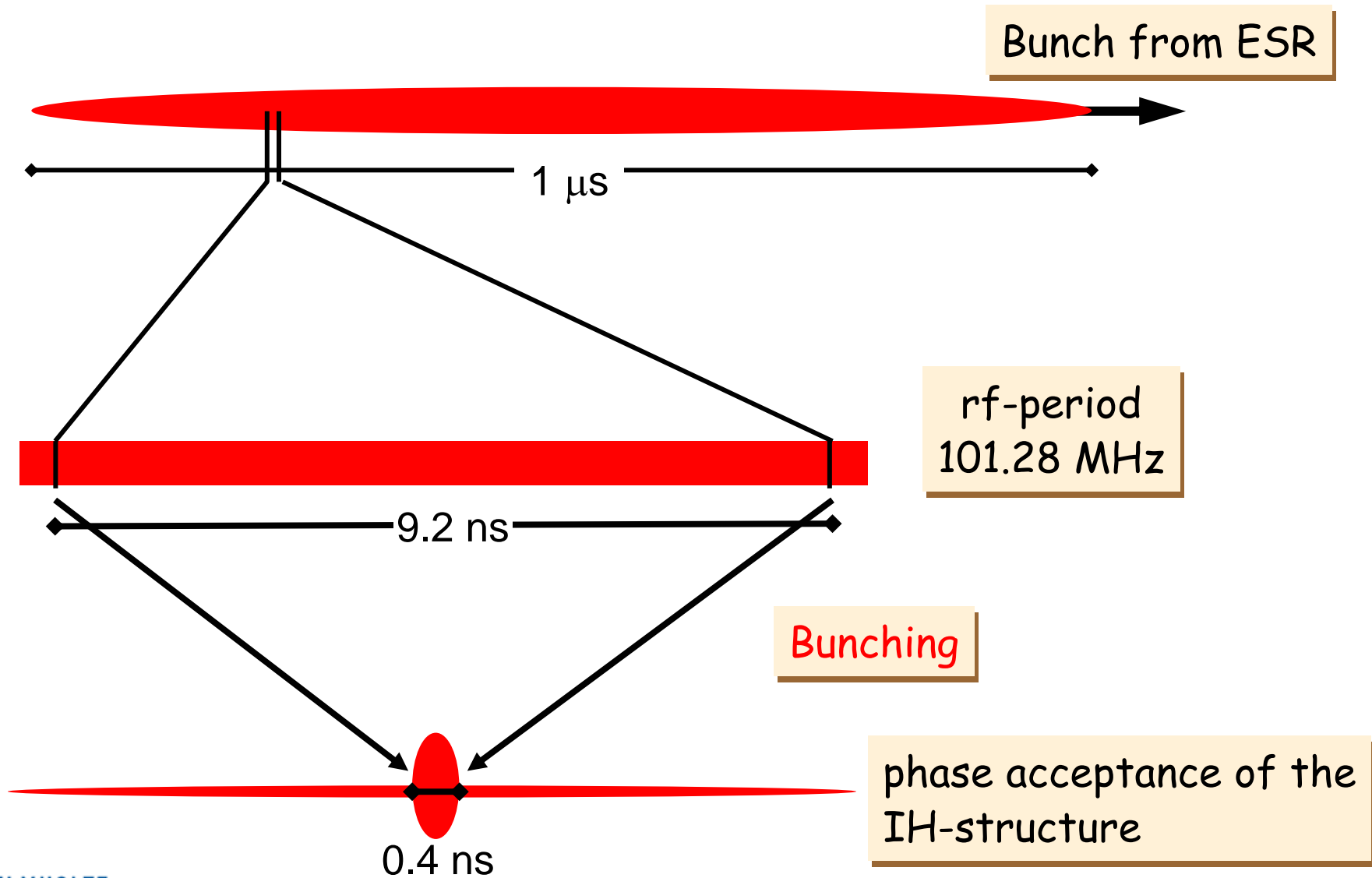
Tuning of the DDB cavities at IAP Frankfurt



Bead pull
measurements
at IAP Frankfurt



Bunching of the beam bunch from ESR



Preparation of the LINAC commissioning

Bunch length measurements with diamond detectors

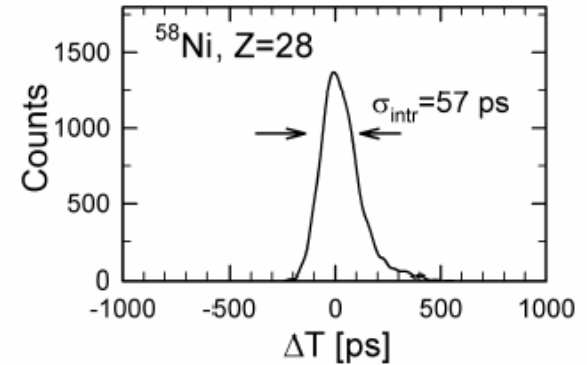
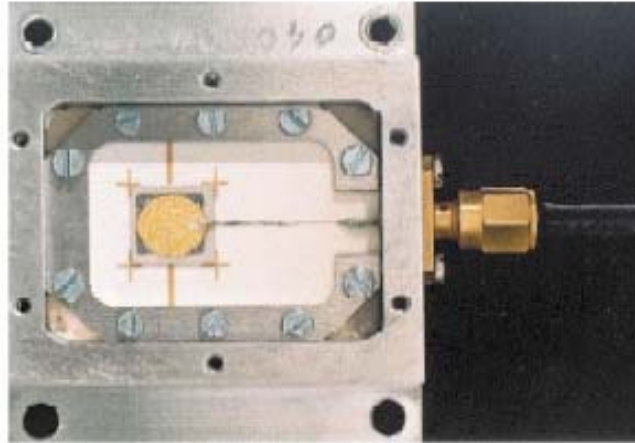
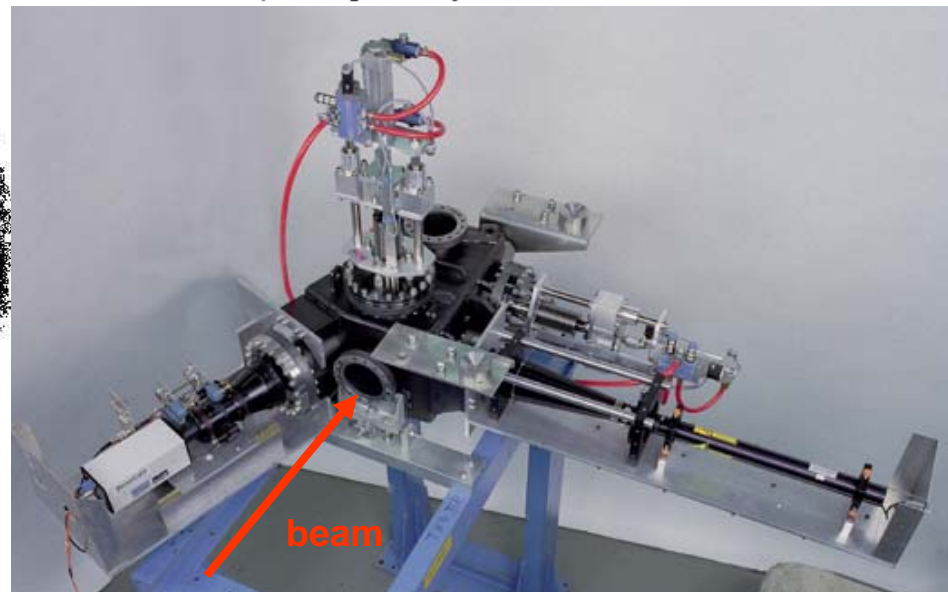
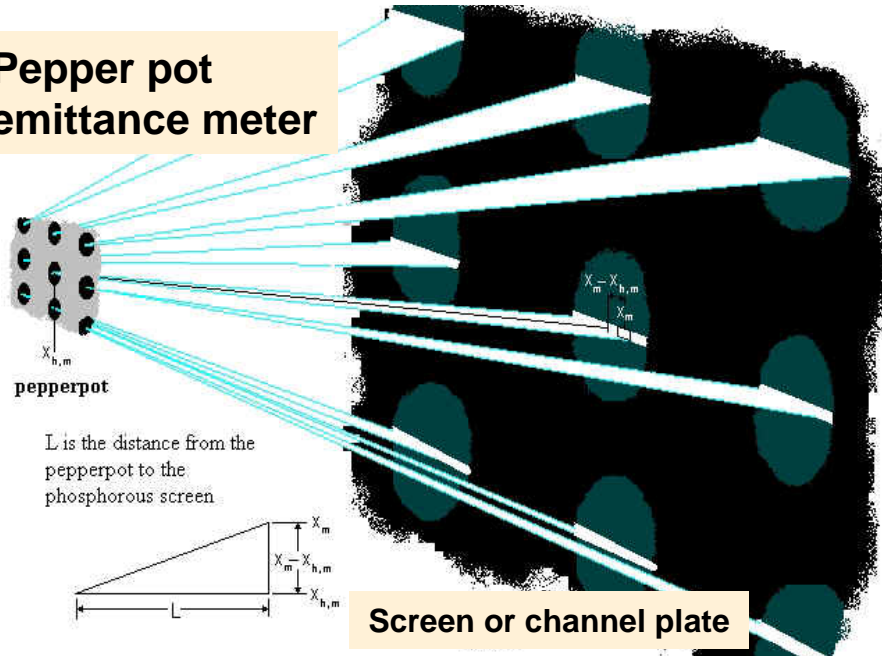


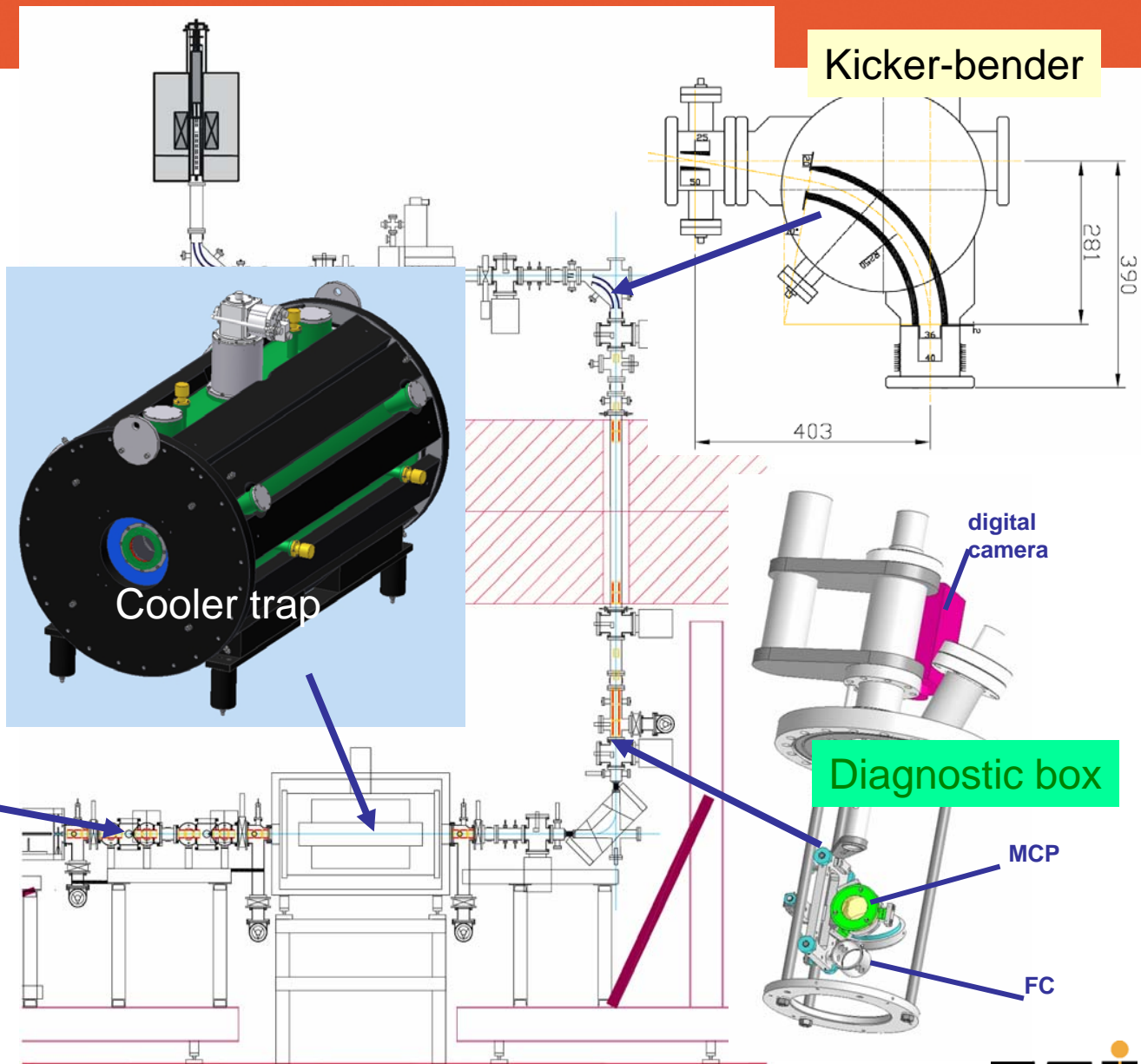
Figure 6: Time spectrum measured with ^{58}Ni ions at 600 MeV/amu. The samples used are 80 μm respectively 1.2 mm thick.

Pepper pot emittance meter

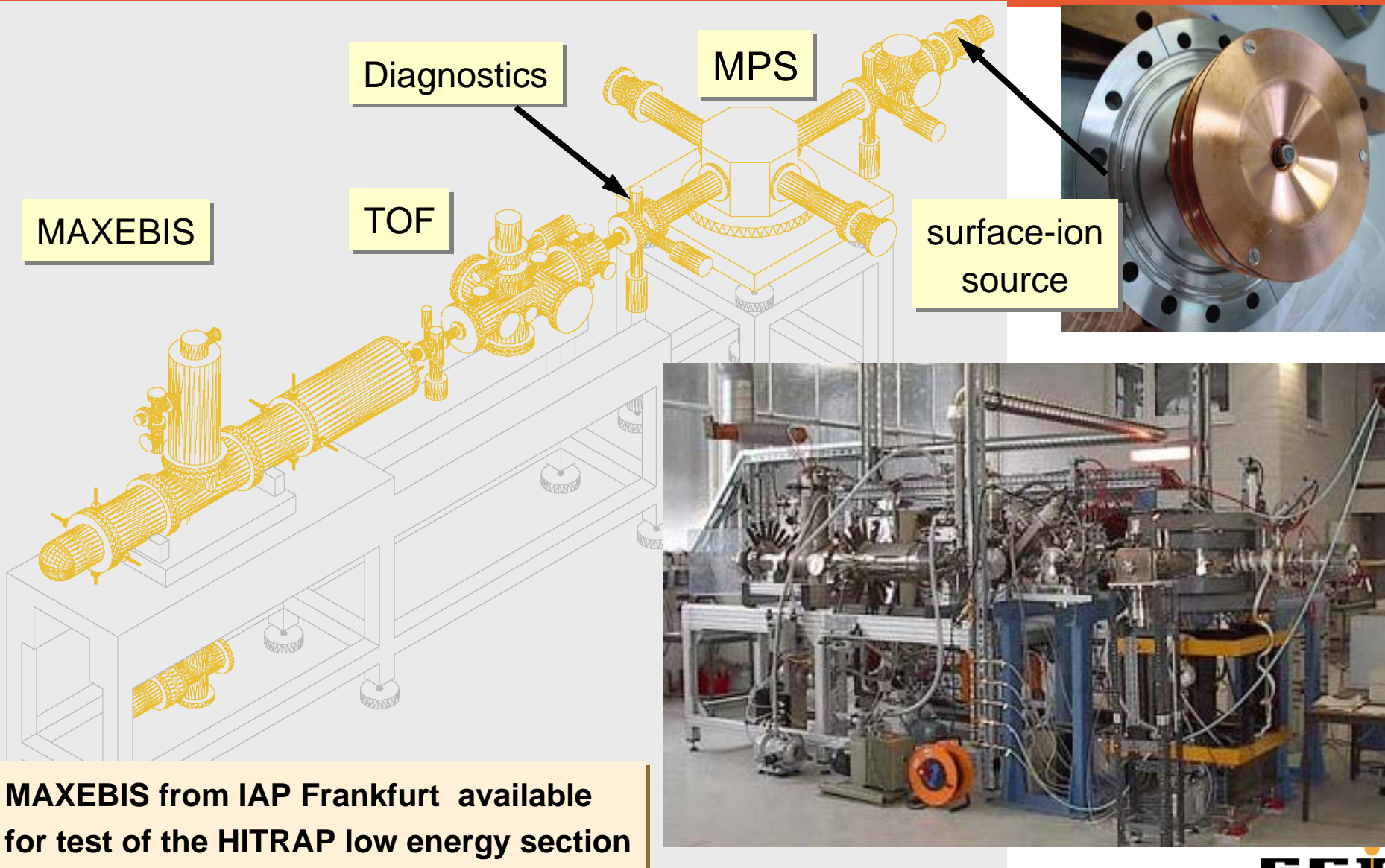


HITRAP low beam energy section

- Cooler trap magnet almost completed
- LEBT components in production
- Prototype of diagnostic box from KVI Groningen
- Design of vertical beam line is being done
- Offline tests with MAXEBIS setup in Heckhalle

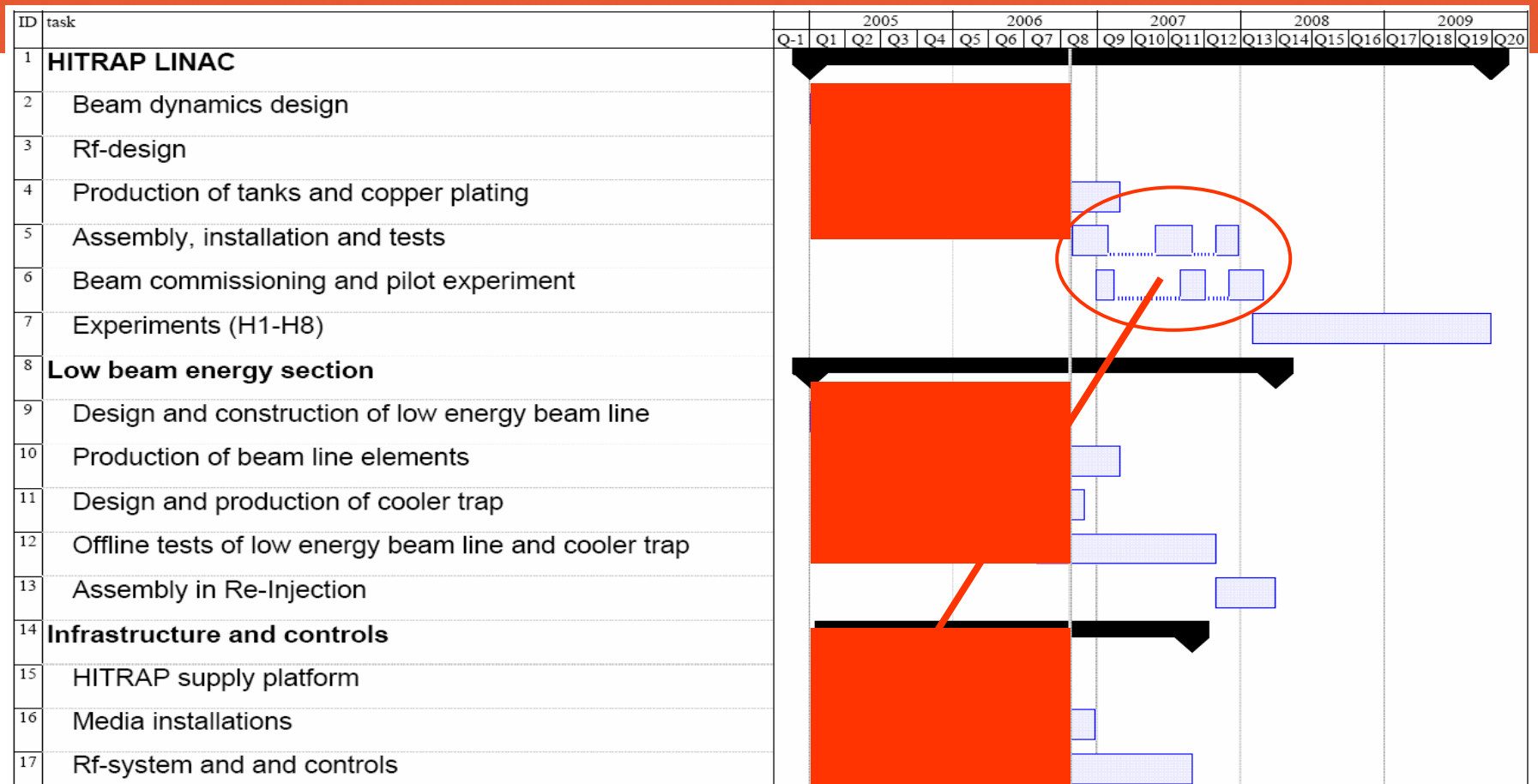


MAXEBIS setup for offline tests



MAXEBIS from IAP Frankfurt available for test of the HITRAP low energy section

Schedule and commissioning plans



| Planned | Duration | Goal of the beam time |
|-------------|-----------|--|
| 02/2007 | 21 shifts | Tuning of ramp down time of ESR and measurement of the beam quality downstream the double drift buncher |
| fall 2007 | 21 shifts | Test bunch compression and measurement of the beam quality behind the IH and behind the matching section |
| end of 2007 | 21 shifts | Improvement of ESR ramping and measurement of the beam quality after the RFQ |