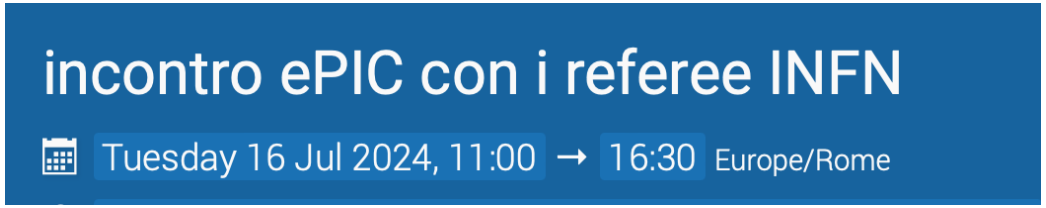
ePIC Italy General Meeting

Updates from the Summer, the "season restart" + CSN3

Since Bologna meeting…

https://agenda.infn.it/event/42627/



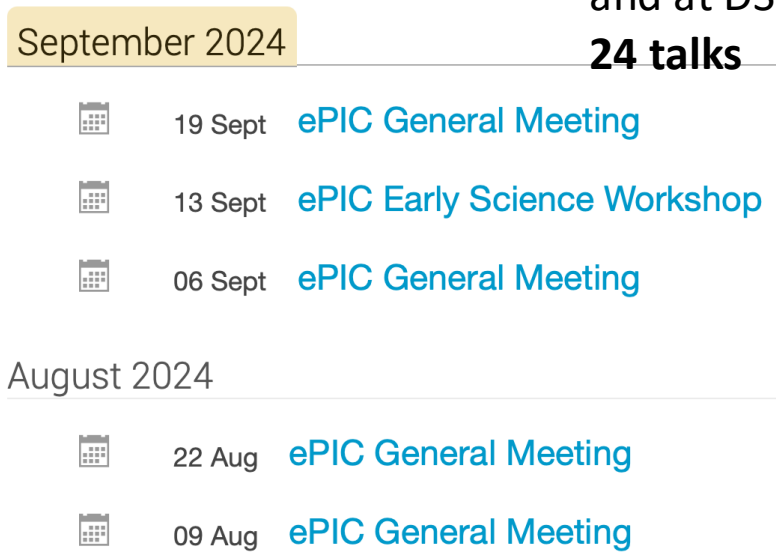
Documento di programmazione: https://cernbox.cern.ch/index.php/s/eW51GkEhxX1DGMZ

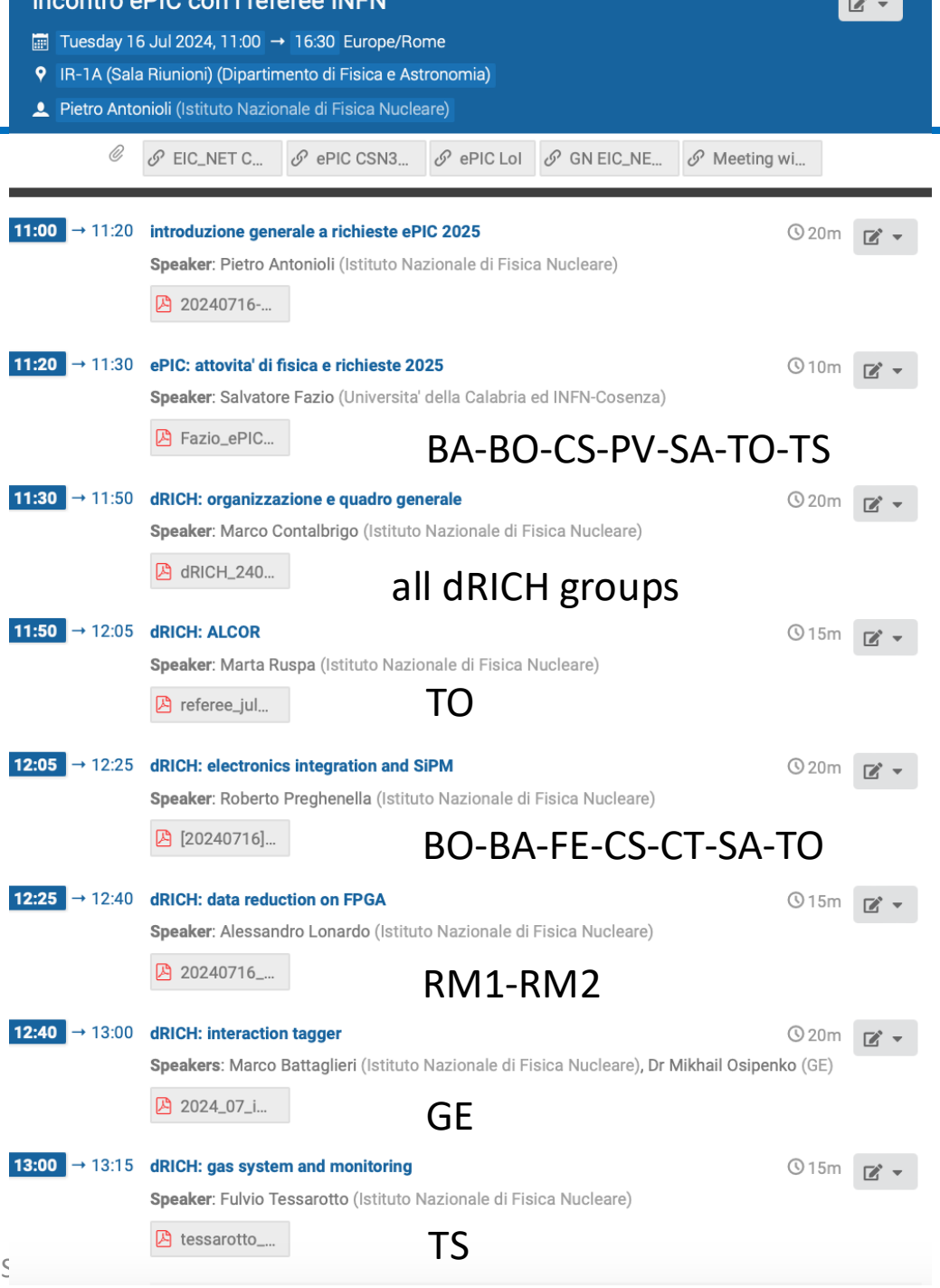
https://indico.bnl.gov/event/20727/

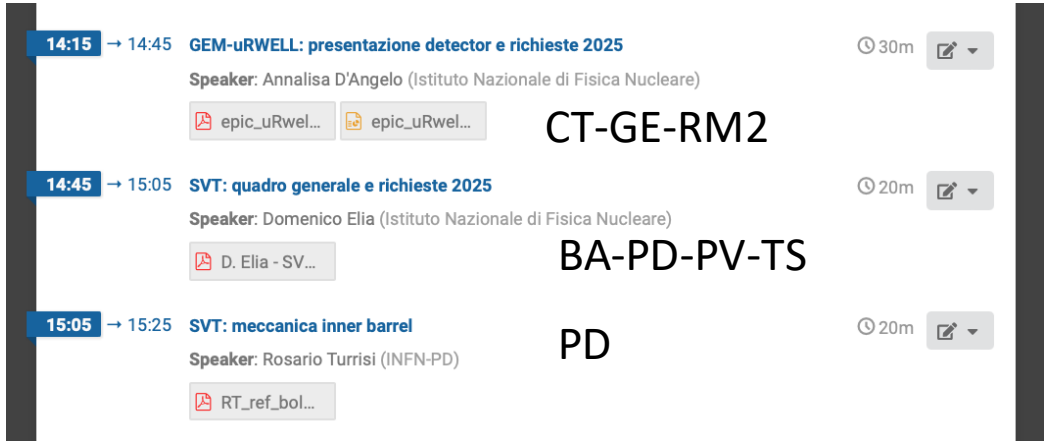
22–27 Jul 2024
US/Eastern timezone

strong ePIC Italy presence in general meeting and at DSC level (mRWELL-ECT, SVT, dRICH)
24 talks

https://indico.bnl.gov/category/411/



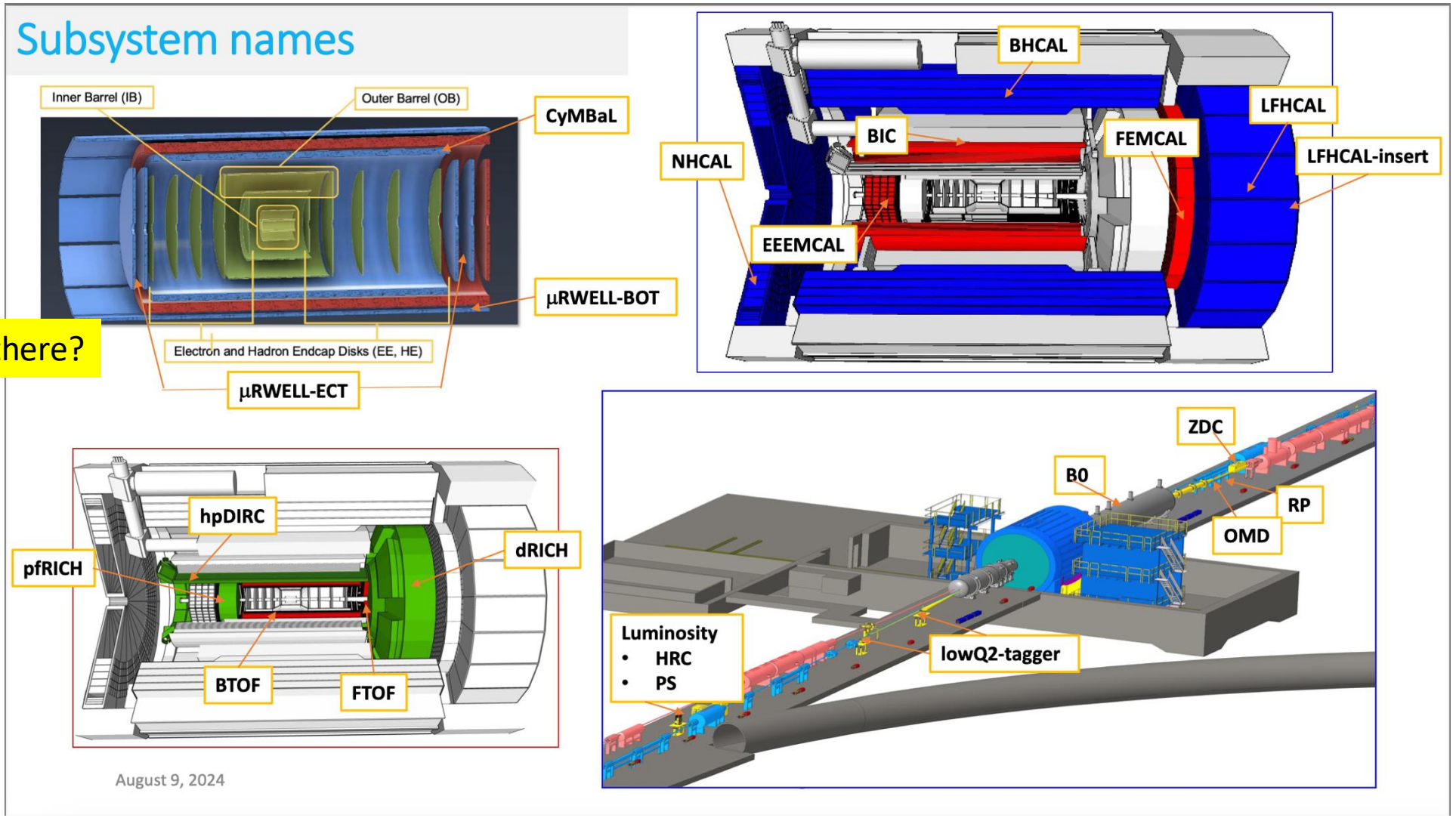




Big package of requests/ plan consistent with Bologna's meeting / LoI

A note from August 9 meeting

Is SVT still there?



EIC schedule

CD-3A:

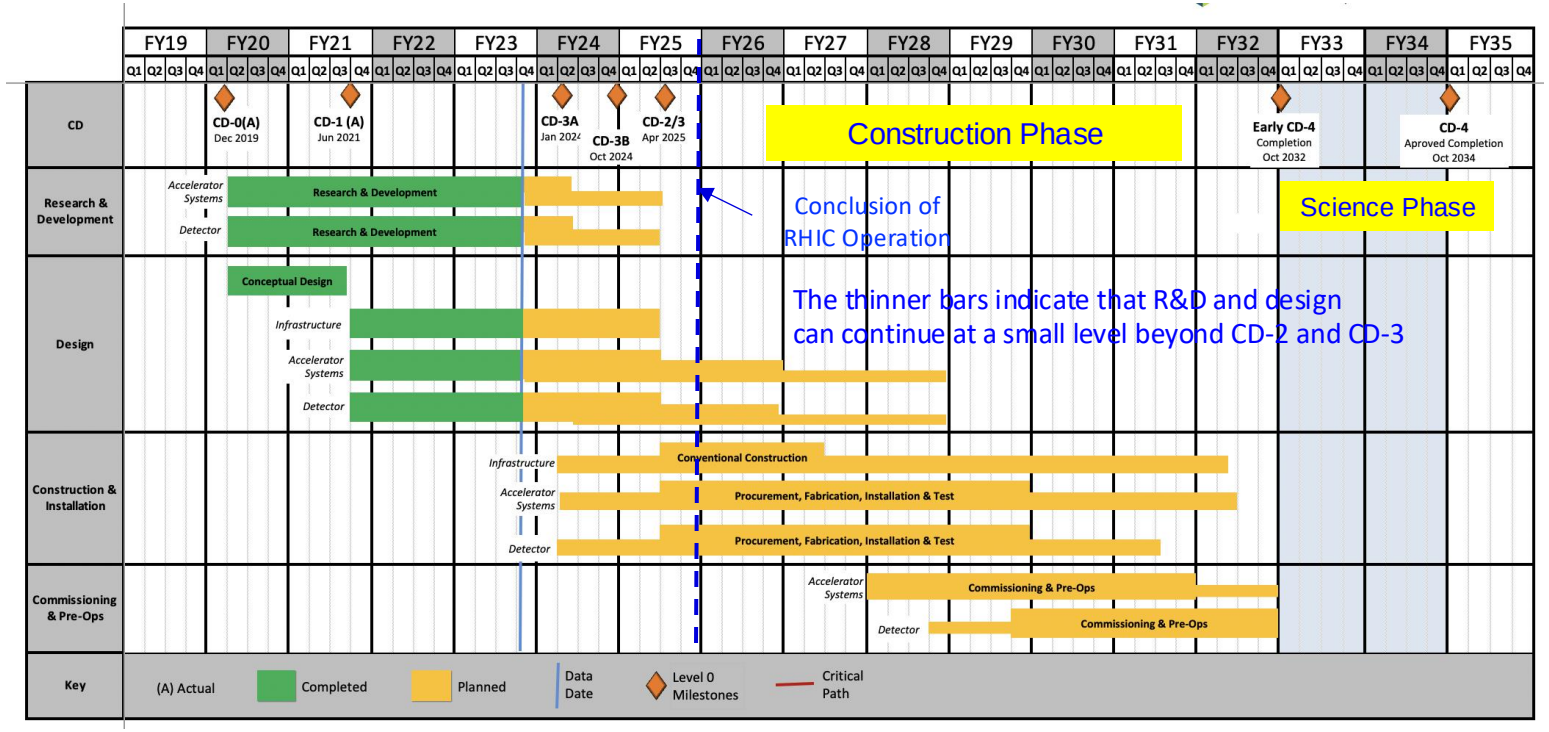
Approve start of long-lead procurements
CD-3A items passed final design review
All interfaces related to them are frozen
Waiting for ESAAB meeting for authorization

CD-2:

Approve prelim. design for all subdetectors
Design Maturity: >60%
Need "pre-"TDR (or draft TDR)
Baseline project in scope, cost, schedule

CD-3:

Approve final design for all subdetectors
Design Maturity: ~90%
Need full TDR



Current EIC Critical Decision Plan	
CD-0/Site Selection	December 2019 ✓
CD-1	June 2021 ✓
CD-3A	March 2024 ✓
CD-3B	**October 2024**
CD-2/3	**April 2025**
early CD-4	October 2032
CD-4	**October 2034**

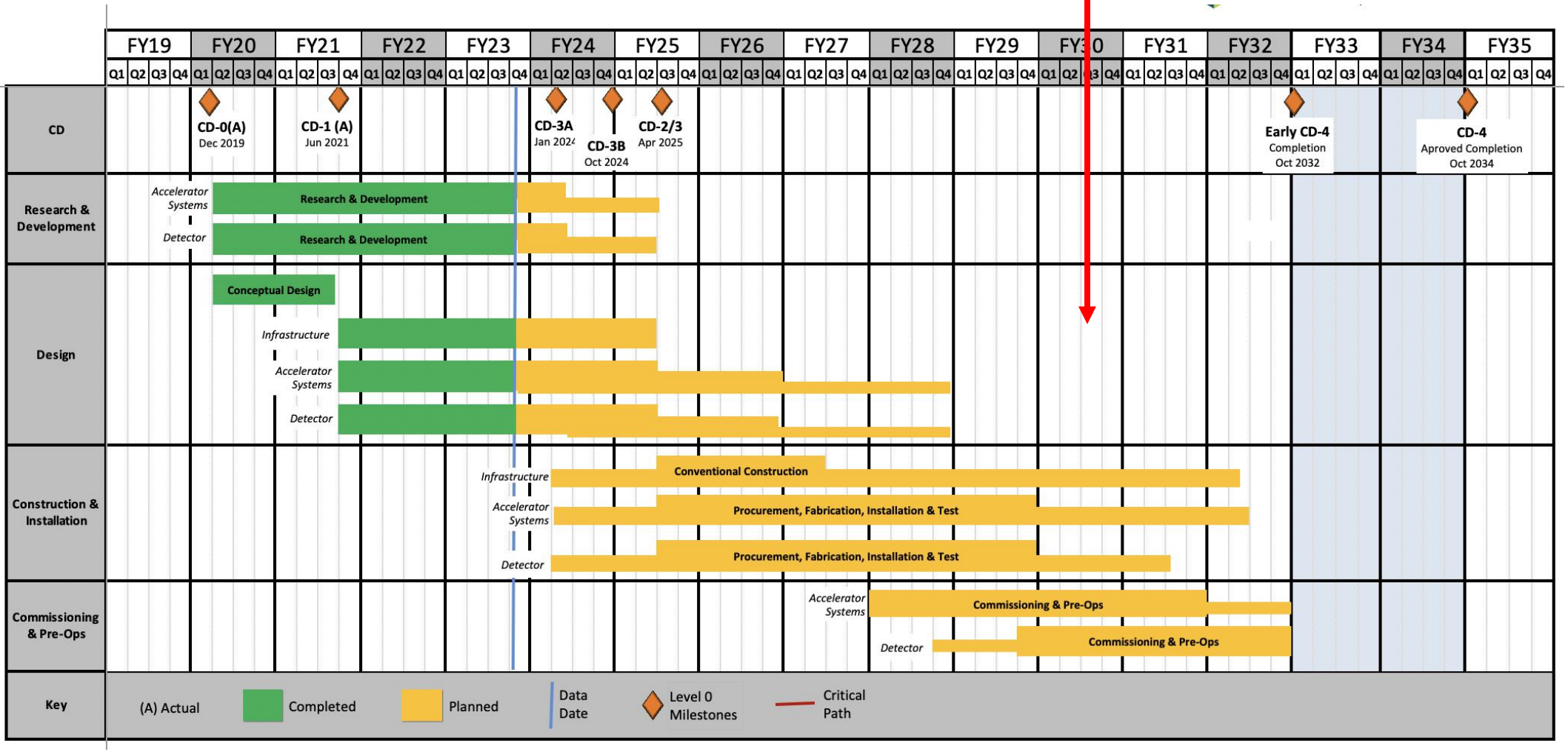
September 2022 EIC received $138M DOE Inflation Reduction Act funding → CD-3A

Updated Project Schedule: based on the actual appropriated FY24 funding ($98M), on uncertain FY25 budget scenarios (President's Budget is only ~$113M)

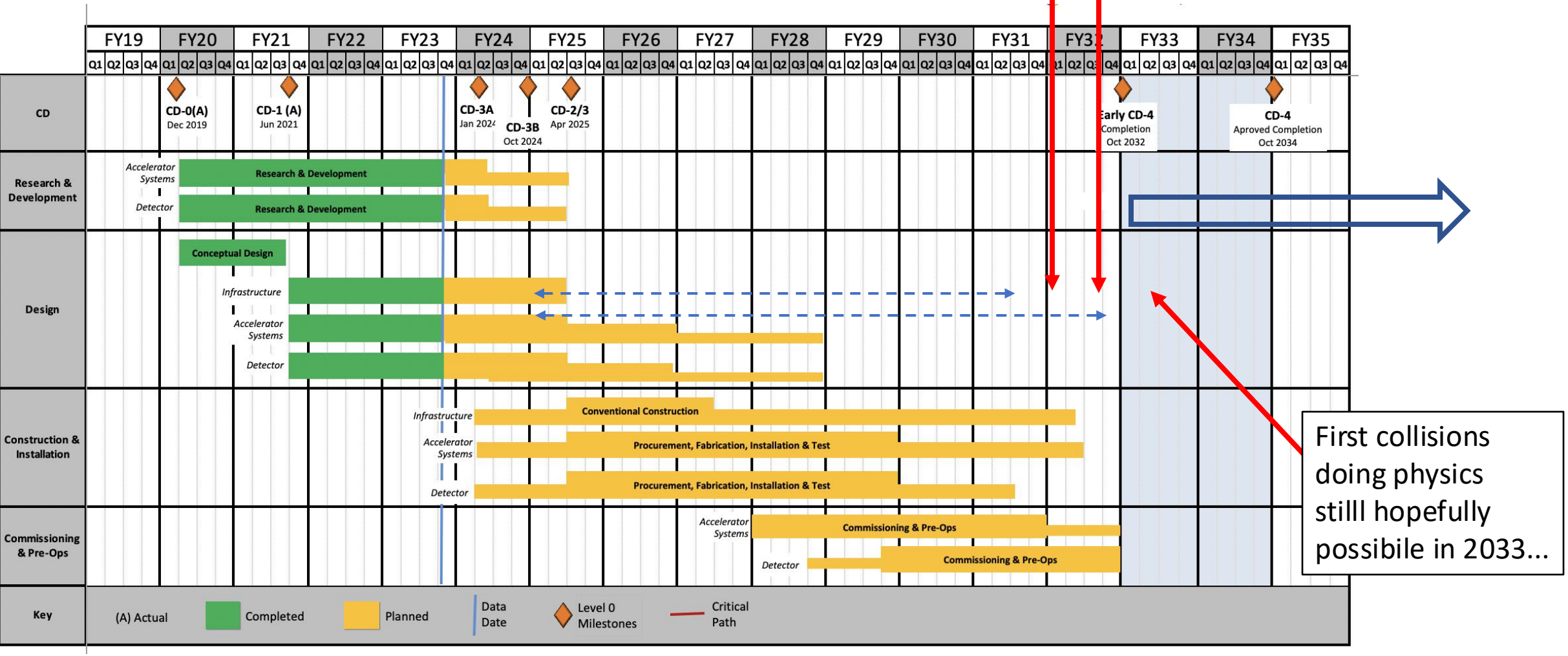
Updated EIC Critical Decision Plan	
CD-0/Site Selection	December 2019 ✓
CD-1	June 2021 ✓
CD-3A	March 2024 ✓
CD-3B Review	**January 7-9 2025**
CD-2/3 Review	End of 2025
early CD-4	December 2034?
CD-4	December 2036?

(courtesy from R. Ent @ QNP2024)

detector ready in the hall was "here"



detector ready in the hall now cuuld be somewhere"here"



First collisions doing physics stilll hopefully possibile in 2033...

Need to buy, build, ship and commission in a larger window....

EIC phased approach

ePIC Early Science Workshop

Friday 13 Sept 2024, 10:30 → 13:30 US/Eastern

Description **Connection Information:** https://www.zoomgov.com/j/16028186096?pwd=dndBRnBFSkxkN3RITnNLZlRITjZKQT09

Recording: https://youtu.be/Cd0gvc1-T9k

Early.Physics.eca.L... Early.Physics.eca.v...

see Marco's report

Report of the machine complements what we heard by Jim and Elke @ Lehigh

Accelerator at Phase 1 and Ultimate

RCS:
7nC / bunch
5 – 10 GeV polarized e- → change injection scheme to reach 28 nC / bunch and 18 GeV electrons

ESR:
7nC / bunch
5 – 10 GeV polarized e- → add more RF cavities to reach 28 nC / bunch and 18 GeV electrons

HSR:
100 – 250 GeV polarized p → update PS to reach 275 GeV protons and 110 GeV/u nuclei
100 GeV/u nuclear beams → add 41 GeV bypass to get full HSR beam energy capabilities

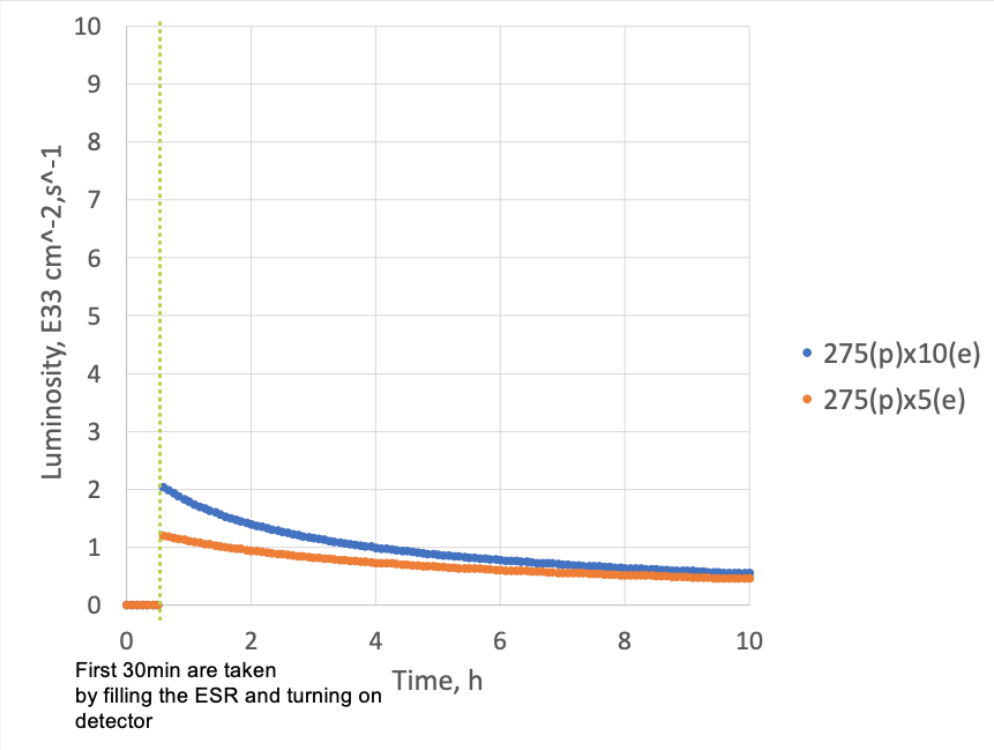
pre-cooling at injection → add strong hadron cooling to achieve ultimate beam parameters and integrated luminosity

Proposal for the Day-One Physics and the initial years of science is driven by
- Start of the promised NSAC/NAS science program
- Alignment with expected order in commissioning the collider and ramp up of performance that comes with gain of operational experience
- Having access to new physics results early to get high impact publications, i.e. PRLs, ……

at the beginning no electron polarization
and reduced luminosity
→ emphasis on ions + unpolarized

→ think hard about well preparing for this early physics

The e-p luminosity in Phase 1



- 7 nC electron bunch charge 28 nC (CDR)
- 1.1 nC proton bunch charge for 275x10
  - 0.55 nC for 275x5
- Constant proton beam IP divergencies are maintained throughout the store. by gradual increase of proton IP beta-functions as the beam emittance increases.
- The electron IP beta-functions are adjusted accordingly to match electron and proton transverse beam size.

- Compare to HERA peak luminosity of $5x10^{31}cm^{-2}sec^{-1}$

CSN3: assegnazioni

Sez. & Suf.	MISS				CON				ALTRICONS				TRA				SEM				PUB				MAN				INV				LIC-SW				APP				SPSERVIZI				TOTALE			
		Sj	Dot.	Ant.		Sj	Dot.	Ant.		Sj	Dot.	Ant.		Sj	Dot.	Ant.		Sj	Dot.	Ant.		Sj	Dot.	Ant.		Sj	Dot.	Ant.		Sj	Dot.	Ant.		Sj	Dot.	Ant.		Sj	Dot.	Ant.		Sj	Dot.	Ant.		Sj	Dot.	Ant.
BA	58.0	5.5			80.5								2.0																														140.5	5.5		
	35.5	11.0			24.0	30.0							2.0																														61.5	41.0		
BO	25.5	15.5			49.5	10																							48.0				1.0								7.5				124	33		
	11.0	16.5			31.5	9.5																							23.0				1.0								7.5				66.5	33.5		
CS	22.5	2			9.0																																						31.5	2		
	12.0	3.5			1.0																																						13.0	3.5		
CT	8.5	7			1.0																																						9.5	7		
	4.0	7.5			0.0																																						4.0	7.5		
FE	16.5	6			34.0	11							2.0																9.0														61.5	17		
	6.5	5.5			3.0	15.0							2.0																7.0														18.5	20.5		
GE	14.5				15.0																																						29.5			
	7.5	2.0			1.0	10.0																																					8.5	12.0		
LNS	10.0	18												3																				5.0									15	21		
	2.0	7.5												3.0																				0.0									2.0	10.5		
PD	9.5	2.5			14.5								3.0																6.0	20													33	22.5		
	4.5	3.0			8.0								2.0																																	
PV.DTZ	13.5	2.5			3.0								2.0																																	
	7.5	1.0			1.5								0.5																																	
RM1	15.0				2.0																																									
	6.0	2.0			0.0	1.0																																							
RM2	6.0	12.5			5.5				3.0																																					
	2.5	8.0			5.5				1.0																																					
SA	10.5	5.5																																												
	3.5	5.5																																												
TO	28.5	5			21.0																																								
	14.5	5.0			10.0																								0.0									220.0						24.5	225.0		
TS	41.0	15			47.0																								39.5														127.5	15		
	12.0	17.5			0.0	29.0																							3.0														15.0	46.5		
TOTALE	279.5	97			282	21			3				9	3															158	20			6				30	270			0	7.5			767.5	418.5		
	376.5				303				3				12				0				0				0				178				6				300				7.5				1186			
	129	95.5	0	0	85.5	94.5	0	0	1	0	0		6.5	3	0	0													54	24	0	0	1	0	0		15	220	0	0	0	7.5	0	0	292	444.5	0.0	0.0
	224.5				180.0				1.0				9.5				0.0				0.0				0.0				78.0				1.0				235.0				7.5				736.5			

	Richieste (kEU)	Assegnato (kEU)	Ass/rich
totale no missioni	809.5	512	63.2%
missioni	376.5	224.5	59.6%
totale	1186	736.5	60%

details to be discussed soon with RL/detect. coord.

Some initial comments/information

- difficult budget session for CSN3 -> more than 1 MEU cut needed after first referee assessment
- next year we might need to ask "richieste straordinarie" (and all sigle will do that)
- critical "resitituzioni" next month → recirculated as "anticipabili" → increase "buffer"

several points for ePIC to reflect
- ALCOR engineering run sub-funded (no dicing): largest item!
- sensors half-funded for μRWELL-ECT and SVT
- some activities/section not-funded (SiPM: TS CS)
- dRICH - tagger s.j.
- generally missions reduced greatly → discipline establishing periodic meetings we wanted to have "within Italy"
- balance between January and July meetings (January is in Italy... unique opportunity!)
- need to define soon next ePIC Italy meeting site

and in the big financial scheme...

EIC_NET	INFN R&D				Total R&D	Tot YTD
Year	tracking	dRICH	uRWELL	SRO		
2019	0	19	0	5,5	24,5	24,5
2020	0	33,5	0	6,5	40	64,5
2021	0	72	0	6	78	142,5
2022	0	149,5	0	0	149,5	292
2023	0	198,5	0	6	204,5	496,5
2024	15	349	5	15	384	880,5
ePIC						
2025	60	200	20		280	
2026	40	100	30		170	
2027					100	
2028						
2029						
2030						

	INFN in-kind (kEU)			
Year	SVT	dRICH	uRWELL	TOT
2019				
2020				
2021				
2022				
2023				
2024				
	INFN In-Kind (kEU)			
Year	SVT	dRICH	uRWELL	TOT
2025	0	450	30	480
2026	180	1300	40	1520
2027	180	1400	200	1780
2028	270	1450	100	1820
2029	220	800	80	1100
2030	50	400	50	500
	900	5800	500	7200
	Total IKC (EU)		7200	
	EoI Target (total)		7200	

DoE funds (kEU)			TOT YTD
eRD	PED	Construction	
58,9	0	0	58,9
53,4	0	0	112,3
58,8	0	0	171,1
244	0	0	415,1
360	45,5	0	820,6
373,5	87	0	1281,1

280+480=760 but we got 512 kEU

and we need to spend in one more year (perhaps two...)

review plan...
first discussion with P. Giubellino

September meeting is a "restart"/quick update meeting

December we will have updates from RRB, updates from groups!

Questions?