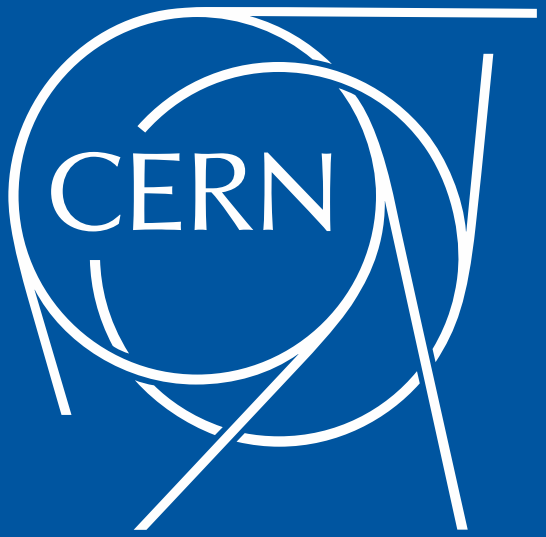
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Mode of operation for 2017

Jose Alberto Rodriguez
BE-OP-ISO

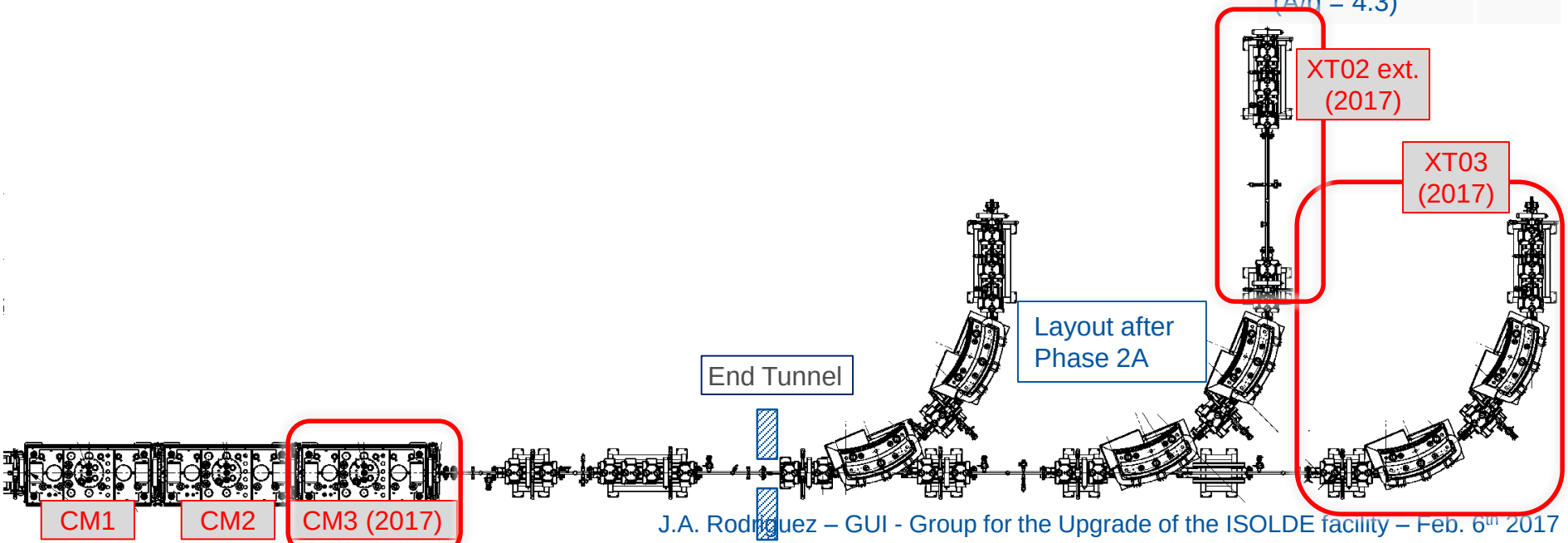
Content:

- HIE-ISOLDE Physics in 2017
- HIE-ISOLDE Operations
  - Alternating High and Low Energy Physics
  - Long High Energy Experiments (two targets needed)
- Summary

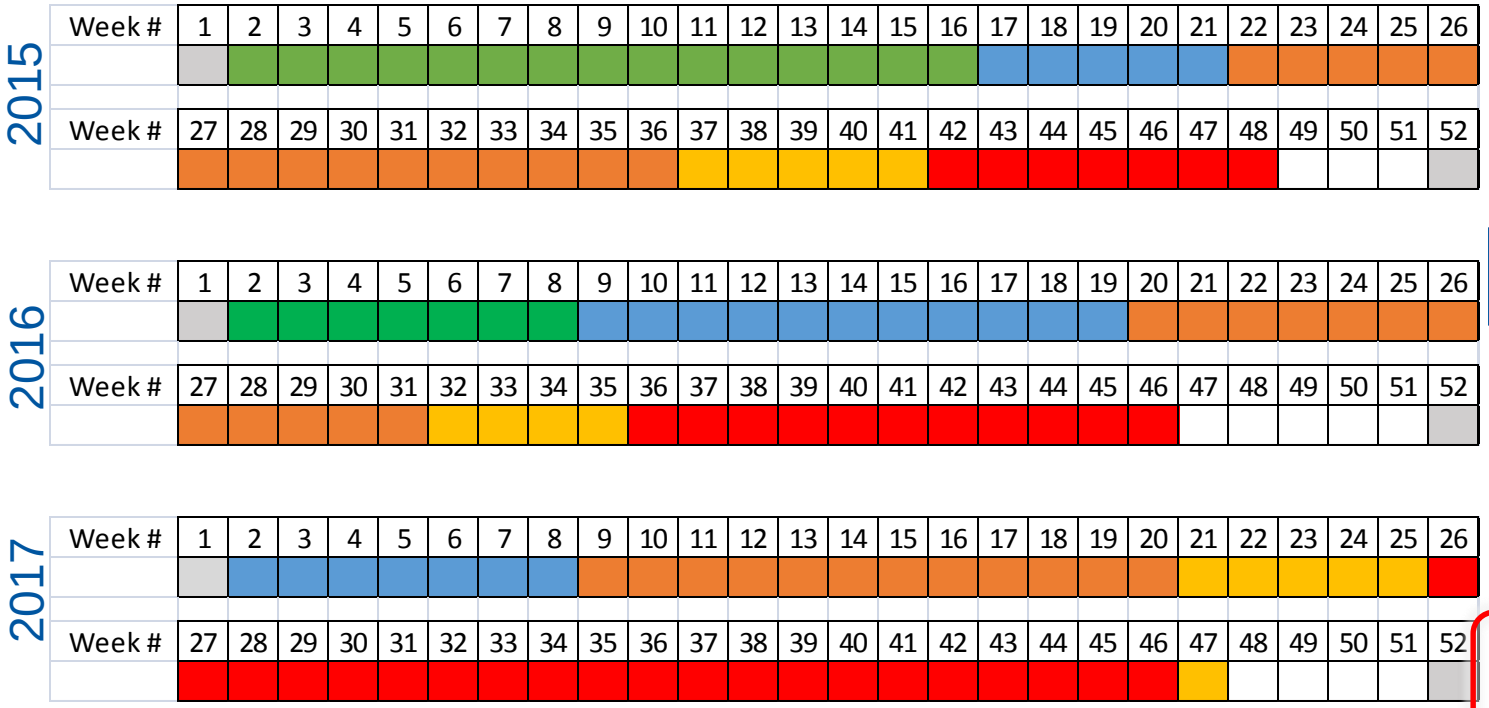
HIE-ISOLDE Physics in 2017:

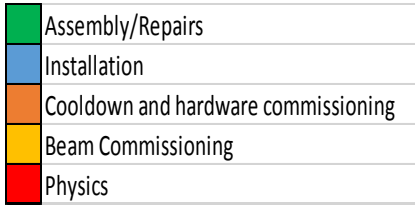
Phase 2A of the HIE-ISOLDE project

# Cryomodules	3
# HEBT lines	3
E [MeV/u] (A/q = 2.5)	11.5
E [MeV/u] (A/q = 4.3)	7.9



HIE-ISOLDE Physics in 2017:

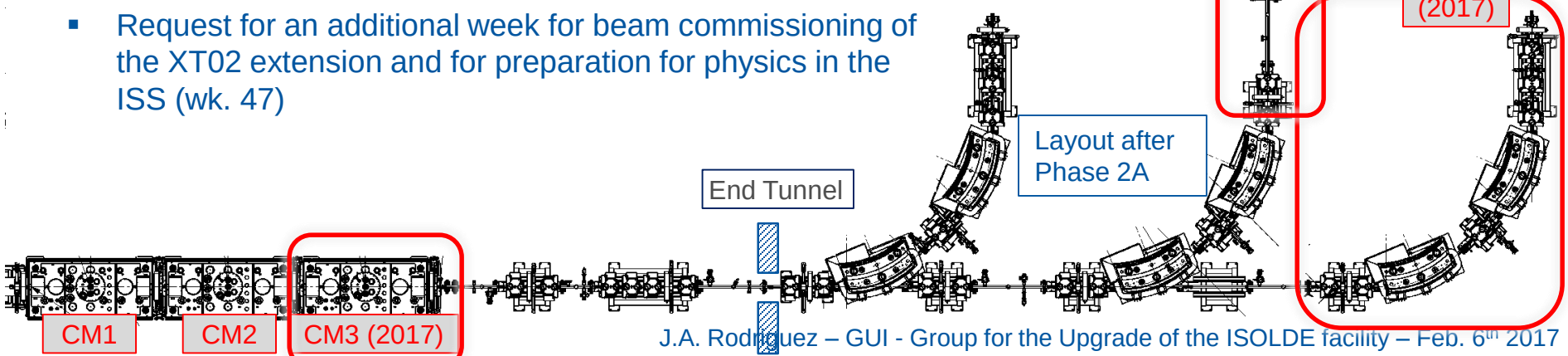




Phase 2A of the HIE-ISOLDE project

# Cryomodules	3
# HEBT lines	3
E [MeV/u] (A/q = 2.5)	11.5
E [MeV/u] (A/q = 4.3)	7.9

- Almost double than in 2016 (21 wks.) → We need to re-evaluate how we will operate the machine
- Request for an additional week for beam commissioning of the XT02 extension and for preparation for physics in the ISS (wk. 47)



Content:

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HIE-ISOLDE Operations:

Alternating high and low energy physics:

- GPS for HIE-ISOLDE physics preferred
- Target installed on Friday, set-up Monday to Thursday, beam to users Thursday evening (earlier if lasers are not needed), Friday contingency
- Monday beam characterization and isotope/energy change if needed
- Target would reach its expected lifetime on Wednesday morning (1.8 μA avg. current assumed)

	HRS										GPS										HIE
	08:30	09:30	10:30	11:30	12:30	13:30	14:30	15:30	16:30	17:30	08:30	09:30	10:30	11:30	12:30	13:30	14:30	15:30	16:30	17:30	
Fr	------						LE Physics				Target Installation						Pumping/Heating				
Sa	LE Physics										Pumping/Heating										Stable
Su	LE Physics										Pumping/Heating										Stable
Mo	LE Physics										Separator Set-Up				RILIS Set-up						
Tu	------								LE Physics		CA0	p-Scan			Target yields			CA0			
Wd	------								LE Physics		CA0	TRAP/EBIS Set-Up						CA0			
Th	------										CA0	EBIS Set-Up			RIB to linac			HIE Physics			
Fr	Target Installation						Pumping/Heating				------						HIE Physics				RIB
Sa	Pumping/Heating										HIE Physics										RIB
Su	Pumping/Heating										HIE Physics										RIB
Mo	Separator Set-Up							-----			RIB Charact.				HIE Physics						RIB
Tu	-----										HIE Physics (16.25 shifts, 5.3E18)										RIB
Wd	-----										HIE Physics (19.25 shifts, 6.2E18)										RIB
Th	CA0	p-Scan			Target yields				LE Physics		-----										
Fr	------						LE Physics				Target Installation						Pumping/Heating				
Sa	LE Physics										Pumping/Heating										Stable
Su	LE Physics										Pumping/Heating										Stable
Mo	LE Physics										Separator Set-Up				RILIS Set-up						
Tu	------								LE Physics		CA0	p-Scan			Target yields			CA0			
Wd	------								LE Physics		CA0	TRAP/EBIS Set-Up						CA0			
Th	------										CA0	EBIS Set-Up			RIB to linac			HIE Physics			
Fr	Target Installation						Pumping/Heating				------						HIE Physics				RIB
Sa	Pumping/Heating										HIE Physics										RIB
Su	Pumping/Heating										HIE Physics										RIB

	Shifts	%
HIE Physics	19.3	45.8
LE Physics	17.0	40.5
Targets	2.8	6.5
REX/HIE	1.8	4.2
LE to HIE to LE	0.5	1.2
CA0 + p-Scan	0.8	1.8
Total	42.0	100
RILIS	0.6	1.5
Separators	1.6	3.9
REX/HIE	5.0	11.9
HIE Stable Phys.	8.0	19.0

HIE-ISOLDE Operations:

Alternating high and low energy physics:

- Low energy physics could start earlier if target fails before Thursday morning
- Stable beam could be sent to the users during the weekends. They were requested several times last year
- In total, we could expect to run ~ 10 high energy experiments (~ 15-18 shifts/experiment) in this mode
- In addition, during the 21 weeks:
  - High energy stable beam: ~ 50 shifts of high energy stable beam could be possible
  - Low energy physics: ~ 100-150 shifts could be feasible

	HRS										GPS										HIE
	08:30	09:30	10:30	11:30	12:30	13:30	14:30	15:30	16:30	17:30	08:30	09:30	10:30	11:30	12:30	13:30	14:30	15:30	16:30	17:30	
Fr	------						LE Physics				Target Installation				Pumping/Heating						
Sa	LE Physics										Pumping/Heating										Stable
Su	LE Physics										Pumping/Heating										Stable
Mo	LE Physics										Separator Set-Up				RILIS Set-up						
Tu	------								LE Physics		CA0	p-Scan			Target yields			CA0			
Wd	------								LE Physics		CA0	TRAP/EBIS Set-Up						CA0			
Th	------										CA0	EBIS Set-Up			RIB to linac			HIE Physics			
Fr	Target Installation						Pumping/Heating				------							HIE Physics			RIB
Sa	Pumping/Heating										HIE Physics										RIB
Su	Pumping/Heating										HIE Physics										RIB
Mo	Separator Set-Up								-----		RIB Charact.				HIE Physics						RIB
Tu	-----										HIE Physics (16.25 shifts, 5.3E18)										RIB
Wd	-----										HIE Physics (19.25 shifts, 6.2E18)										RIB
Th	CA0	p-Scan			Target yields				LE Physics		-----										
Fr	------						LE Physics				Target Installation				Pumping/Heating						
Sa	LE Physics										Pumping/Heating										Stable
Su	LE Physics										Pumping/Heating										Stable
Mo	LE Physics										Separator Set-Up				RILIS Set-up						
Tu	------								LE Physics		CA0	p-Scan			Target yields			CA0			
Wd	------								LE Physics		CA0	TRAP/EBIS Set-Up						CA0			
Th	------										CA0	EBIS Set-Up			RIB to linac			HIE Physics			
Fr	Target Installation						Pumping/Heating				------							HIE Physics			RIB
Sa	Pumping/Heating										HIE Physics										RIB
Su	Pumping/Heating										HIE Physics										RIB

	Shifts	%
HIE Physics	19.3	45.8
LE Physics	17.0	40.5
Targets	2.8	6.5
REX/HIE	1.8	4.2
LE to HIE to LE	0.5	1.2
CA0 + p-Scan	0.8	1.8
Total	42.0	100
RILIS	0.6	1.5
Separators	1.6	3.9
REX/HIE	5.0	11.9
HIE Stable Phys.	8.0	19.0

HIE-ISOLDE Operations:

Long HIE-ISOLDE experiment (no UC target used):

- Possible, but very tight schedule (a bit more margin if lasers are not needed). No contingency
- GPS for HIE-ISOLDE physics needed. HRS takes longer to set-up
- If UC target is used: Modified Scenario 1 with beam to users on Wednesday instead of Thursday, no stable beam during the weekend

	HRS										GPS										HIE
	08:30	09:30	10:30	11:30	12:30	13:30	14:30	15:30	16:30	17:30	08:30	09:30	10:30	11:30	12:30	13:30	14:30	15:30	16:30	17:30	
Fr	------						LE Physics				Target Installation						Pumping/Heating				
Sa	LE Physics										Pumping/Heating										Stable
Su	LE Physics										Pumping/Heating										Stable
Mo	LE Physics										Separator Set-Up				RILIS Set-up						
Tu	------								LE Physics		CA0	p-Scan		Target yields				CA0			
Wd	------								LE Physics		CA0	TRAP/EBIS Set-Up						CA0			
Th	------										CA0	EBIS Set-Up			RIB to linac			HIE Physics			
Fr	Target Installation						Pumping/Heating				------						HIE Physics				RIB
Sa	Pumping/Heating										HIE Physics										RIB
Su	Pumping/Heating										HIE Physics										RIB
Mo	Separator Set-Up								-----		RIB Charact.				HIE Physics						RIB
Tu	------										HIE Physics (16.25 shifts, 5.3E18)										RIB
Wd	------										Target Installation						Pumping/Heating				
Th	------										Separator			RILIS		CA0	p-Scan		-----		
Fr	------										Target yields				TRAP/EBIS/LINAC			HIE Physics			RIB
Sa	------										HIE Physics										RIB
Su	------										HIE Physics										RIB
Mo	------										RIB Charact.				HIE Physics						RIB
Tu	------										HIE Physics (14 shifts, 4.5E18)										RIB
Wd	------										HIE Physics (17 shifts, 5.5E18)										RIB
Th	CA0	p-Scan		Target yields					LE Physics		-----										
Fr	------						LE Physics				Target Installation						Pumping/Heating				
Sa	LE Physics										Pumping/Heating										Stable
Su	LE Physics										Pumping/Heating										Stable

	Shifts	%
HIE Physics	33.3	52.8
LE Physics	17.0	27.0
Targets	4.0	6.3
REX/HIE	2.3	3.6
LE to HIE to LE	0.5	0.8
CA0 + p-Scan	1.1	1.8
Separators	0.4	0.6
RILIS	0.4	0.6
Stand-by	4.1	6.5
Total	63.0	100
RILIS	0.6	1.0
Separators	1.6	2.6
REX/HIE	5.0	7.9
HIE Stable Phys.	8.0	12.7

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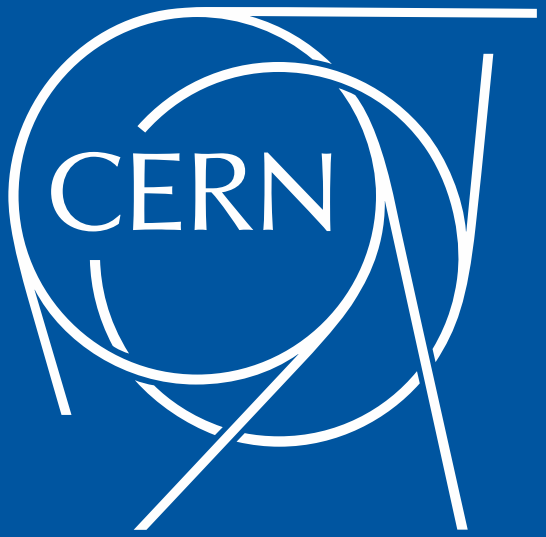
Summary:

- HIE-ISOLDE Phase 2A will be ready for HIE-ISOLDE Physics in 2017 (3 cryomodules with 5 QWR each, 3 HEBTs lines)
- The campaign will start earlier (wk. 26) and last for 21 weeks (almost twice as long as in 2016)

  ⟹ Need to re-evaluate how the machine will be operated

- Alternating high and low energy experiments may be the most efficient operations mode given the constrains that we have:
  - Two full time machine supervisors during working hours (one piquet outside normal working hours)
  - One additional machine supervisor occasionally supporting the other two

- Highlights of this mode of operations:
  - Alternating experiments that need and don't need lasers ionization
  - Targets installed on Friday mornings, so that set-up starts on Monday mornings
  - Beam to users on Thursday evening (Friday for contingency)
  - Linac set-up in parallel to low energy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