HIE-ISOLDE Project Status Report: Planning of Phase II

75th ISOLDE Collaboration Committee meeting
February 2nd 2016

Y. Kadi
for the HIE-ISOLDE project team

OUTLINE

- Shut-down works
- Schedule 2016-2018
  - ✓Physics @ 5.5 MeV/u
  - ✓Physics @ 10 MeV/u
- Conclusions

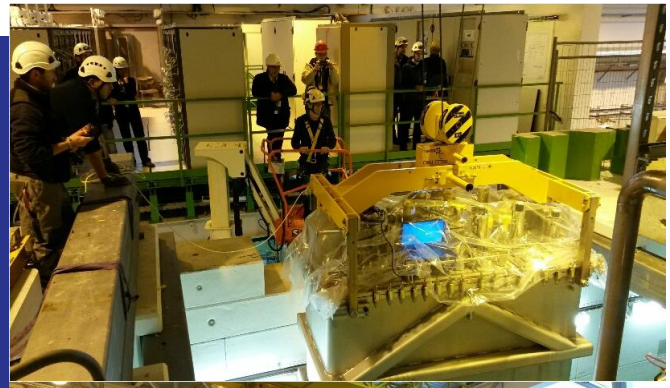
Preparation for running w/ CM1 + CM2

Main HIE ISOLDE installation and start-up tasks:

- Removal CM1: End-of-year 2015 / Wk1 2016
- Modifications and repair BI Dboxes: Jan 2015 – April 2016
- Installation CM2: end Feb – end March 2016
- Installation REX 9 Gap RF amplifier: end Feb – end March 2016
- Re-installation CM1: end March – end April 2016
- Cryo modifs & maintenance: Dec 2015 – end April 2016
- HW & Beam commissioning CM1 & 2: May – mid Aug 2016

courtesy E. Siesling, 22.01.2016

Dismounting & Transport of CM1



<u>Cryo Module 1 transport to SM18:</u>
for retrofitting of the couplers.
Friday 8 January.
To be received back end of March.

courtesy E. Siesling, 22.01.2016

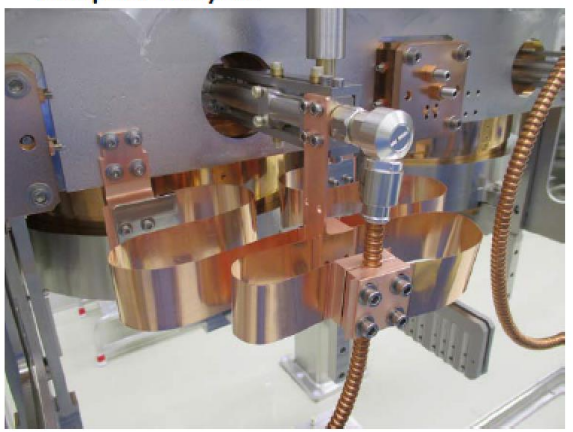
Assembly of CM2

Courtesy Y. Leclerq, 29.01.2016

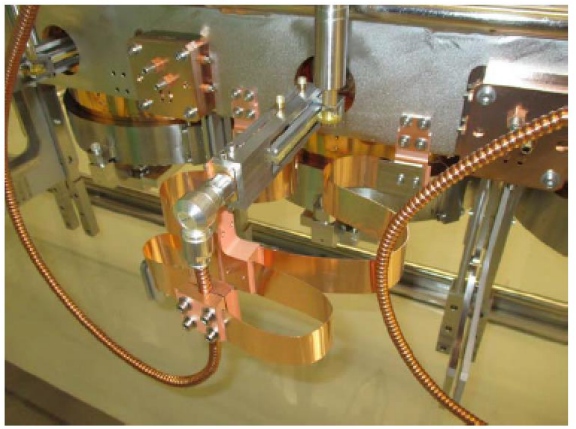
Achieved W04 – CM2

- Routing instrumentation
- Installation thermalization
  - Coupler thermalization OK
  - 3rd cable thermalization: rework needed : OK
- Tightening bellows
- Preparation for installation of additional temperature sensors
- Preparation for outside clean room tests
  - Pressure test equipment (CRG + AL4030)
  - HSE
  - VSC availabilities
  - Survey procedures

Coupler fully IN

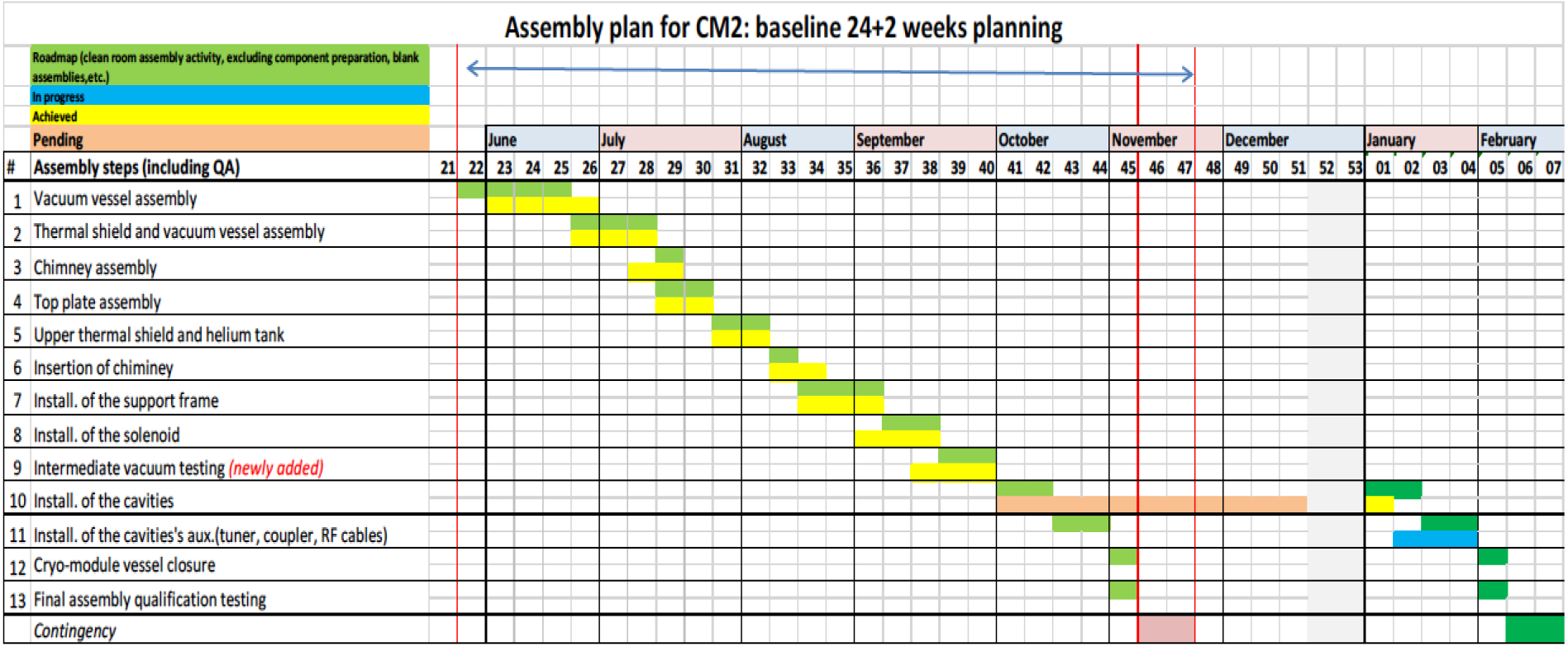


Coupler fully OUT



Roadmap for CM2

Courtesy Y. Leclerq, 29.01.2016



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- End-of-year shut-down works
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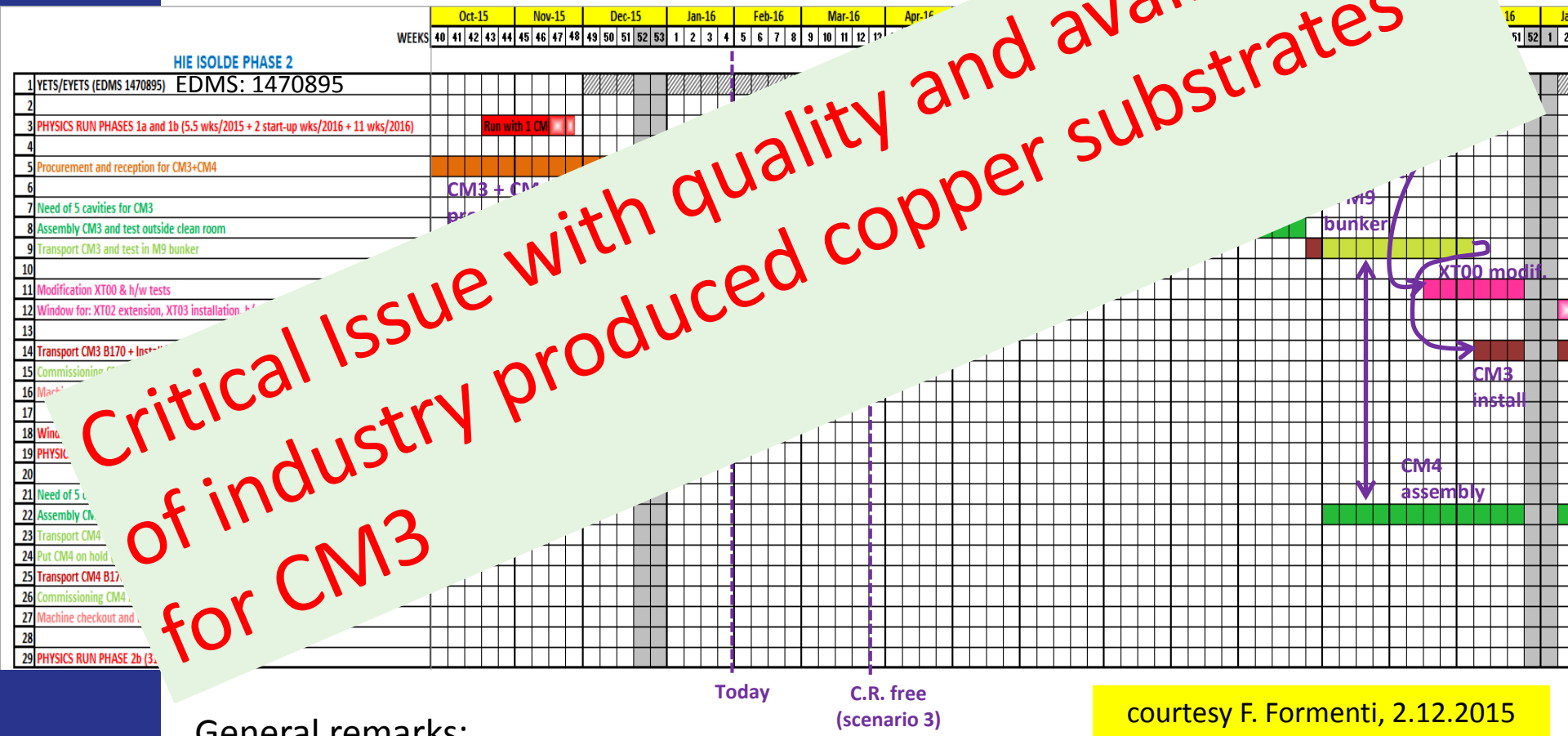
Forecast for HIE-ISOLDE Phase 2 (years 2015- 2016)



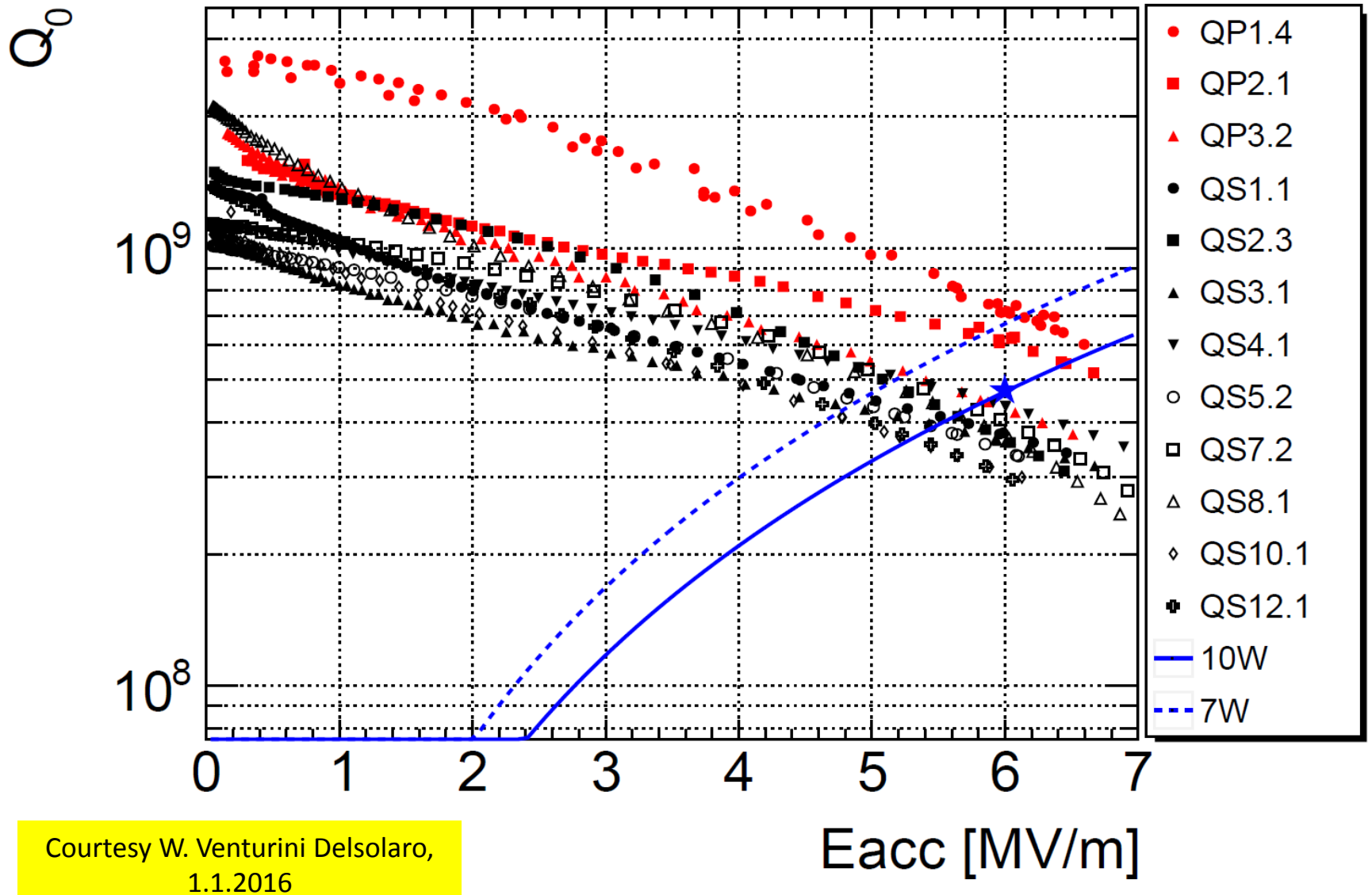
Critical Issue with quality and availability of industry produced copper substrates for CM3

courtesy F. Formenti, 2.12.2015

General remarks:

- Test in M9 bunker are foreseen for CM3 and CM4 while the HIE-ISOLDE facility is in operation
- XT00 modification for PHASE 2

Performance of series cavities (vertical test)



Courtesy W. Venturini Delsolaro, 1.1.2016

Performance of series cavities for CM2 (vertical test)

name	Eacc (10W) [MV/m]	Pc (6MV/m) [W]
QS2.3	5.6	12.8
QS5.2	5.4	13.7
QS7.2	5.6	12.0
QS8.1	5.6	12.7
QS10.1	5.3	15.3
QS12.1	5.3	15.7

Heat load inventory for 4 CM

Heat load type	Quantity [-]	Individual load [W] or [g/s]	Load @4.5 K [W]	Load @ 50K-75 K [W]	Liquefaction [g/s]
Low-β cavity @ 4.5K (RF)	0	7	0		
High-β cavity @ 4.5K (RF)	20	~~10~~ 16	~~200~~ 320	← latest measures	
RF power supply cable	20	1	20		
Cryostat @ 4.5 K	4	13	52		
Cryostat shield @ 50-75 K	4	270		1080	
Transfer line @ 4.5 K	32	0.6	19		
Trans. line shield @ 50-75 K	32	3.1		99	
Dewar 2'000 L @ 4.5 K	1	3	3		
Flexi. line with bayo @ 4.5 K	24	4	96		
Cryogenic valve @ 4.5 K	30	3	90		
Cryogenic valve @ 50-75 K	16	3		48	
Current leads for 4 solenoids	8	~~0.05~~ 0.00			~~0.40~~ 0.00
TOTAL			**~~480~~ 600**	**1227**	**~~0.40~~ 0.00**

Heat load vs existing cold box cooling power

- **Summary table:**

	4.5 K level [W]	50 K - 75 K level [W]	Liquefaction [g/s]
Client's heat load inventory with 2 cryo-mod	~~266~~ 326	669	~~0.2~~ 0.00
Client's heat load inventory with 4 cryo-mod	~~480~~ 600	1227	~~0.4~~ 0.00
Client's heat load inventory with 6 cryo-mod	~~680~~ 800	1785	~~0.8~~ 0.00
« ALEPH » cold box cooling power (measured)	630	Not measured	1.7
« Hall 180 » cold box cooling power (measured)	1050	Not measured	1.5

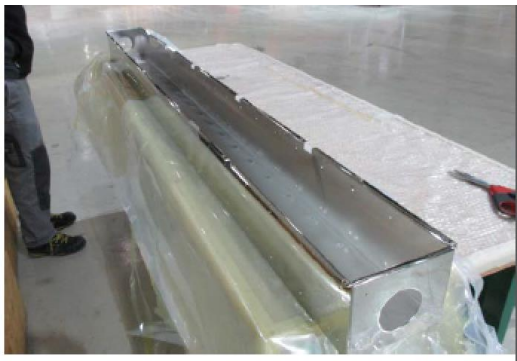
- **Remark:**

  «ALEPH» and «Hall 180» cold boxes require the same cycle flow of 155 g/s (provided by the compressors), but « ALEPH » cold box has only 2 turbines whereas « Hall 180 » has 3 turbines.

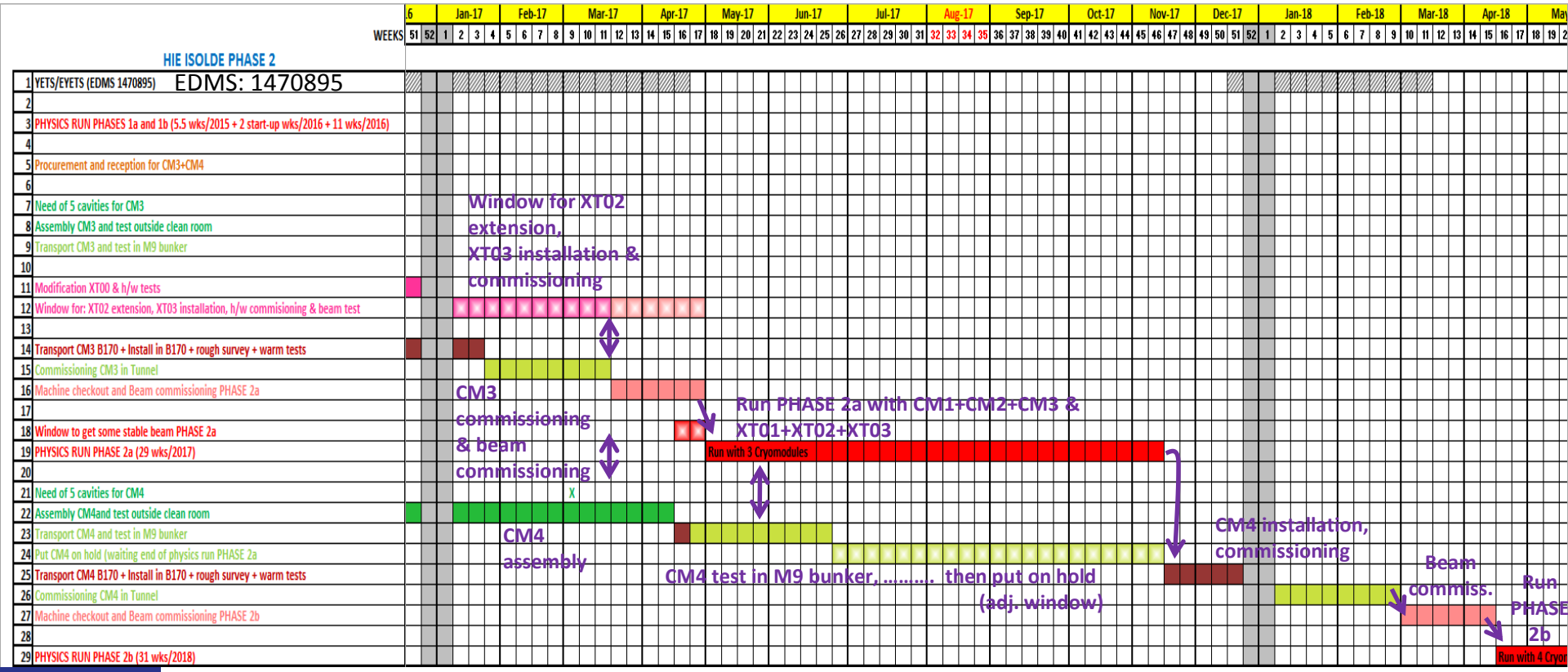
Status: CM3 & CM4

Achieved W04 – CM1 – CM3 – CM4

- CM1
  - Cleaning well advanced
  - Coordination on-going
- CM3-CM4
  - Thermal shield:
    - One reception + leak test complete: some limited fixing, oxidation.
    - 2nd one starting next week
  - Reservoir:
    - On hold
  - VV: OK
  - Frames: both leak tight and complete
  - Additional parts: reception on-going



Forecast for HIE-ISOLDE Phase 2 (years 2017- 2018)



courtesy F. Formenti, 2.12.2015

General remarks:

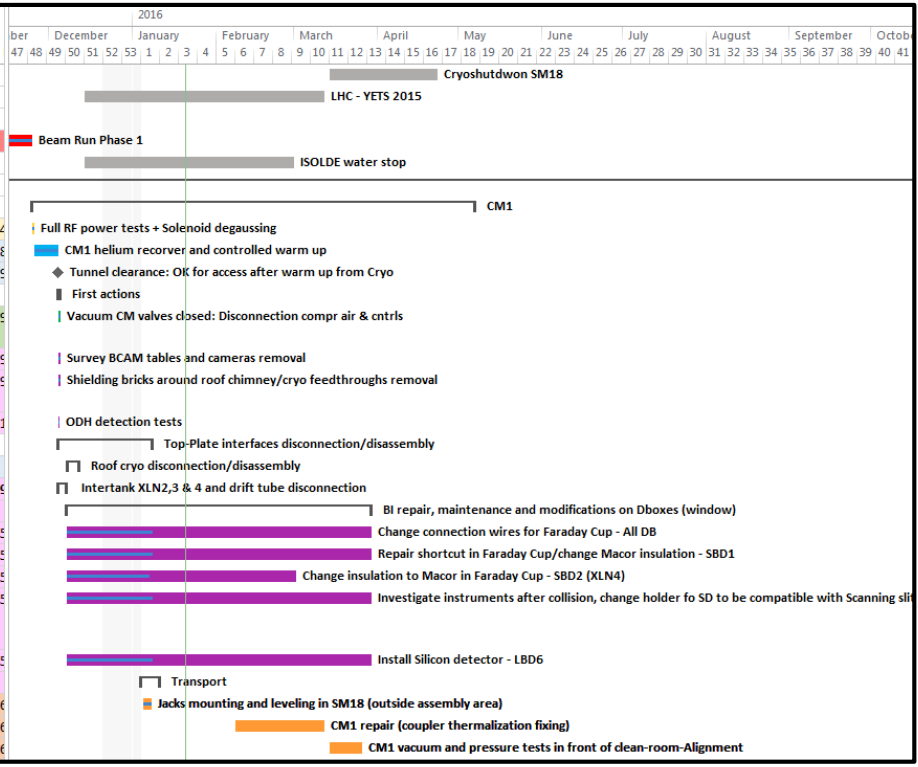
- PHASE 2 run could be split into PHASE 2a (2017) and PHASE 2b (2018)
  - HIE-ISOLDE Physics workshop in February 1st 2016
- **Regain RF performance with high-beta cavities of CM4**

Planning: YETS and beyond..

- Weekly HIE Installation meeting on activities and follow up – Erwin Siesling
- Weekly HIE Project Team meeting on planning and progress – Fabio Formenti
- Reporting to HIE Management meeting – Yacine Kadi

- Detailed planning on the sharepoint: https://espace.cern.ch/HIE-ISOLDE-mgt/Presentations/Forms/AllItems.aspx

	Un ID	% Co	Task Name	Duration	Start	Finish
1	155	0%	Cryoshutdwon SM18	6 wks	Mon 14/03/16	Fri 22/04/16
2	191	0%	LHC - YETS 2015	11 wks	Mon 14/12/15	Fri 11/03/16
3	192	0%	LHC - EYETS 2016	17 wks	Mon 05/12/16	Fri 14/04/17
4	387	100%	Beam Run Phase 1	5.3 wks	Mon 19/10/15	Tue 24/11/15
5	408	0%	ISOLDE water stop	46 days	Mon 14/12/15	Mon 29/02/16
6	**1**	**29%**	**Phase 1b**	**657 days**	Mon 09/06/14	**Tue 10/01/17**
7	**391**	**25%**	**CM1**	**108.5 days**	**Tue 24/11/15**	**Fri 06/05/16**
8	507	100%	Full RF power tests + Solenoid degaussing	1 day	Tue 24/11/15	Wed 25/11/15
9	393	100%	CM1 helium recorver and controlled warm up	7 days	Wed 25/11/15	Fri 04/12/15
10	510	100%	Tunnel clearance: OK for access after warm up from Cryo	0 days	Fri 04/12/15	Fri 04/12/15
11	**532**	**100%**	**First actions**	**0.5 days**	**Fri 04/12/15**	**Fri 04/12/15**
12	509	100%	Vacuum CM valves closed: Disconnection compr air & cntrls	4 hrs	Fri 04/12/15	Fri 04/12/15
13	508	100%	Survey BCAM tables and cameras removal	4 hrs	Fri 04/12/15	Fri 04/12/15
14	534	100%	Shielding bricks around roof chimney/cryo feedthroughs removal	4 hrs	Fri 04/12/15	Fri 04/12/15
15	535	100%	ODH detection tests	2 hrs	Fri 04/12/15	Fri 04/12/15
16	**516**	**100%**	**Top-Plate interfaces disconnection/disassembly**	**14.63 days**	**Fri 04/12/15**	**Fri 08/01/16**
42	**537**	**100%**	**Roof cryo disconnection/disassembly**	**4 days**	**Tue 08/12/15**	**Fri 11/12/15**
47	**404**	**100%**	**Intertank XLN2,3 & 4 and drift tube disconnection**	**1 day**	**Fri 04/12/15**	**Mon 07/12/15**
52	**556**	**21%**	**BI repair, maintenance and modifications on Dboxes (window)**	**71 days**	**Mon 07/12/15**	**Tue 29/03/16**
53	681	20%	Change connection wires for Faraday Cup - All DB	71 days	Mon 07/12/15	Tue 29/03/16
54	679	20%	Repair shortcut in Faraday Cup/change Macor insulation - SBD1	71 days	Mon 07/12/15	Tue 29/03/16
55	680	25%	Change insulation to Macor in Faraday Cup - SBD2 (XLN4)	51 days	Mon 07/12/15	Tue 01/03/16
56	678	20%	Investigate instruments after collision, change holder fo SD to be compatible with Scanning slit, change SD to annular (for TOF measurements) - SBD5	71 days	Mon 07/12/15	Tue 29/03/16
57	677	20%	Install Silicon detector - LBD6	71 days	Mon 07/12/15	Tue 29/03/16
58	**536**	**100%**	**Transport**	**5 days**	**Mon 04/01/16**	**Sun 10/01/16**
65	410	100%	Jacks mounting and leveling in SM18 (outside assembly area)	3 days	Tue 05/01/16	Thu 07/01/16
66	395	0%	CM1 repair (coupler thermalization fixing)	5 wks	Mon 08/02/16	Fri 11/03/16
67	396	0%	CM1 vacuum and pressure tests in front of clean-room-Alignment	2 wks	Mon 14/03/16	Fri 25/03/16



courtesy E. Siesling, 22.01.2016

Overall Summary

- **Radioactive beam delivered to Miniball experiment on Oct. 22nd 2015 as initially planned.**
- **The results of the hardware tests highlighted that CM1 is not fully qualified for sustained operation (problem on RF couplers):**
  - **CM1 has been de-installed and will be re-worked during shutdown;**
  - **New RF couplers with improved thermalisation of the RF power line tested on QS12 and installed on CM2.**
- **New coherent planning is proposed for Phase 2**
  - Agree with Collaboration on a common scope for Physics run 2 & 3 (2016-2017)
  - **Preparation of CM3/CM4 components on-going**
  - **Issue with cavity substrates being addressed**
- **Procurement for the 3rd beam line and extension of XT02 for HELIOS has been launched**

Thank you for your attention