



HIE-ISOLDE Project Status Report

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49th INTC Meeting
CERN, 11 February 2015

OUTLINE

- Outcome of CSR 27-10-2014
- Status of the technical systems
- Schedule
- Conclusions

Outcome 2nd CSR 27-10-2014

- Project monitoring tools found adequate
- Financial situation under control
- Schedule risk for physics deadline in 2015 highlighted
- Cryomodule assembly time is the schedule driver
- Re-assessment and mitigation plan requested by Dec.2014
- Phase II: go-ahead with procurement of remaining components
- Spare parts policy to be evaluated (for funding)
- Phase III: not for now, focus on high beta section (4 cryomodules)

Mitigation options and Actions

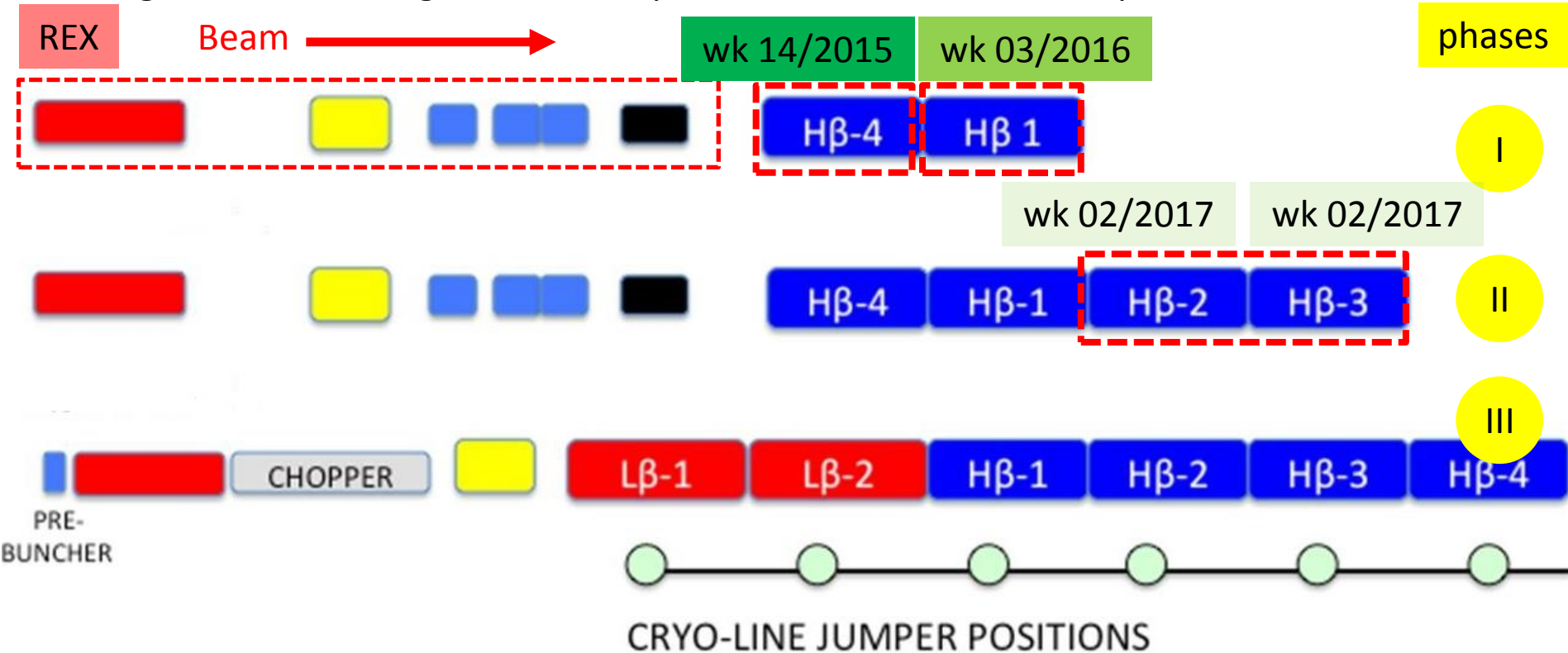
Endorsed by the Acc.-Tech. Sector Management on 16Dec14

- Test CM1 directly in the linac, skipping SM18 test
- Adapt installation and test planning (dry runs, check-out) and coordinate it tightly; anticipate resources during summer period
- REX re-commissioning: WG coordinated by R. Catherall
- Expedite 9-gap amplifier solution => backup solution with L4
- eventual extension of the proton run in 2015

Next review by ATS-MB mid-March 2015

Project Phases

Green light from A&T mngt to continue procurement for HIE-ISOLDE phase II.



Legend:



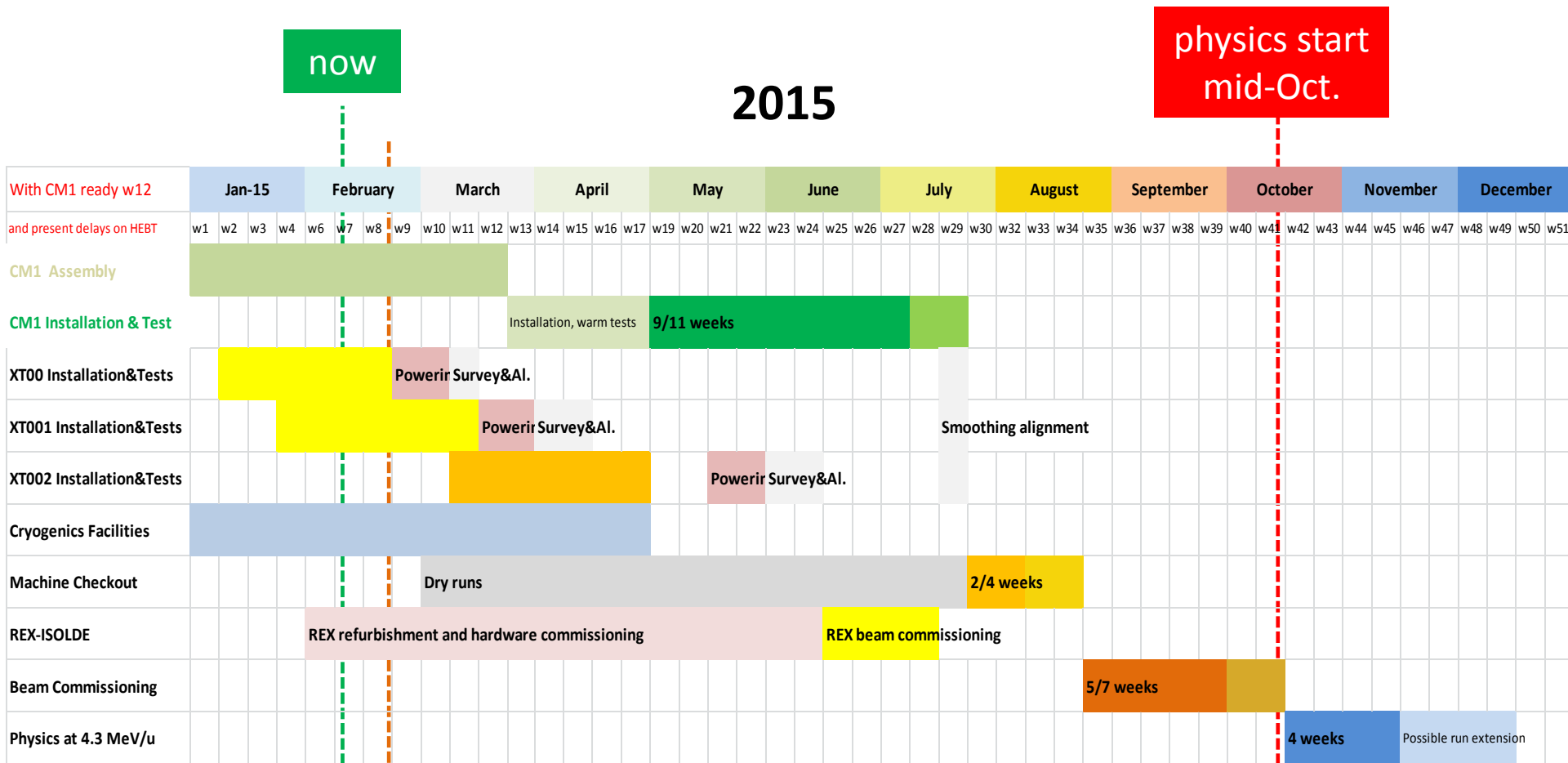
Existing REX-structures:

RFQ, IHS: 20-gap IH-structure, 7GX: 7-gap split-ring cavities, 9GP: 9-gap IH-structure



Present Status of Phase „I a“ (CM1)

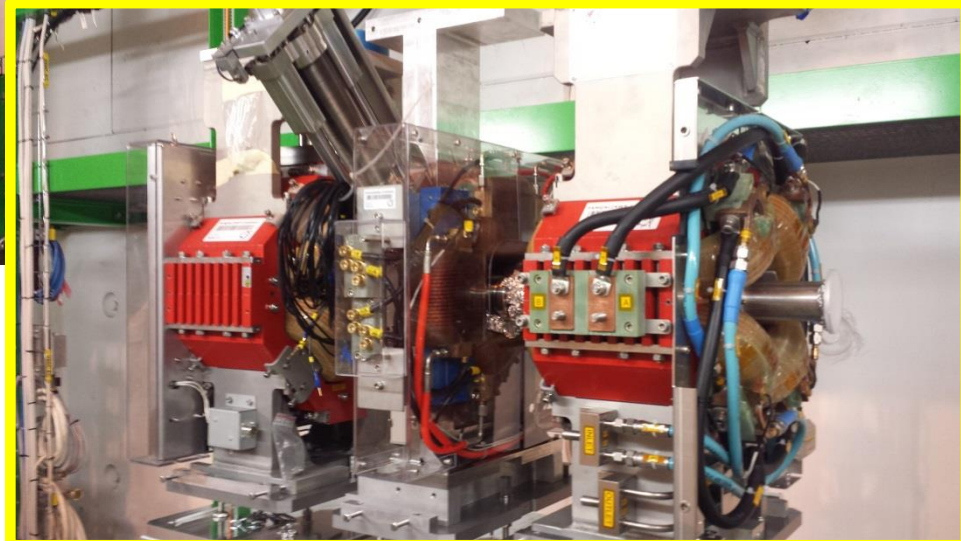
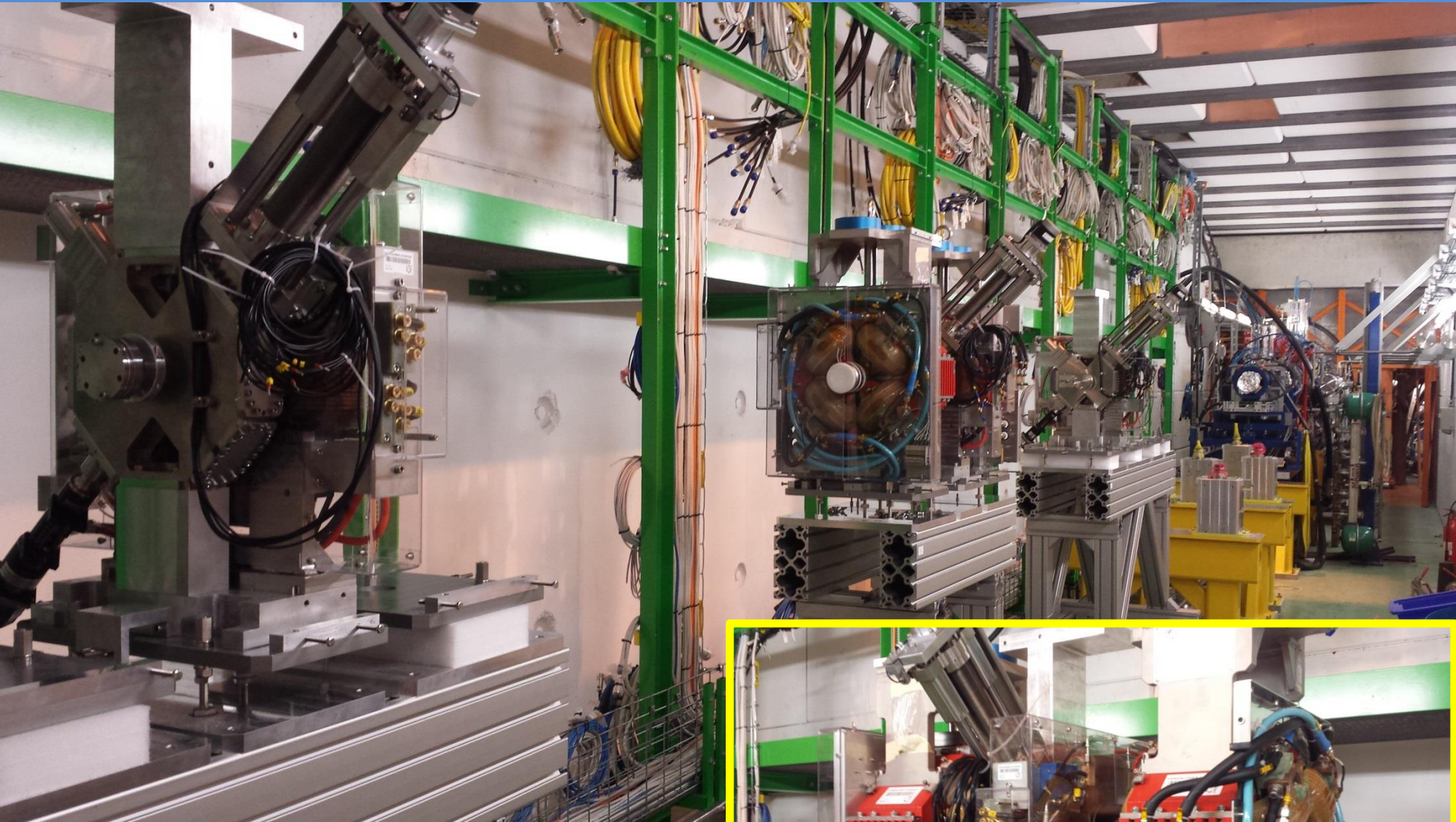
Roadmap to phase „I a“



HW tests starting
19 Feb.

Several mitigation measures to catch up with earlier delays possible (first already adopted: no cold test of CM1 in SM18).

HEBT installation status (XT00 in Linac tunnel, B170)



First doublet installed, DBs, correctors
CM jacks in place
Short Diagnostic Boxes being tested
Survey network being established

HEBT installation status (XT00 / XT01 / XT02, B170)



Cables, pipes, supports all in place



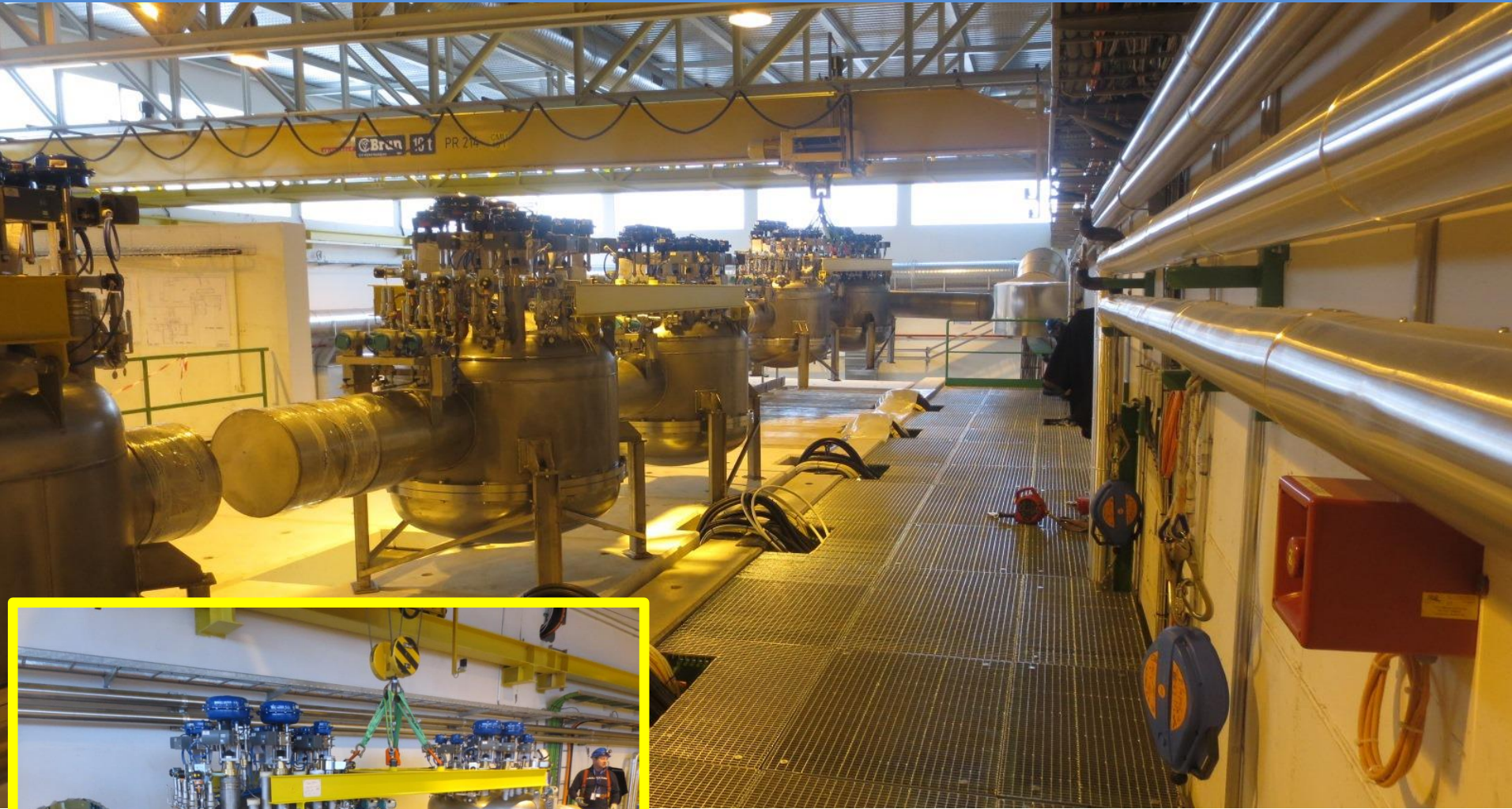
On mezzanine racks and crates to be filled up

Cryogenics installation status



Warm compressors in B198 being commissioned
Cold box in B199 in place; piping work

Cryogenic distribution line



Jumper boxes being positioned above the Linac tunnel (2.2.2015)

REX re-installation and -commissioning status



REX (NC linac, injector for HIE ISOLDE) being consolidated
RF ON after Easter (9-gap amplifier on 15 June with backup solution, good for light ions).
Original 9-gap amplifier scheduled to be back here end July.
The matter of REX commissioning will be presented at IEFC => Person in charge is R. Catherall.

CM1 assembly status



Assembled:

- Vacuum vessel with thermal shield
- Top plate with helium vessel and circuits, top thermal shield and supporting frame
- SC solenoid (tested at warm)

CM1 assembly status



Assembled:

- Blank cavity mounting
- Instrumentation setup

Cavity final rinsing and dressing going on (3/5 done).

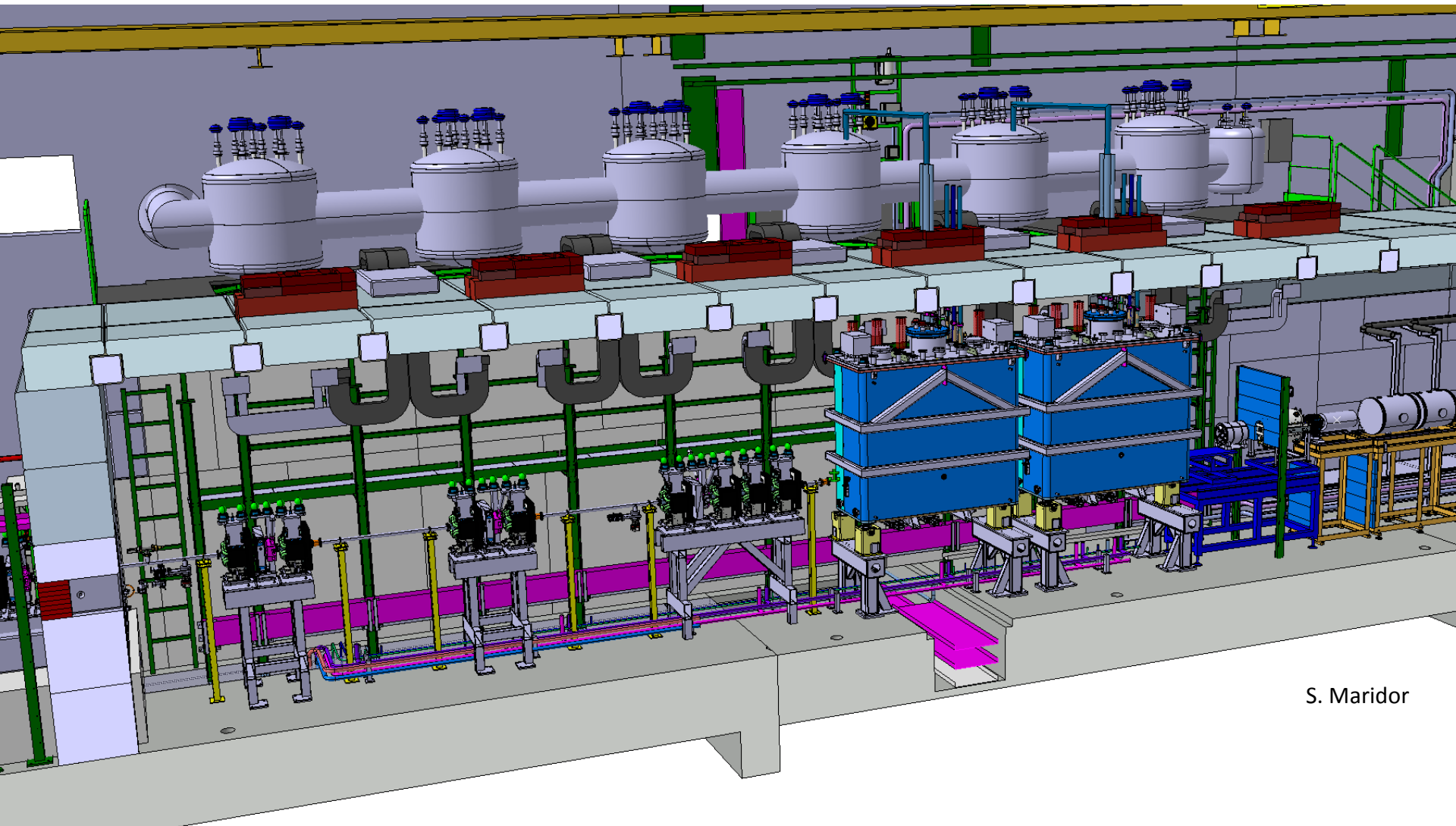
Next:

- Global leak test with He circuits pressurized
- Cavity and ancillaries assembly
- Pressure test
- Final leak test



CM1 expected to be ready for transport wk 12/2015.

Phase „I b“ (CM 2)



S. Maridor

Components:

- Cavities – assembled so far 7 from RI, 7 sputtered (5/7 RI + 2 CERN) – 5 to use in CM1; 1 stripped (to be recoated in 2 wks), followed by the other; plan to have **next batch of 5** ready in June.
- Solenoid – new coil will be impregnated wk 6; results of fixings in wk 8; if passing tests delivery planned for wk 12.
- Vacuum vessel – dimensional checks to be completed; to arrive here wk 7.
- He vessel – ok, to arrive here wk 7.
- Thermal shield – all Ni plated panels arrived at CERN; now with MME to repair the damaged pipes (bent by Corima); found a solution to straighten them, need pressure test to validate .

Planning:

- Announced assembly time for CM2 21 wks (CM1 foreseeably = 25-27 wks).
- Assembly start ca. wk 14 (end March)
- Assembly finish ca. wk 34-35 (2nd half of August)
- Cold test in SM18 ca. wks 36-43 (until end October)
- Installation in SC Linac SD 2015/2016, then HW commissioning (services to be available)
- Beam to ISOLDE start ca. April 2016 (?), beam commissioning 5-7 weeks, physics at 5.5. MeV/c could start ca. mid/end May 2016

Manpower:

- TE-MS-C confirms deployment of same staff for CM2 as for CM1;
- As of end March gradual handing-over of the activities to BE-RF, while responsibility for assembly remains with TE-MS-C.
- To make up for that BE-RF intends to add 1 staff full-time and to re-allocate one of the existing AL40-30 people, as of April.
- EN-MME: Principle agreement to support the CM2 components manufacturing



Phase II (CM3 + CM4)

Components for CM3 + CM4

Components (except cavities and solenoids):

Parts list prepared and circulated ATS-MB for approval.

Cost estimate 1.37 MCHF, w/o manpower (~0.8 MCHF).

Discussed with Procurement Service => Agreed to launch negotiations with companies / workshop.

Results to be compiled for management decision by mid-March.

Cavities:

Originally ordered 15 from industry. Additional 2 made at CERN (actually 3 but QP1 no usable).

Stolen (raw material for 3 inner conductors and 1 outer cylinder; remaining parts unusable).

To be re-ordered for CM3 + CM4, strictly speaking 3 (if 0 spares) making use of the "+5" option in the contract

Recommended to have 5 spares, meaning to re-order 8 more cavities (20 installed + 5 spares at the end of phase II).

Solenoids:

Used He tanks have been scrapped after first tests of CM1 and 2; need to re-build new (12-15 wks). New solenoids for CM3 and 4 could be available around wk 23.

Summary

- Looks like **phase 1 a** will be getting there in time; at least it has a good chance to do so (provided no major technical issues turn up or hiccups occur – transport incident, major vacuum leak, pollution, RF performance, ... (long list)). Present ready-for-installation date of CM1 = wk 12/2015.
- **Phase I b** (CM2) shall normally also get ready well in time as per baseline planning adopted in April 2014. CM2 will first be cold tested in SM18 – needs SM18 cryogenics in M9 bunker operational by wk 34/2015. Present CM2 assembly finished date = wk 34/2015, ready for installation as of wk 43/2015 (installation in SD).
- Procurement for **phase II** (CM 3 + 4) is being prepared and shall be launched – subject to management approval – in March 2015.
- Construction for **phase II** (CM 3 + 4) planned for 2016, allowing physics with 4 high-beta CMs as of 2017.
- Continued high commitment needed at all levels to make the above plans a reality.
- Spare policy defined (EDMS 1466161), to be submitted to management for approval

Thank you

SPARE PARTS at the end of PHASE 2 (EDMS 1466161)

| Item | Installed | Spares Needed | Spares Available | Action* | Cost (kCHF) |
|------------------|-----------|-----------------|------------------|-----------------------|-------------|
| Cavities | 20 | 5 | 2 | Order 3 (RI) | 180 |
| Tuning systems | 20 | 5 | 0 | Order 5 | 60 |
| Coupling systems | 20 | 10 | 0 | Order 10 (CERN) | 120 |
| Power amplifiers | 20 | 6 | 4 | Order 2 | 25 |
| LLRF controllers | 20 | 10 | 10 | None* | 0 |
| SC solenoids | 4 | 1 | 0 | Activate option for 1 | 80 |
| Other CM parts | NA | Assembly spares | NA | Order | 65 |
| MB | 4 | Spare coils | yes | None | 0 |
| MQ | 22 | 2 | 2 | None | 0 |
| MC | 11 | 2 | 2 | None | 0 |
| SCS PC | 4 | 1 | 0 | Order 1 | 10 |
| MB PC | 4 | 1 | 1 | None | 0 |
| MQ PC | 22 | 4 | 4 | None | 0 |
| MC PC | 22 | 4 | 4 | None | 0 |
| SDB | 5 | 1 | 1 | None | 0 |
| LDB | 8 | 1 | 1 | None | 0 |
| TOTAL | NA | NA | NA | NA | 540 |

Financial Situation (EDMS 1422826)

Infrastructure

“The Cost to Completion of the infrastructure part of the HIE-ISOLDE project, entirely funded by CERN, is **21.2 MCHF**.”

The revised estimate of the infrastructure part shows that the **total cost remains unchanged.**”

Machine

“The Cost to Completion of the machine part of the HIE-ISOLDE project was revised in November 2013 in the EDMS document “*HIE-ISOLDE Project Financial Situation 2013 – Machine Part*”. The new Cost to Completion for the machine part was announced at **21.95 MCHF**.”

The actual accounting of Phase 1 and the revised estimate for Phases 2 & 3 show that the **total cost remains unchanged**”

Financial Situation (EDMS 1422826)

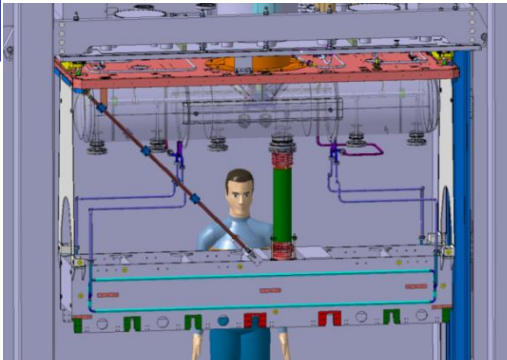
“Funding and Cash Flow for the Machine Part

Based on the income secured so far by the collaboration, the CERN loan granted and special contribution from CERN, the cash balance of the machine part of the HIE-ISOLDE project shows that:

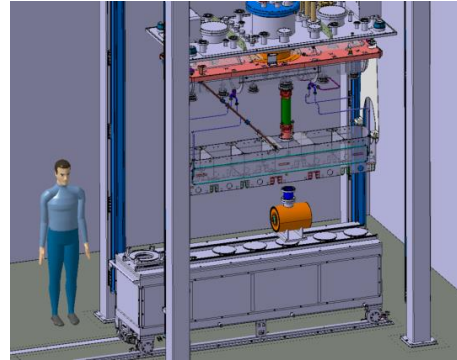
**the Phase 1 is funded,
0.7 MCHF are missing for the Phase 2
and 5.6 MCHF are missing for the Phase 3.”**

Cash flow shortage for Phase 2 (transient effect due to collaboration rate of contribution) does not seem to be a showstopper

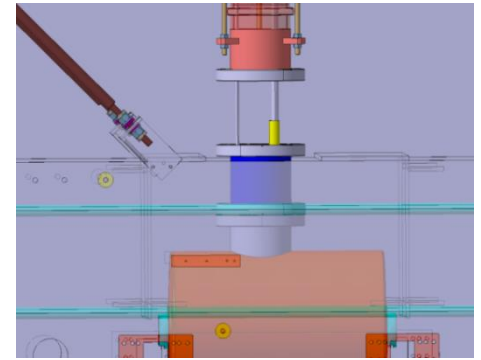
CM assembly process (2/2)



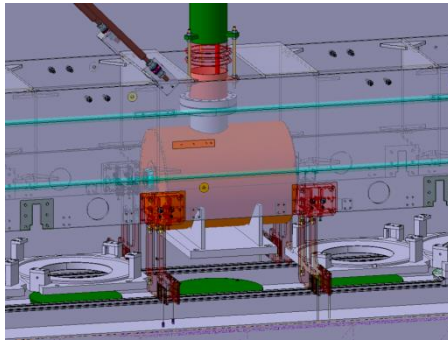
Diagonal rods + cryo circuit



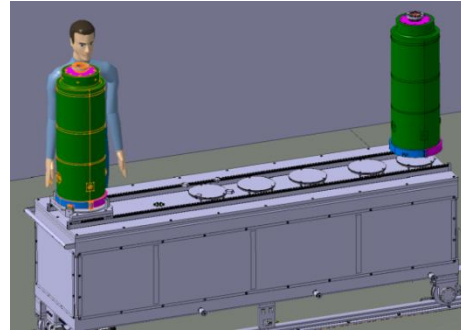
Solenoid



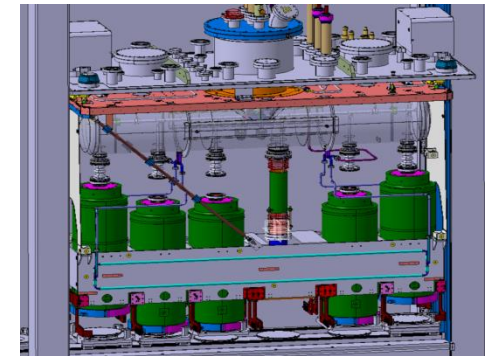
Solenoid connection



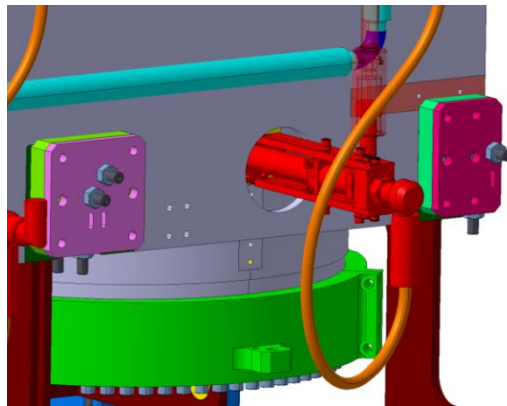
Solenoid alignment



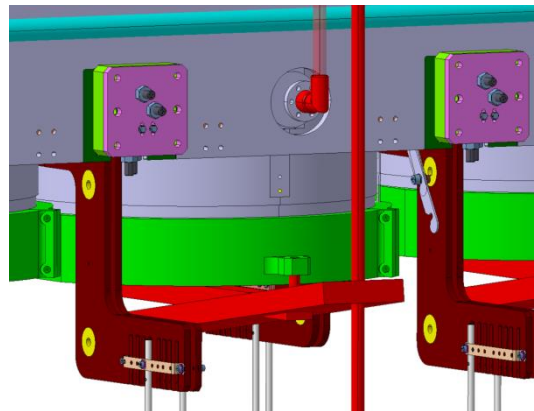
Cavities



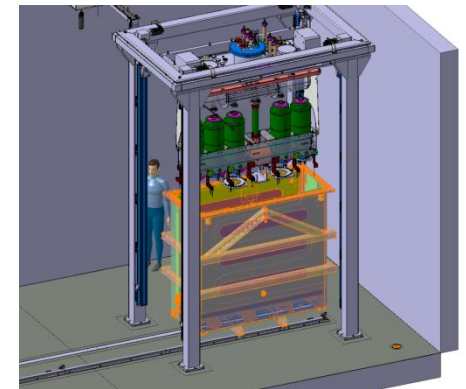
Cavities connection



RF couplers and lines

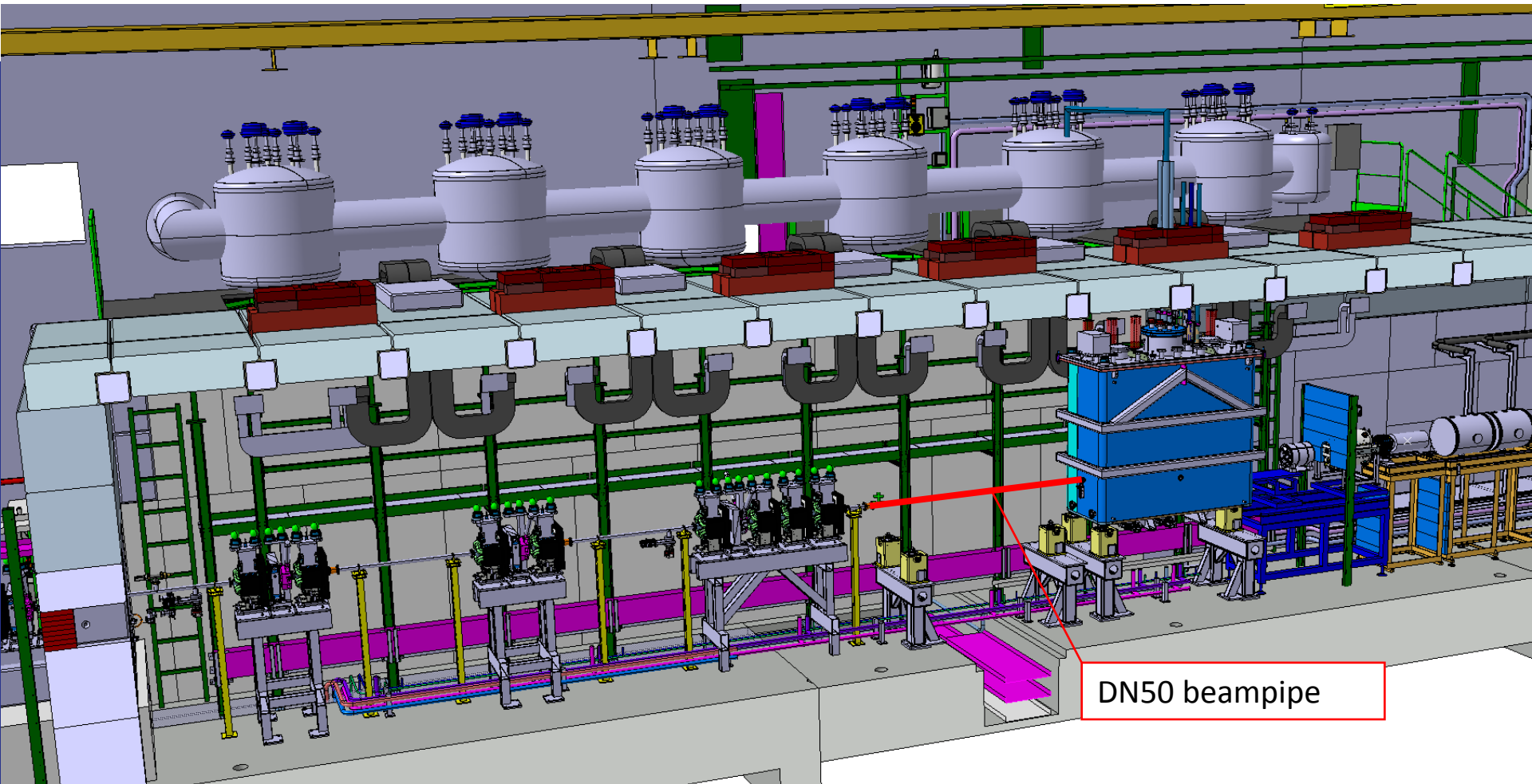


Tuning system



Final insertion inside vessel

(phase „I a“)



DN50 beampipe

Cryo Cold Line & Jumper Boxes installation: Sept 2014 – Jan 2015 => **end-Feb 2015**
(installation Line, Jumper Boxes & Dewar (2000L) ongoing byCRIOTEC)

Cryo Module 1 installation: April – June 2015

Scenario: Physics at 4.3MeV/u with 1 CM as of October 2015