HIE-ISOLDE Project Status Report

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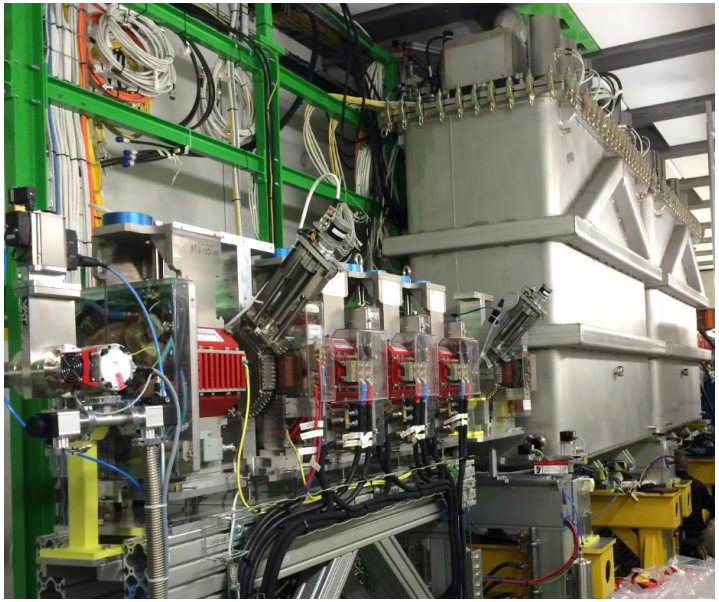
for the HIE-ISOLDE Project Team

54th INTC Meeting
CERN, 3 November 2016

OUTLINE

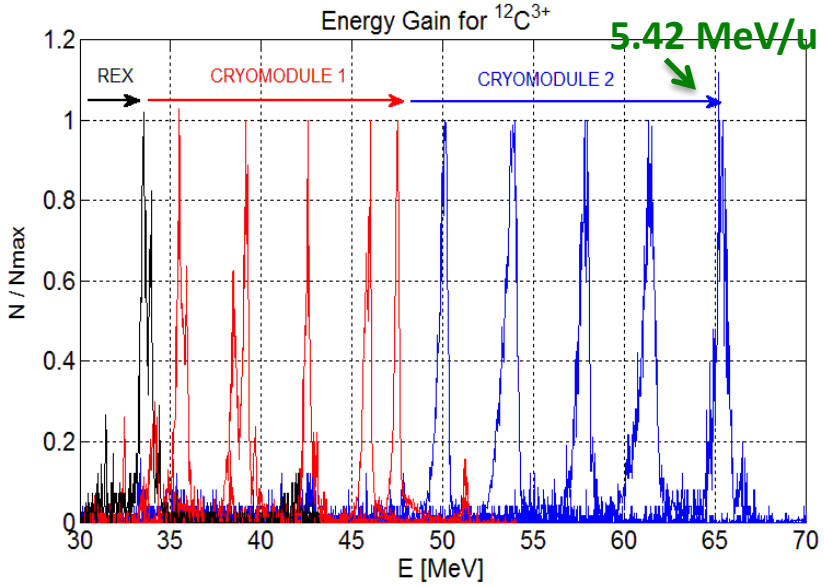
- Phase1 Commissioning & Operation
- Issues to be addressed
- Phase2 Preparation
- EYETS works

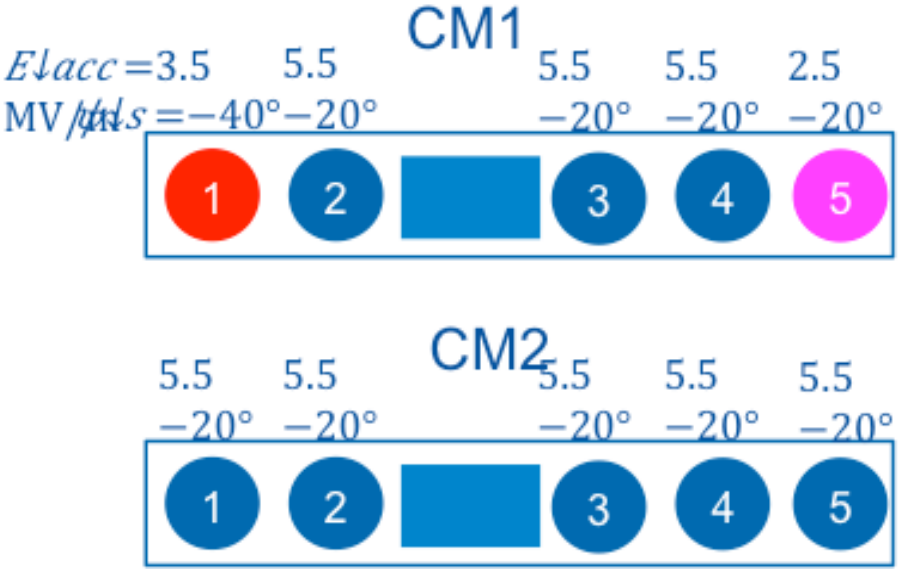
Phase 1: Commissioning



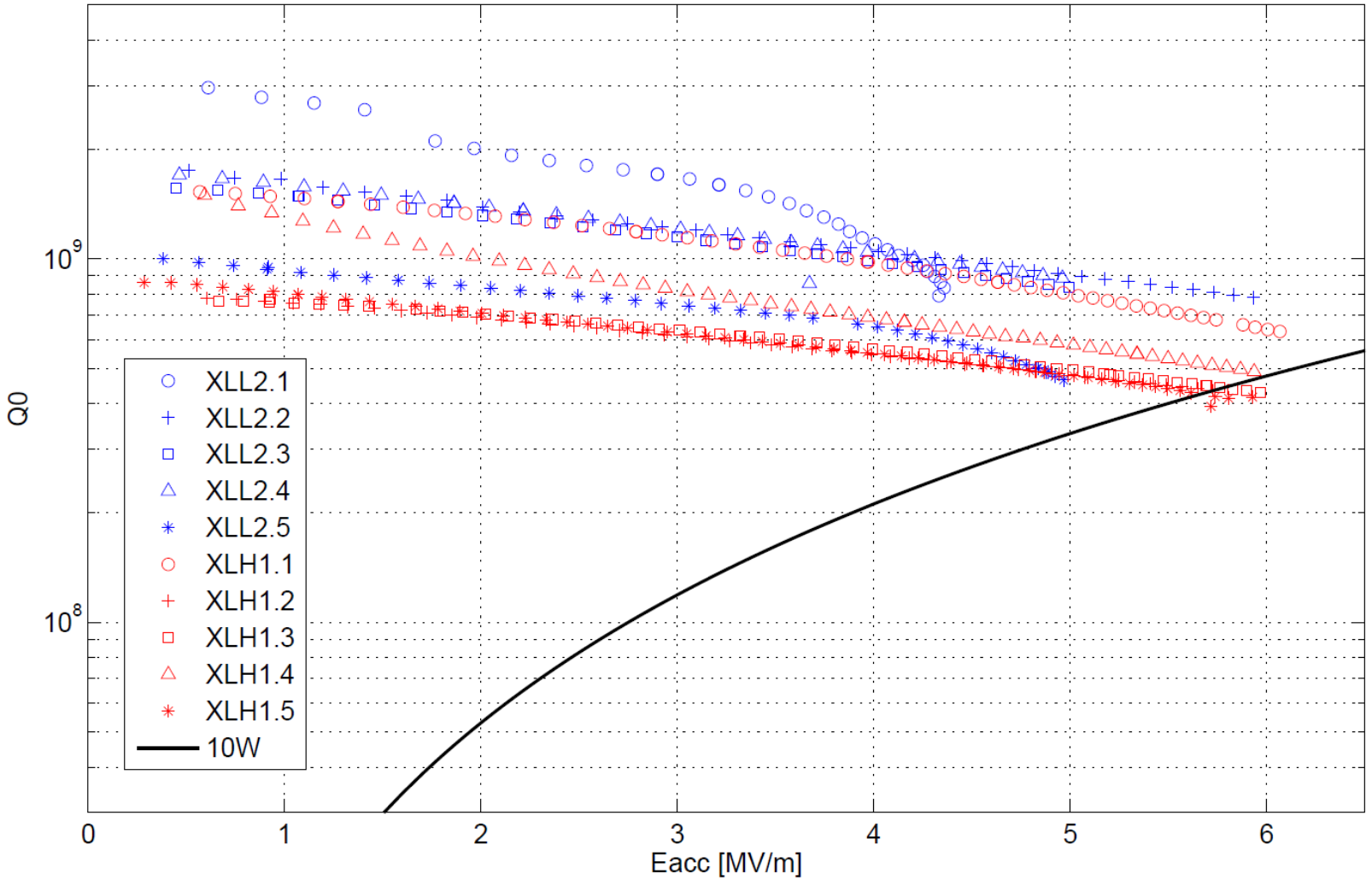
- Main issues identified: field emission in two cavities (CM1), suspect vacuum leak in CM2, short circuit on CM1 solenoid circuit.
- New coupler design seems to be working well
- Commissioning activities postponed to the end of the year:
  - Conditioning of field emission (CAV1&5)
  - Cryogenics load measurements
  - Vacuum leak detection (at warm)

- Delay on the physics run reduced to 2 weeks

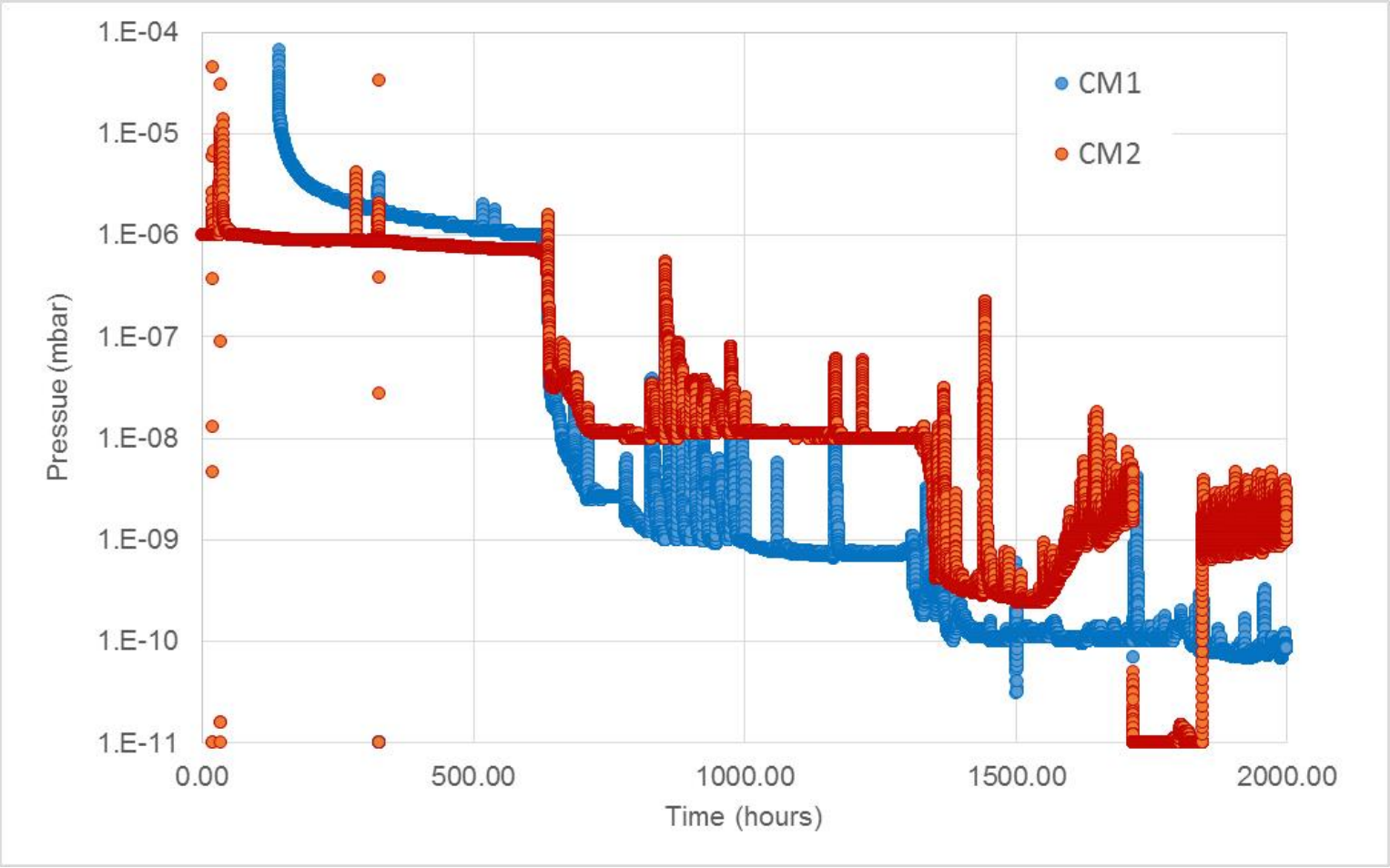




SC Cavity Performance



Beam Vacuum Status



Operations during the Physics Campaign:

- From Sep. 2nd with the delivery of stable beam to the Miniball Spectrometer for testing purposes
- Will finish on wk. 46 when the PSB stops delivering protons and last measurements with stable beams are completed

Experiment #	IS562	IS548	IS557	IS551	IS561	IS559
RIB	^{110}Sn	^{142}Xe	^{78}Zn	^{132}Sn	^{9}Li	^{66}Ni
Energy [MeV/u]	4.5	4.5	4.3	5.5	6.8 (7.2 req)	4.5
Target	GPS	HRS	GPS	HRS	GPS	GPS
Exp. Station	Miniball Spect.	Miniball Spect.	Miniball Spect.	Miniball Spect.	Scattering Chamber	Miniball Spect.
Start date	Sep. 9th	Sep. 26th	Oct. 10th	Oct. 19th	Oct. 28th	Nov. 4th
End date	Sep. 18th	Oct. 2nd	Oct. 16th	Oct. 26th	Nov. 1st	Nov. 14th
Length [hours]	115	100	130	130	70	

Approximately 550 hours of RIBs with HIE-ISOLDE energies (~700 hours by the end of the physics campaign)

Approximately 90 hours of beam at HIE-ISOLDE energies during the whole 2015 campaign!

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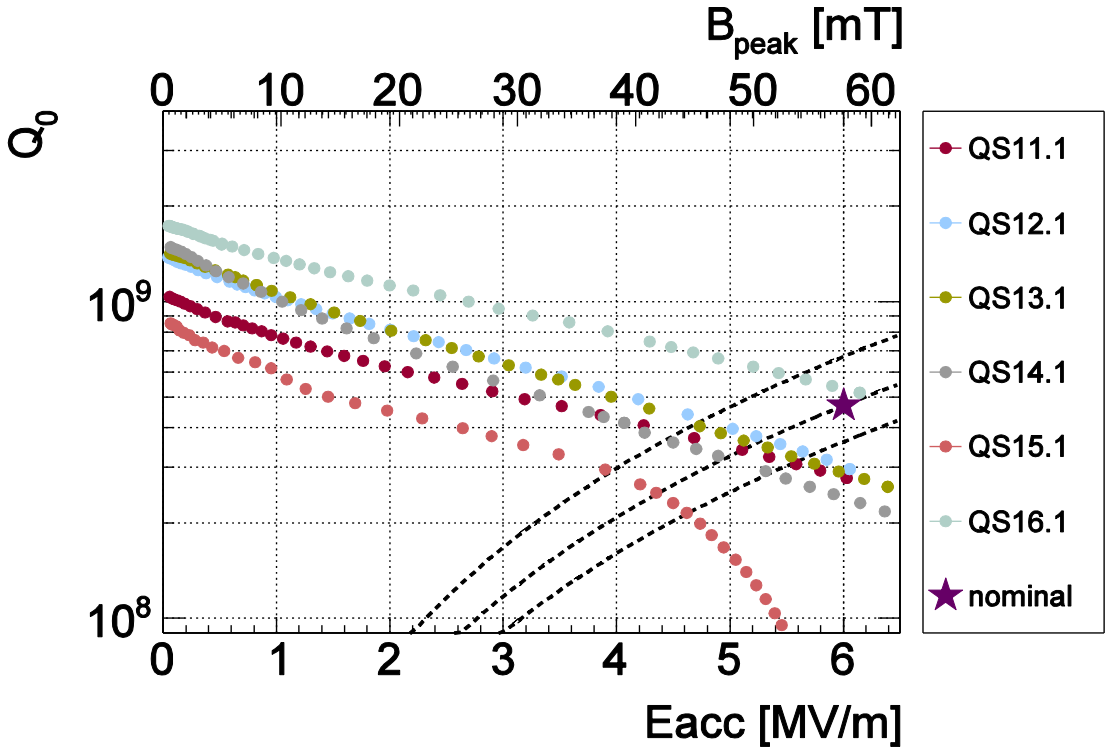
Cavities for CM3



70 W at nominal (5x6 MV/m)
50 W at 5x5.2 MV/m

- **QS15 was still produced without smoothening weld: worst substrate and worst performance of all. Was rejected (will be stripped)**
- QS16 is the best cavity of the QS series so far: will be in CM3
- QS17 was received and no apparent defects were found, after SUBU
- QS18 was spoiled by RI (machining error)
- QS19 and QS20 are finished, already at CERN

CM3 Assembly

- Assembly of CM3 restarted after 5.5 weeks
- Cavities assembled, final alignment on-going
- CM3 out of clean room by end of the year
- Completion of performance test (pressure test, final leak test, survey) post closure : w2

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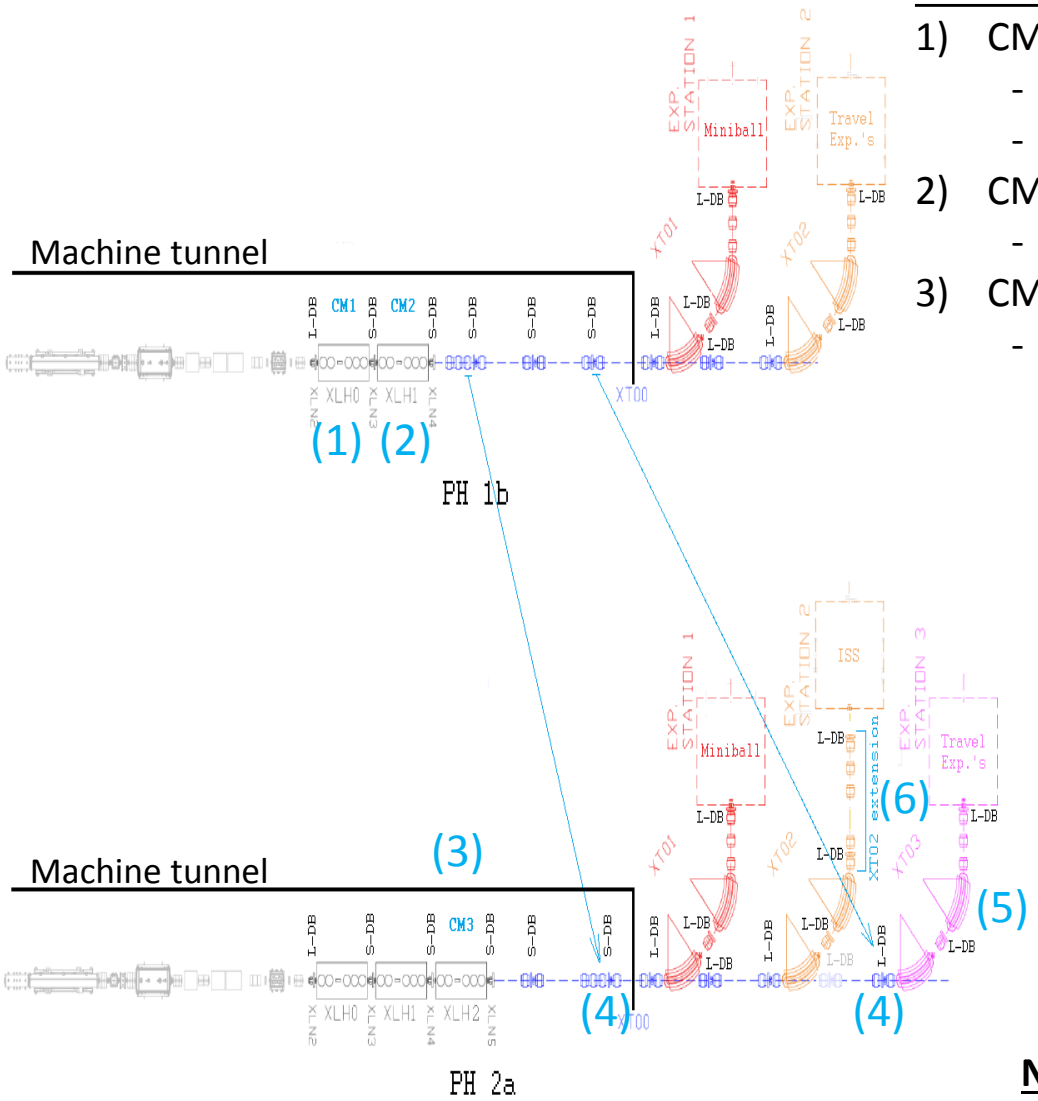
Overview main shutdown H/W activities



<u>Work on the Cryomodules</u> (defines Baseline solution):

1) CM1
   - Field emission on cav. #1 and #5
   - Short to GND of solenoid bus bar
2) CM2
   - Vacuum leak
3) CM3
   - Installation

<u>Work on the transfer lines</u>:

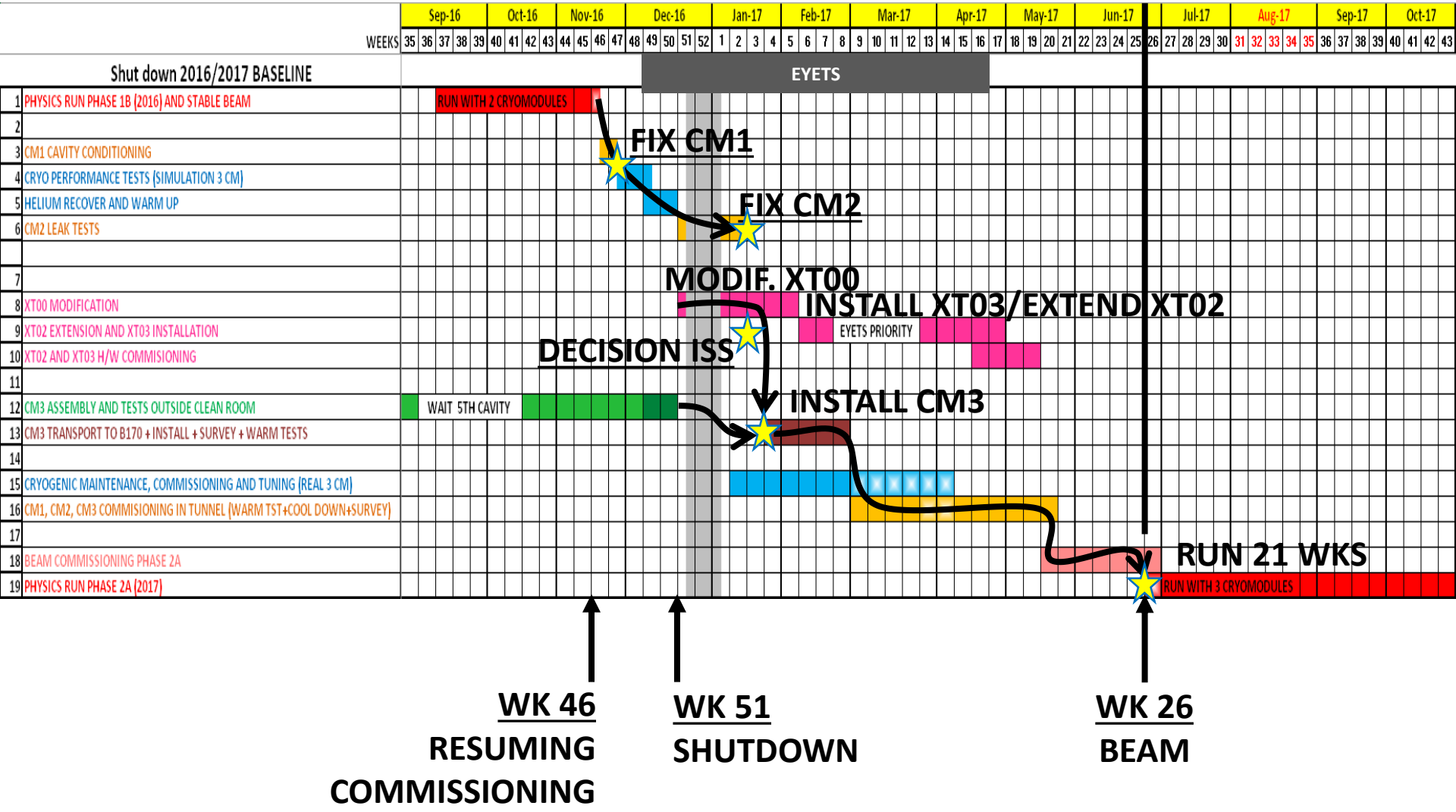
4) Modify XT00 for installation CM3/CM4
   - Move Quadruplet to end tunnel
   - Move Doublet to end XT00
5) Install XT03
6) Extend XT02 for future installation ISS

<u>Work on services</u>:

7) Cryogenic maintenance
   - Compressor
   - Distribution lines

<u>NOTES</u>: All equipment available
ISS decision to come

Baseline solution planning: installation of CM3 only



Overall Summary

- **Phase 1 is now completed.**
- **Quite successful Physics Run**
- **CM3 assembly almost finished**
- **Strategy for Phase 2 cavities under implementation:**
  - Last RI cavity meets specs after change of weld parameters
  - Excellent progress with CERN produced cavities (QS22 and QS23)
  - Seamless cavities also progressing well
- **Schedule for 2016/2017 Shutdown:**
  - Address remaining technical issues
  - Install CM3
  - Install XT03 and ISS magnet on XT02
  - Cryogenics maintenance & consolidation

Big thanks to all CERN groups

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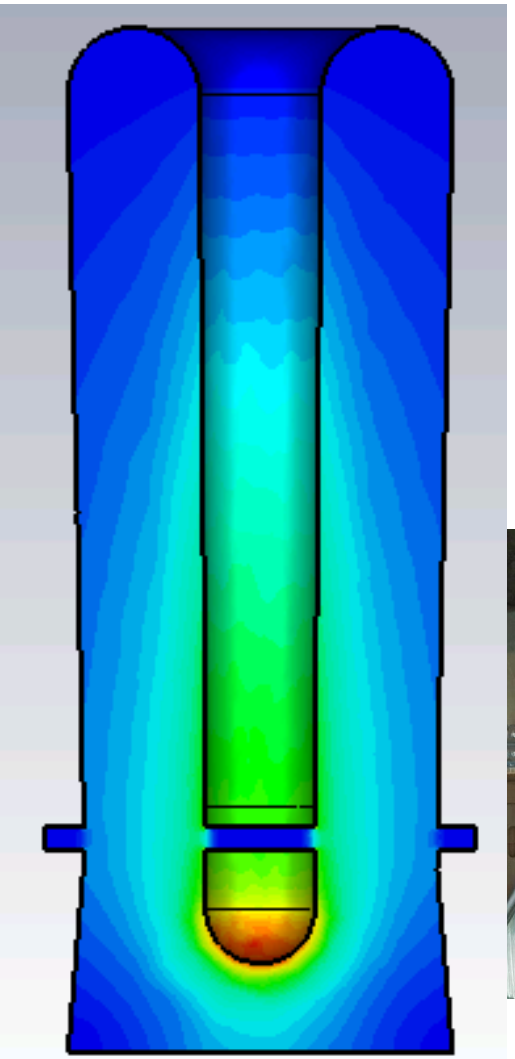
HIE-ISOLDE Phase1 Ceremony

The point on QSC cavities

- Parts for QS21 and QS22 taken back from RI and shipped at CERN
- EN-MME started producing 2 cavities due by end 2016
- Excellent progress. On schedule and no quality issues so far

Seamless cavity



Parameters	QS	QSS
β_{opt} [%]	10.9	12.2
R/Q [Ω]	520	490
E_{peak} /E_{acc}	5.4	5.2
B_{peak}/E_{acc} [Gauss/(MV/m)]	96	93
G= R_s.Q [Ω]	30.3	37.4
U/E_{acc}^2 [J/(MV/m)^2]	0.207	0.214
P_c at 6 MV/m [W]*	7.7	6.6

* calculated assuming R_s = 50 n[Ω]