



# HIE-ISOLDE Status Report

Y. Kadi for the HIE-ISOLDE  
project team

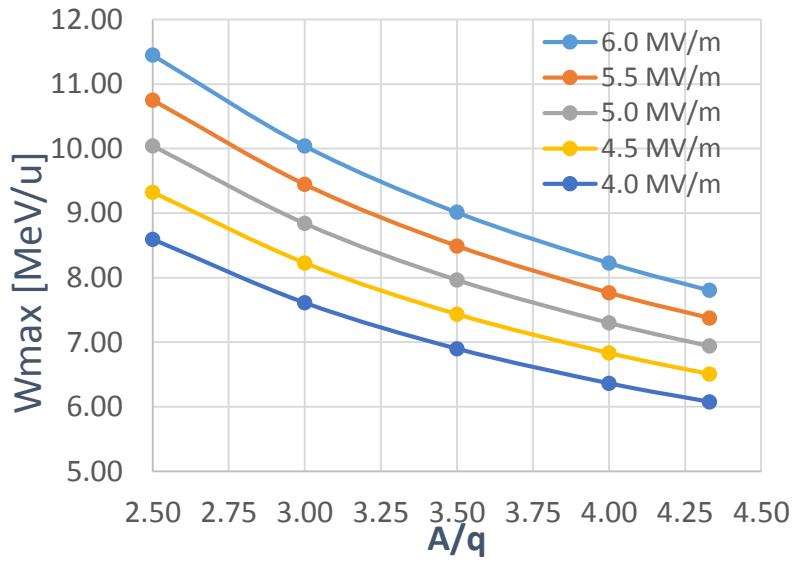
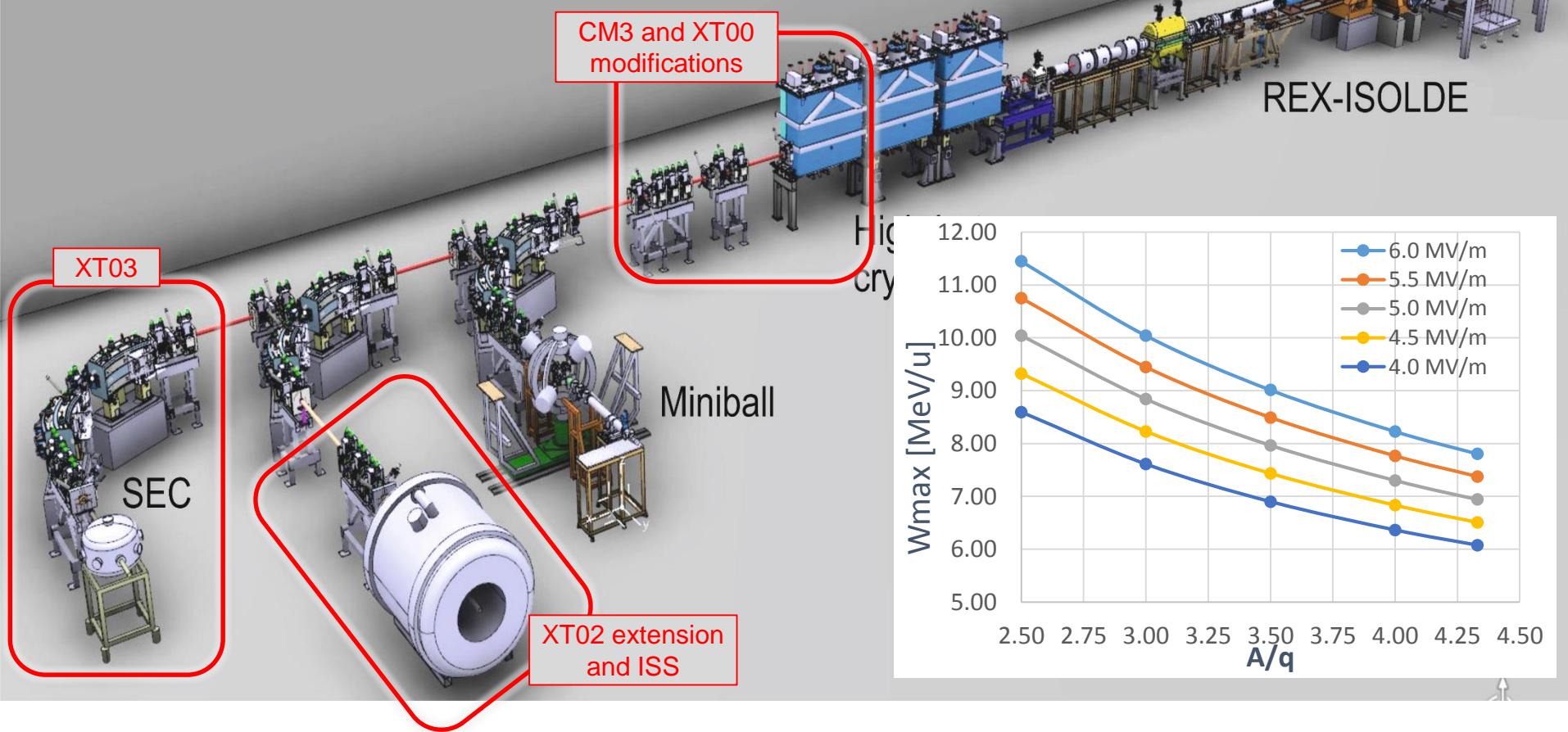
# Outline:

- HIE-ISOLDE Phase 2A
  - Commissioning & Operation
- Status and Schedule for Phase 2B
- Summary

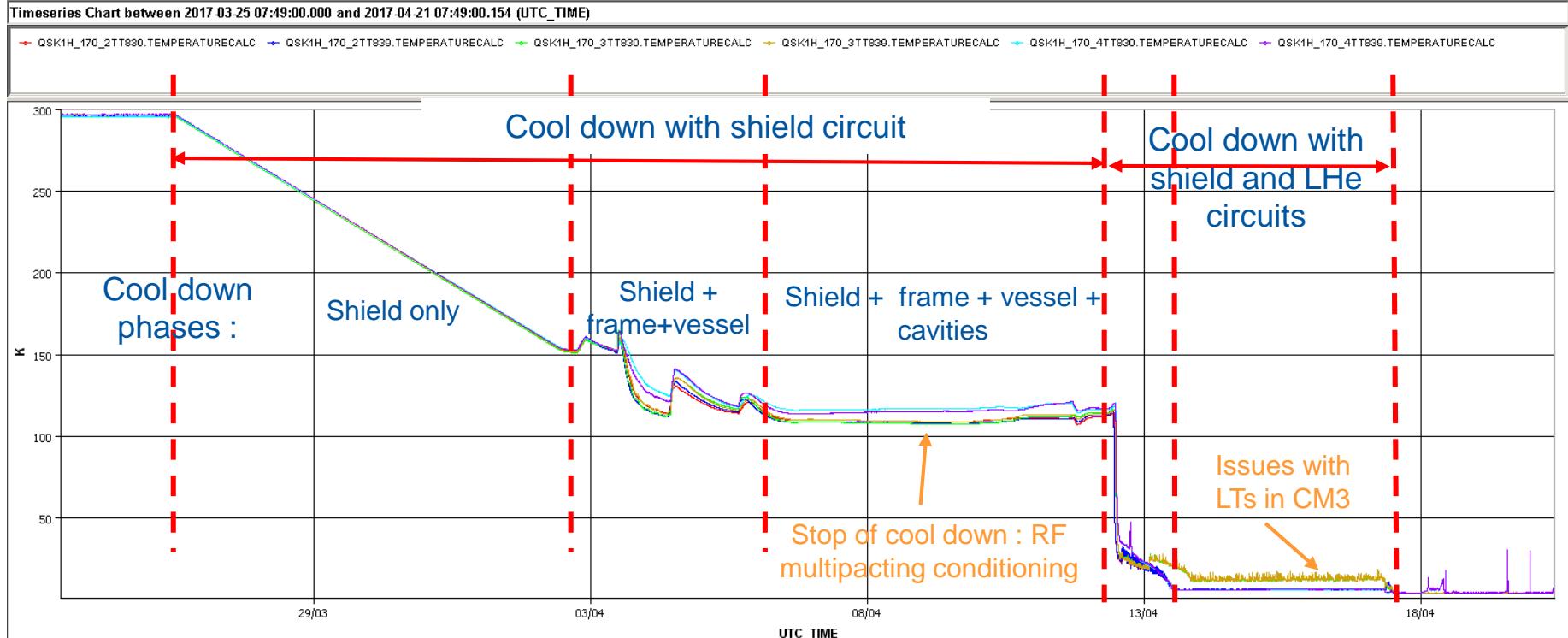
# Phase2 Installation

Phase 2A HIE-ISOLDE project:

- Additional cryomodule (CM3)
- Additional HEBT line (XT03)
- Modification of the XT02 HEBT line



# Cryo Plant Performance:



Cooldown: LHe filling of cryomodules achieved much quicker wrt 2016 and via the frame circuit only  $\Rightarrow$  proof of better LHe «quality»

Operation:  $\sim$  100% available (one LHe loss event in CM1 caused 12 hrs downtime)

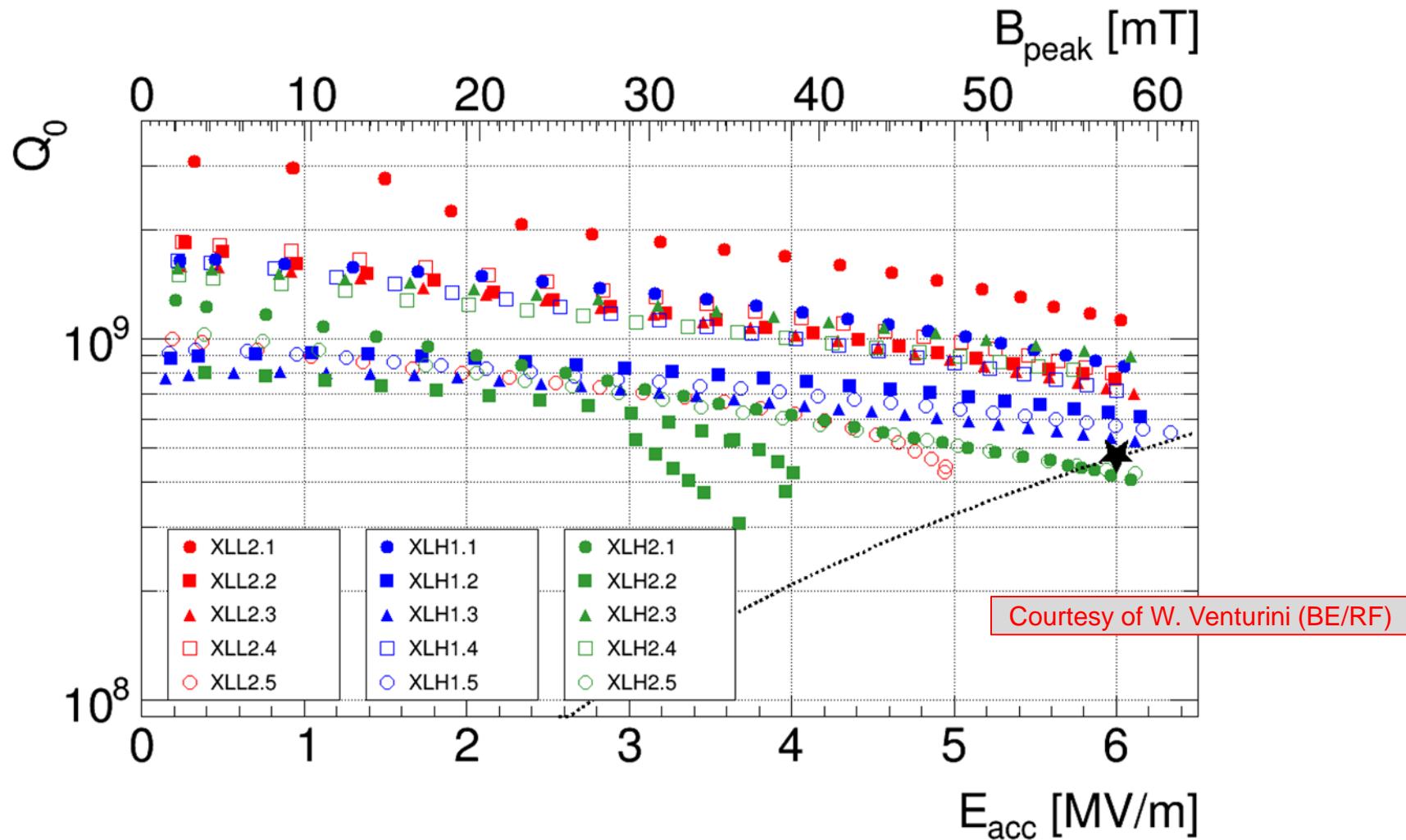
Phases	2016 2 CMs	2017 3 CMs
$300K \rightarrow 5K$	$\approx 15$ days	$\approx 9$ days
LHe Filling (stable)	5 days	4h for CM1&2 + 4h for CM3

Courtesy of O. Pirotte (TE/CRG)

# Hardware Commissioning: SRF cavities



- All cavities conditioned and RF measurements done
- Only one cavity in CM3 and one in CM1 limited by field emission at gradients lower than 6 MV/m

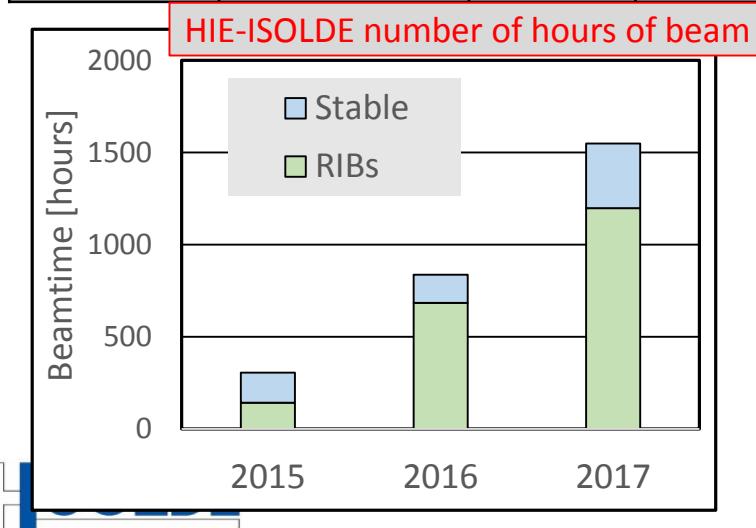


# REX/HIE-ISOLDE Physics Campaign:

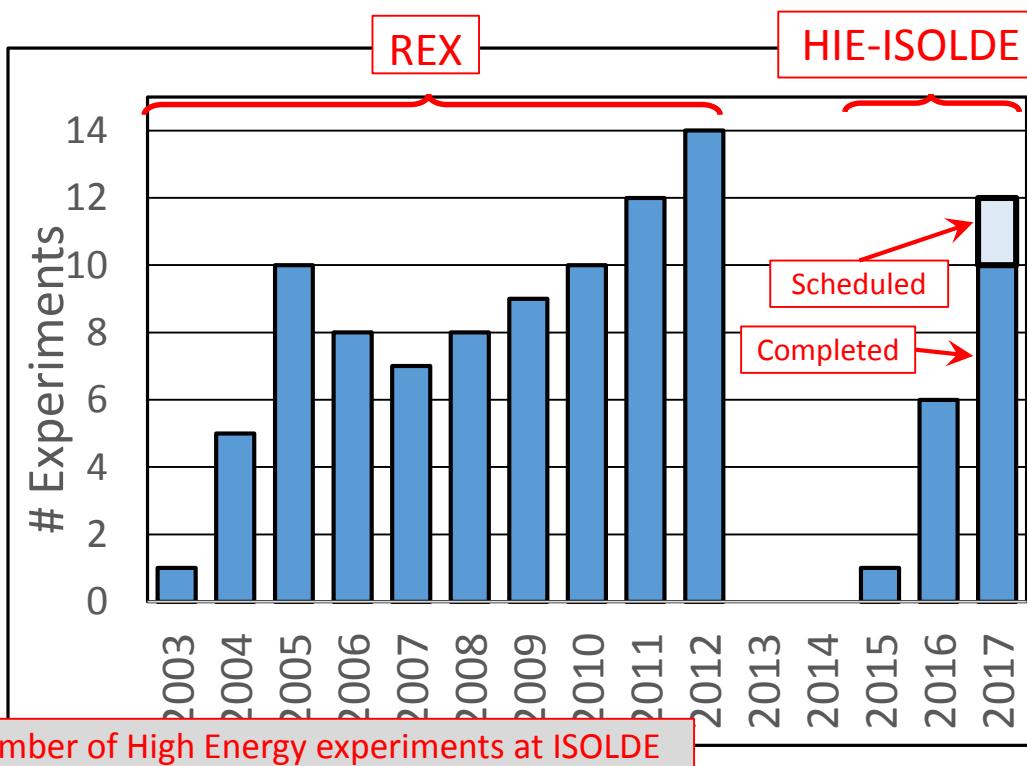


Courtesy of J.A. Rodriguez (BE/OP)

Experiment number	Beam	Energy [MeV/u]	Beamtime [hours]
IS547	$^{206}\text{Hg}^{46+}$	4.19	84
IS561	$^9\text{Li}^{3+} \rightarrow ^9\text{Li}^{3+}$	8.00	80
IS562	$^{108}\text{Sn}^{26+}$	4.50	94
IS562	$^{142}\text{Sm}^{33+}$	4.62	107.5
	$^{140}\text{Nd}^{33+}$	4.62	58.25
IS572	$^{94}\text{Rb}^{23+}$	6.21	140
IS619	$^{15}\text{C}^{5+} \rightarrow ^{15}\text{C}^{6+}$	4.35	245
IS558	$^{140}\text{Sm}^{34+}$	4.65	112.5
IS553	$^{142}\text{Ba}^{33+}$	3.40	23
	$^{144}\text{Ba}^{33+}$	3.40	39.5
	$^{144}\text{Ba}^{33+}$	4.20	84.5
IS659	$^{66}\text{Ge}^{16+}$	4.40	84.25
	$^{70}\text{Se}^{17+}$	4.40	13.1
IS597	$^{72}\text{Se}^{19+}$	4.40	33.5



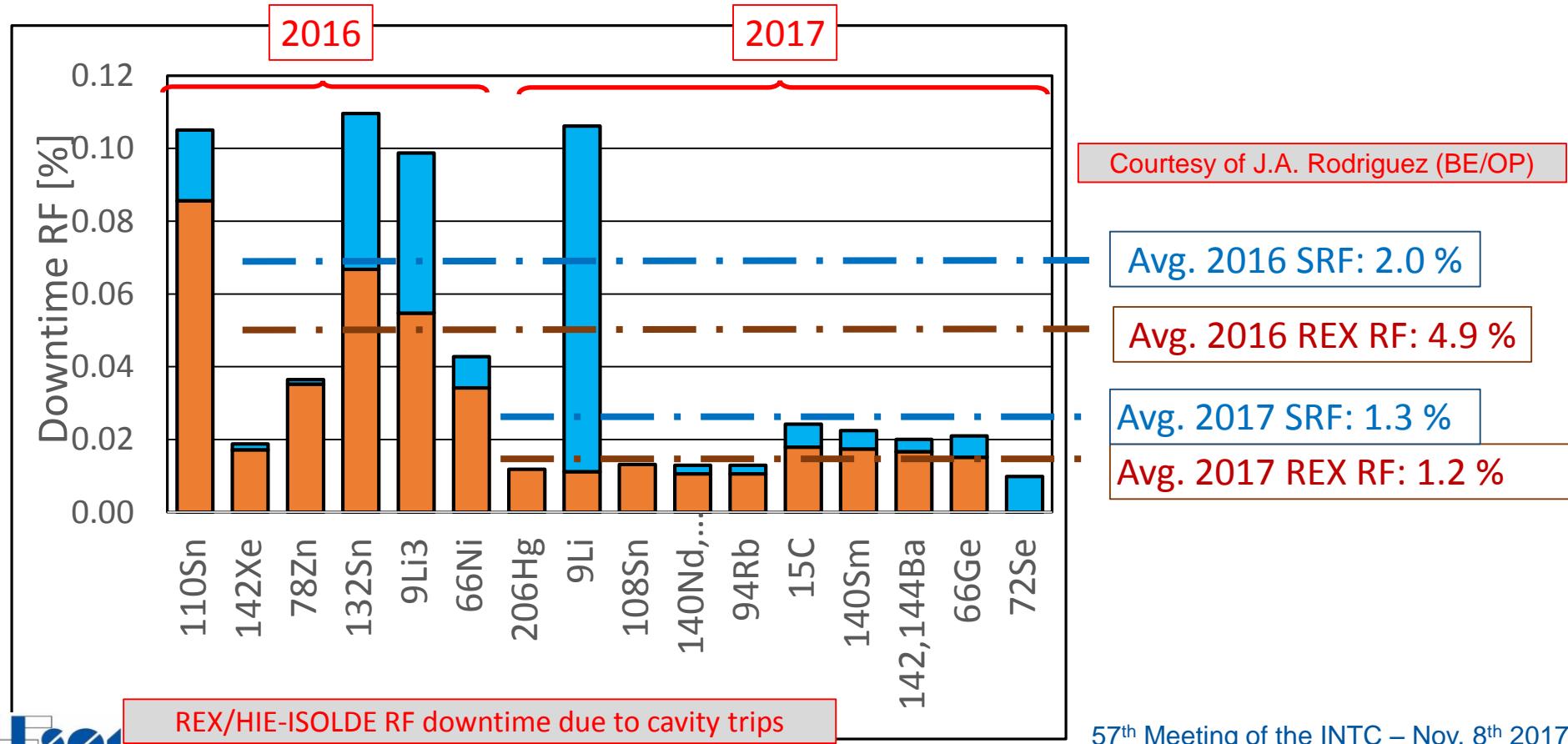
- First stable beam delivered to the Miniball experimental station (end wk. 25)
- First radioactive ion beam (RIB) delivered (end wk. 27)
- Despite the short Physics campaign:
  - ✓ Ten experiments already completed
  - ✓ Two additional experiments planned for the rest of the year



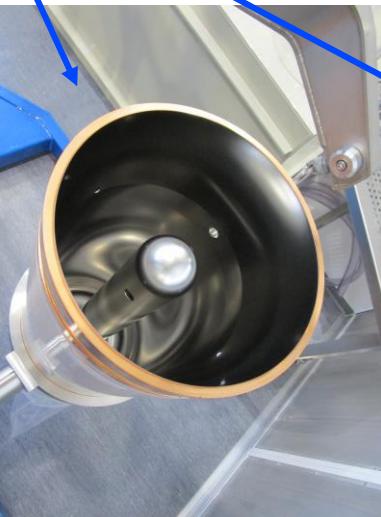
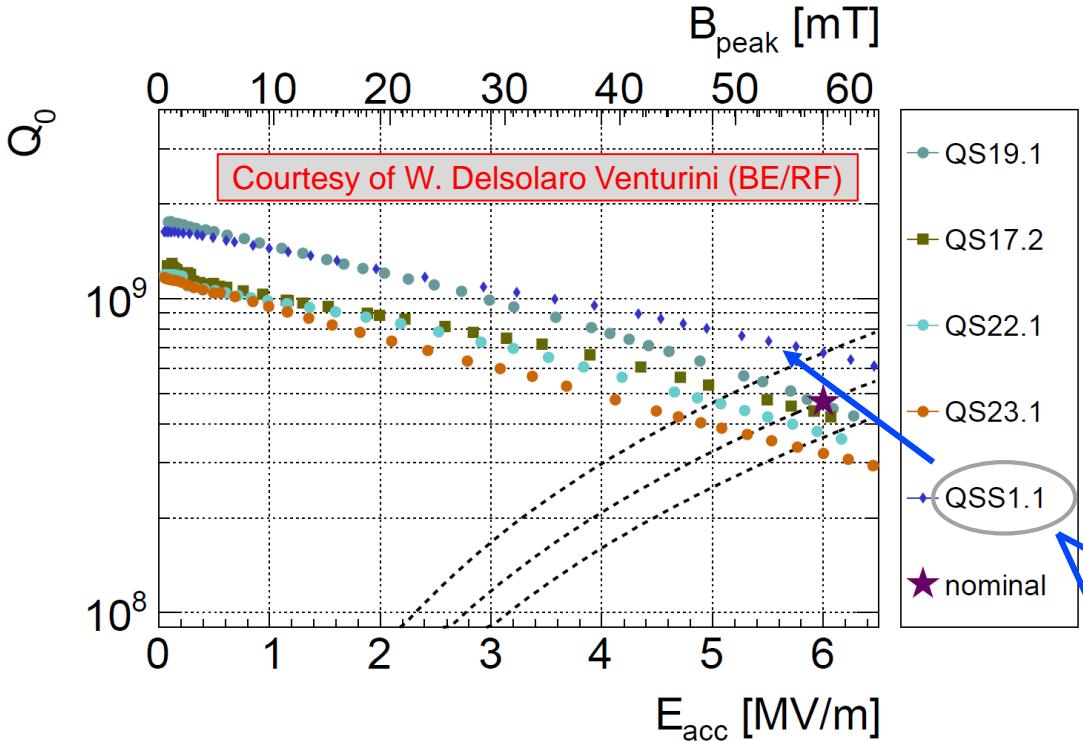
# REX/HIE-ISOLDE Reliability:

➤ Big improvement in the reliability of the linac:

- REX RF 2016: 8 days down because of failure of the 9gap amplifier + 4.9 % cavity trips
- REX RF 2017: 1.2 % cavity trips + 6 hours intervention in 7gap2
- SRF 2016: 2.0 % cavity trips
- SRF 2017: 12 hours because of LHe loss in CM1 + 1.3 % cavity trips (mostly in SRF09 during 9Li at 8 MeV/u to the scattering chamber)



# CM4 Assembly work



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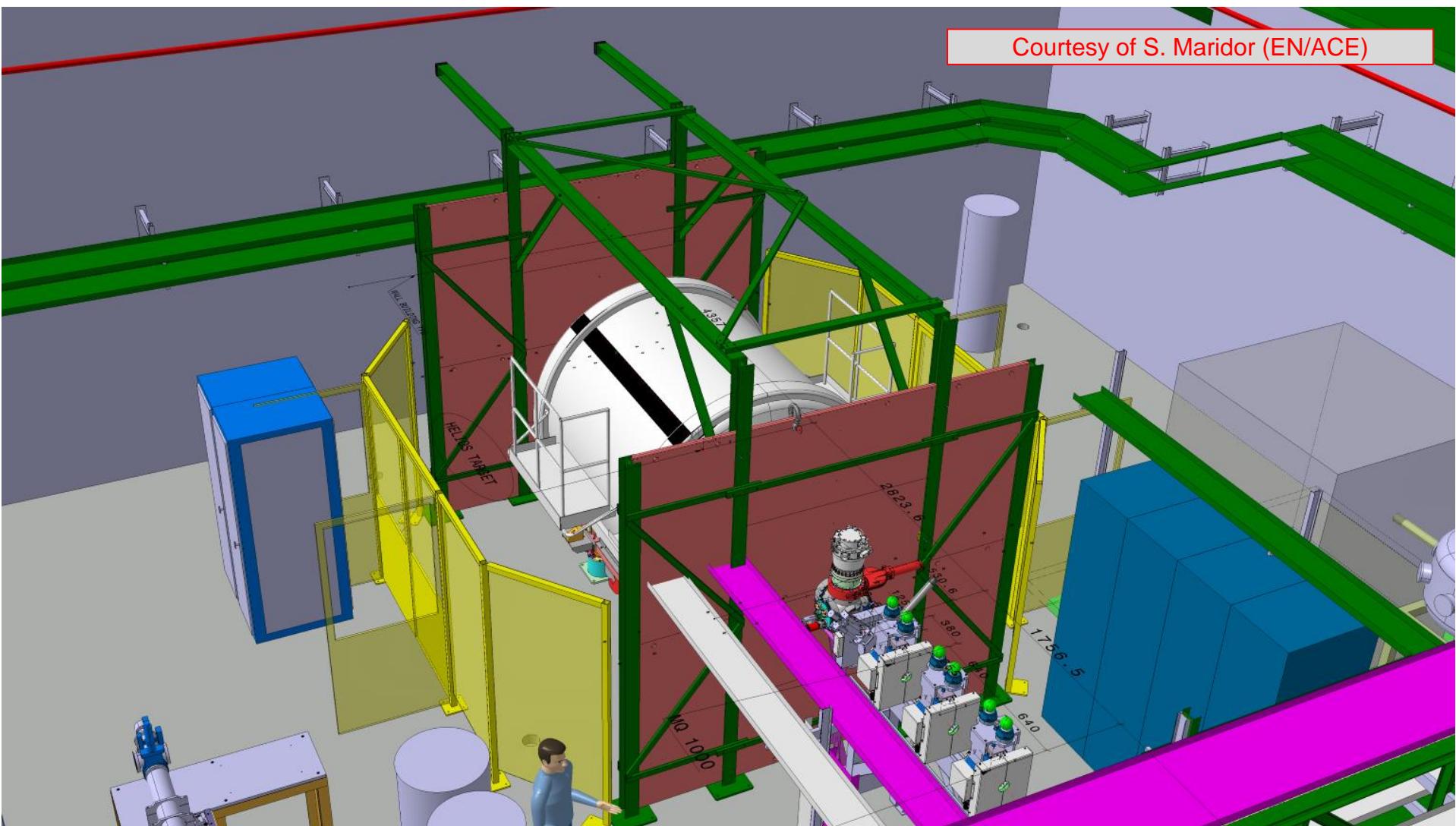


Courtesy of F. Formenti (EN/EA)

# ISS Magnetic Shielding



Courtesy of S. Maridor (EN/ACE)



# ISS Magnetic Shielding



Courtesy of K. J. Buffet (EN/EA)



# ISS Magnetic Shielding

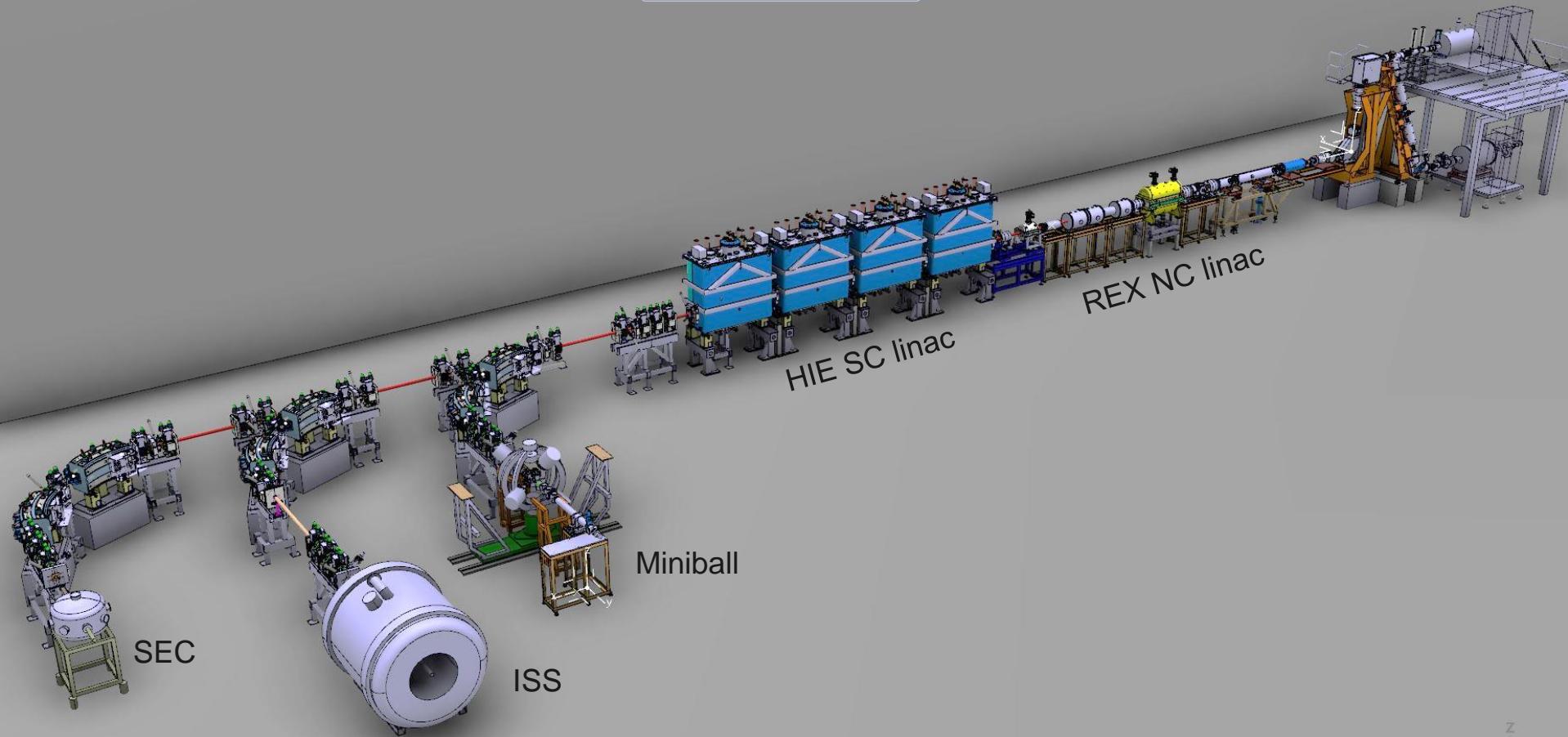


Courtesy of F. Formenti (EN/EA)

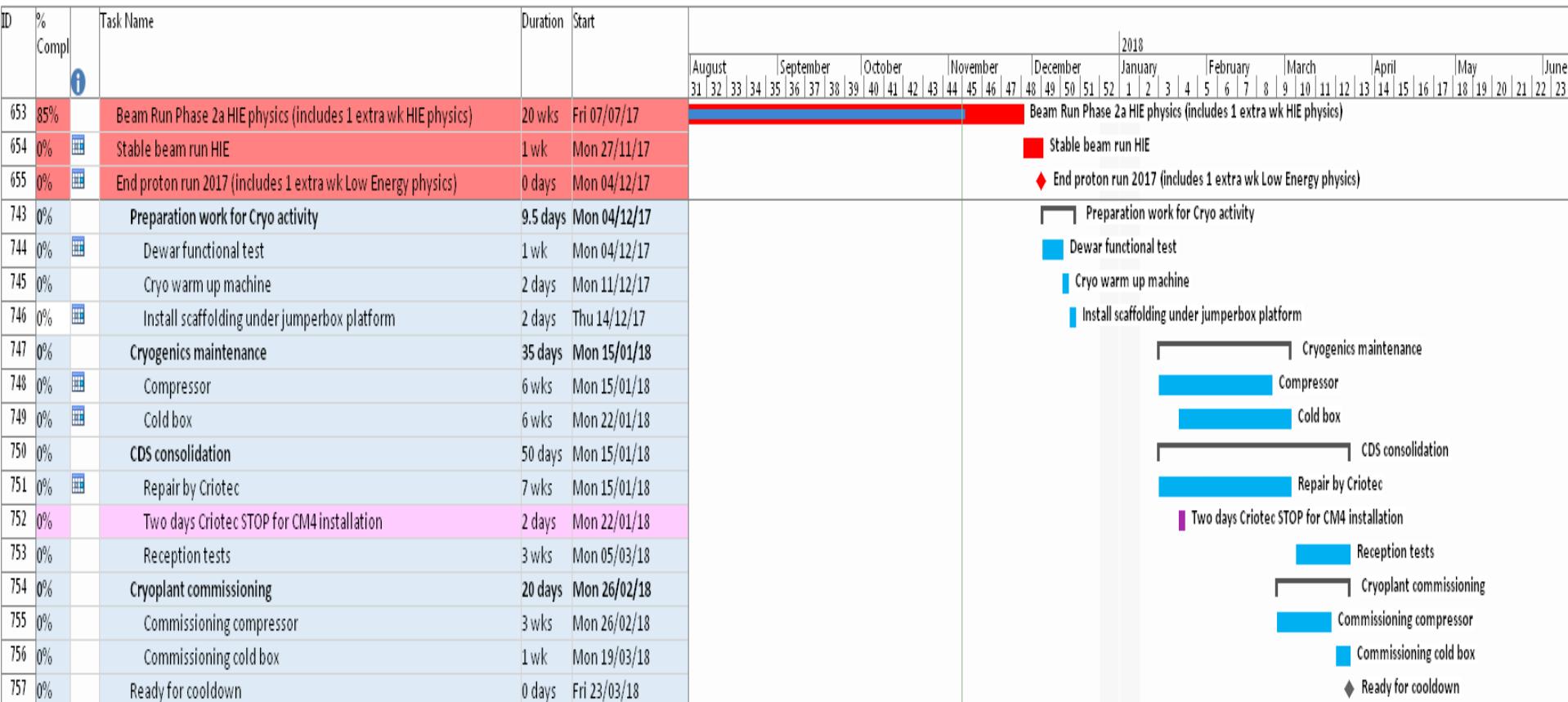
# Phase2 Completion YETS 2017/2018



- Additional cryomodule (CM4)



# Cryo Plant Maintenance

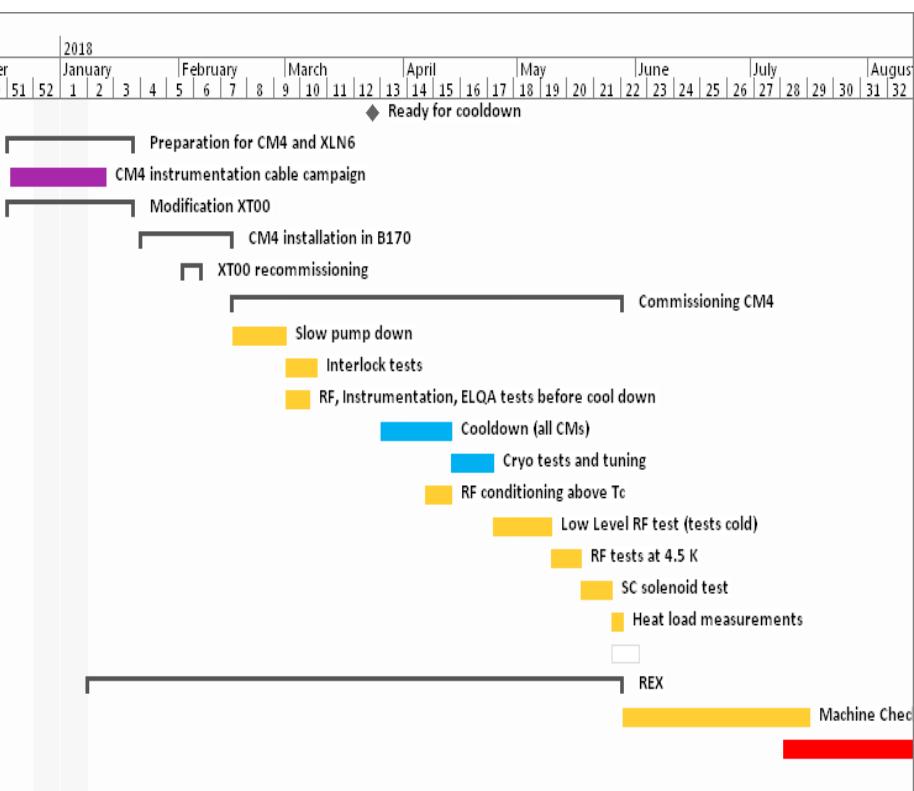


Courtesy of F. Formenti (EN/EA)

# CM4 Installation & Commissioning



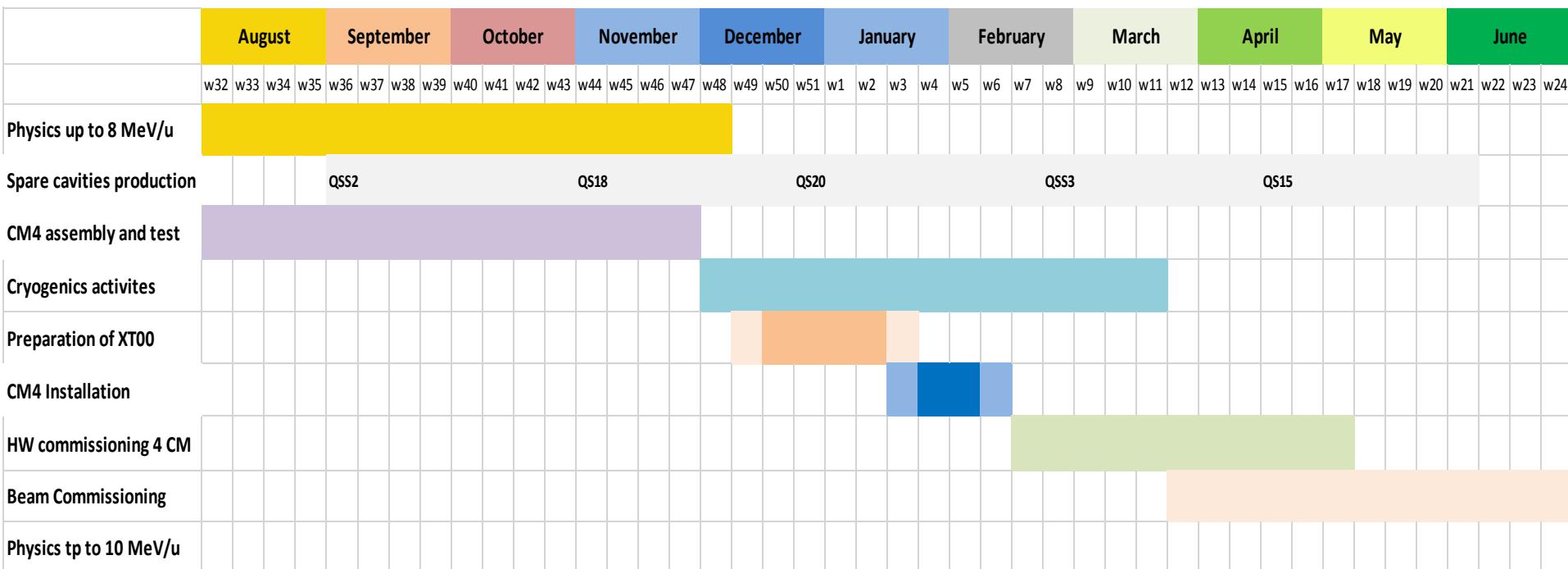
ID	% Compl.	Task Name	Duration	Start
757	0%	Ready for cooldown	0 days	Fri 23/03/18
758	0%	Preparation for CM4 and XLN6	15 days	Mon 18/12/17
759	0%	CM4 instrumentation cable campaign	1.8 wks	Mon 18/12/17
760	0%	Modification XT00	15 days	Mon 18/12/17
776	0%	CM4 installation in B170	18 days	Mon 22/01/18
797	0%	XT00 recommissioning	3 days	Fri 02/02/18
800	0%	Commissioning CM4	67.5 days	Thu 15/02/18
801	0%	Slow pump down	2 wks	Thu 15/02/18
802	0%	Interlock tests	1.2 wks	Thu 01/03/18
803	0%	RF, Instrumentation, ELQA tests before cool down	4 days	Thu 01/03/18
804	0%	Cooldown (all CMs)	2.5 wks	Mon 26/03/18
805	0%	Cryo tests and tuning	7 days	Fri 13/04/18
806	0%	RF conditioning above Tc	1 wk	Fri 06/04/18
807	0%	Low Level RF test (tests cold)	2 wks	Tue 24/04/18
808	0%	RF tests at 4.5 K	1 wk	Wed 09/05/18
809	0%	SC solenoid test	1 wk	Thu 17/05/18
810	0%	Heat load measurements	1 day	Fri 25/05/18
811	0%	Thermal cycles	1 wk	Fri 25/05/18
812	0%	REX	95.5 days	Mon 08/01/18
815	0%	Machine Check out and beam commissioning	7 wks	Mon 28/05/18
816	0%	Beam run Phase 2b	18.6 wks	Mon 09/07/18
817	0%	End proton run 2018	0 days	Fri 16/11/18



Courtesy of F. Formenti (EN/EA)

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

# Spare Cavities



Courtesy of W. Delsolaro Venturini (BE/RF)

# Summary:

## ❑ HIE-ISOLDE Phase 2A Operations successful

- 10 experiments already completed
- 2 more experiments planned
- > 1500 hrs of beam time (pre-LS1)
- Bib improvement of the reliability of the linac

## ❑ Phase 2B status and plan:

- All five cavities installed in CM4
- Assembly of CM4 will be completed before the end of 2017
- Installation in tunnel in February 2018
- Physics campaign in July 2018

## ❑ Spares:

- Complete set of cavities (5xQS + 1xQSS)
- Solenoids (x2)

# Big thanks to all CERN groups



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