

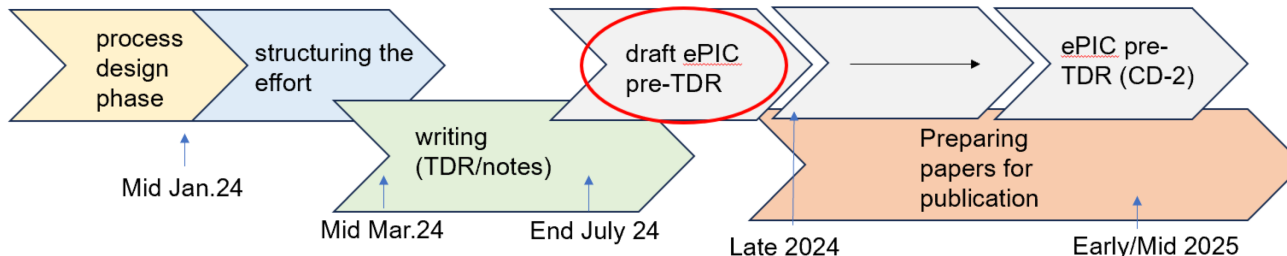
Prototype & Test Beam

ePIC TDR engagement — The strategy in a nutshell

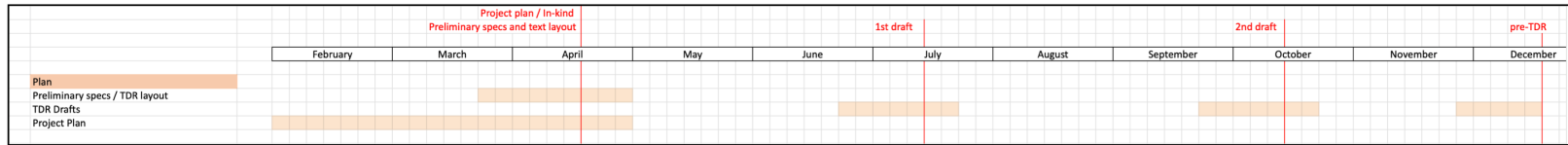
TDR Strategy and Publications



- In 2024 the ePIC collaboration will produce:
 - The ePIC contributions to the EIC TDR
 - The EIC TDR is the top priority
 - Chapters on *Physics Goals and Requirements* and *Experimental Systems*
 - Not just the document, but the simulations and detector R&D that form the basis
 - Requires close cooperation between the collaboration and the project!
 - An ePIC Detector Design paper:
 - Derived and expanded from the *Experimental Systems* TDR chapter
 - An ePIC Physics Performance paper:
 - Derived and expanded from the *Physics Goals and Requirements* TDR chapter
- Focused activity in the TIC:
Report by Silvia to follow
- AC Report in last General Meeting:
<https://indico.bnl.gov/event/21562/>
- Both to be published in a scientific journal (such as NIMA, JINST, or PRC)
 - These publications will serve as a focus in developing the ePIC Membership and Publication policies.



Presented at the PID WG Meeting on February 23 and at the TIC Meeting of March 4 (by Thomas)



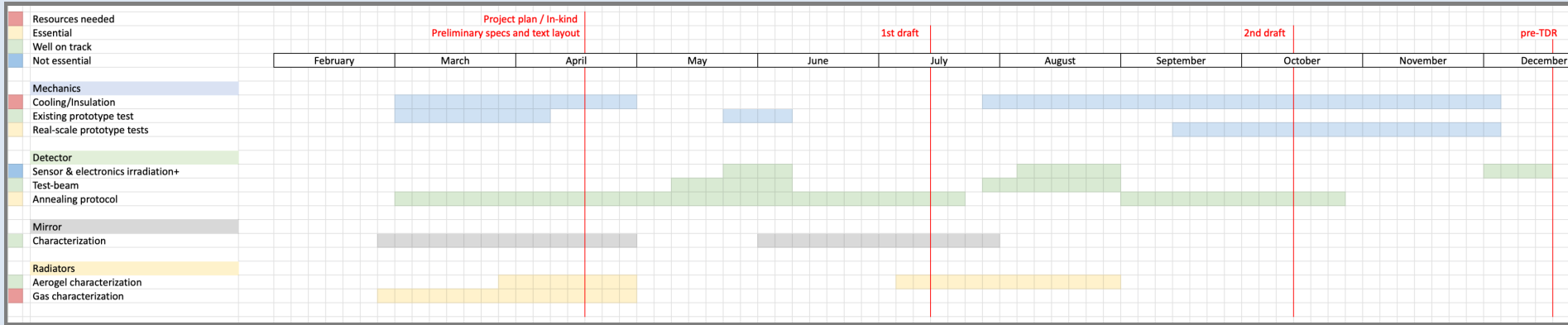
The timescale is aggressive due to the limited manpower
 A 60% readiness within 2024 is realistic, a 90% readiness appears challenging

dRICH @ 60% : Design of major components (mechanics, readout)
 No hardware real-scale demonstrators
Realistically achievable in 2024

dRICH @ 90% : Hardware real-scale demonstrators (mechanics, readout)
 Design refinement based on hardware tests
Realistically achievable during 2025 (1st half)

Left over: Aerogel (mass production) and SiPM (temperature treatments)
 Detail of ancillary systems
 may require longer engineering to reach best performance

Prototypes



Existing prototype: **Temperature control & insulation (preliminary)**
 Photon-detection unit (PDU) validation / gas alternatives
 RDO validation

March
 June
 After October

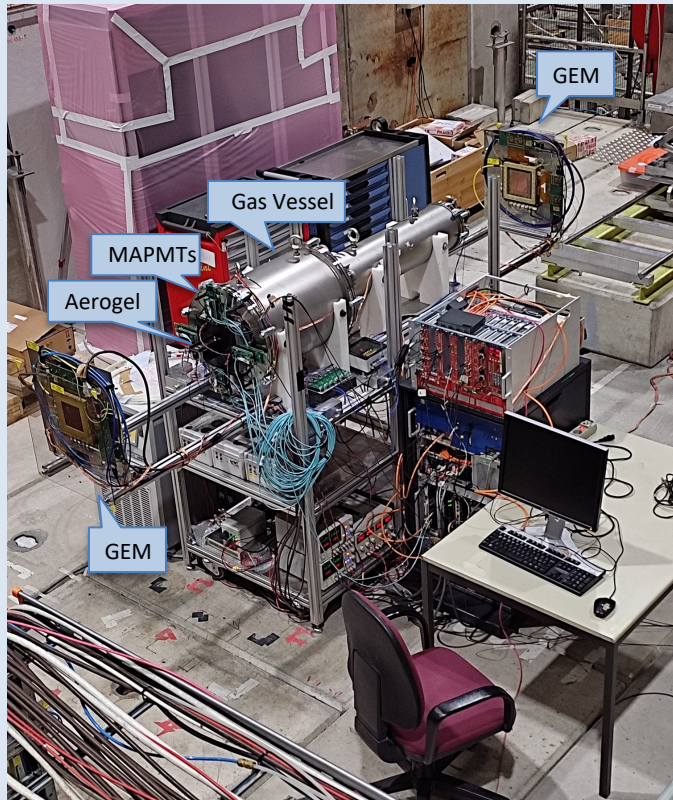
Real-scale prototype: **Mechanics (shell and inner structure)**
Temperature control & insulation
 ePIC off-axis optics
 Detector integration

After summer

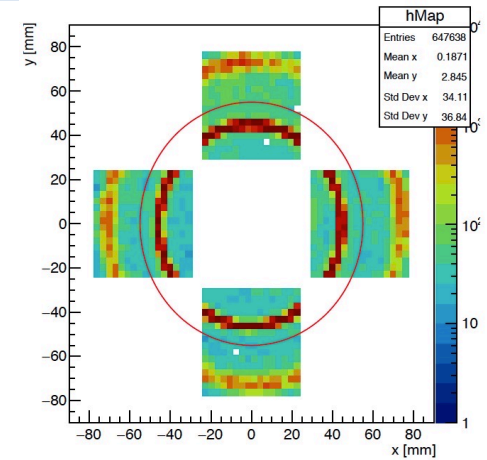
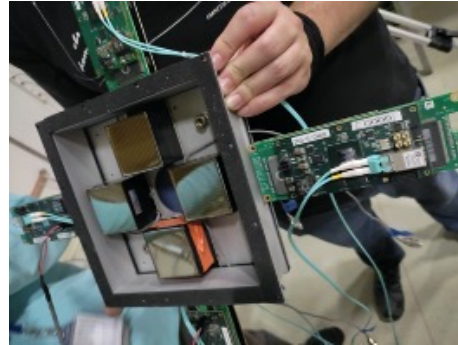
Realistic components: **CFRP mirror substrate**
Aerogel dimensions

April
 After summer

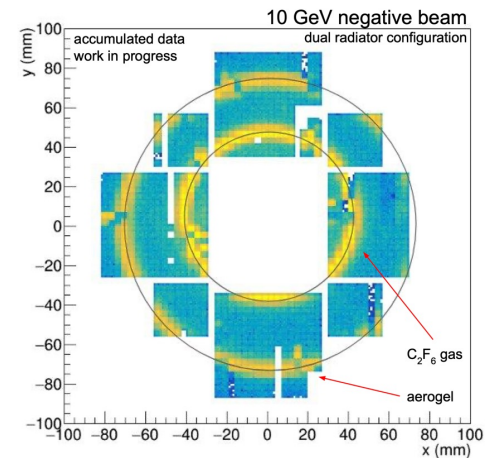
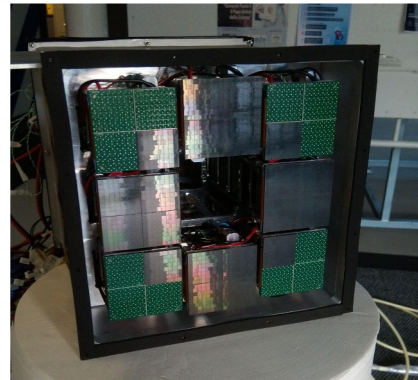
Operative prototype commissioned. Double ring imaging achieved. Performance in line with expectations



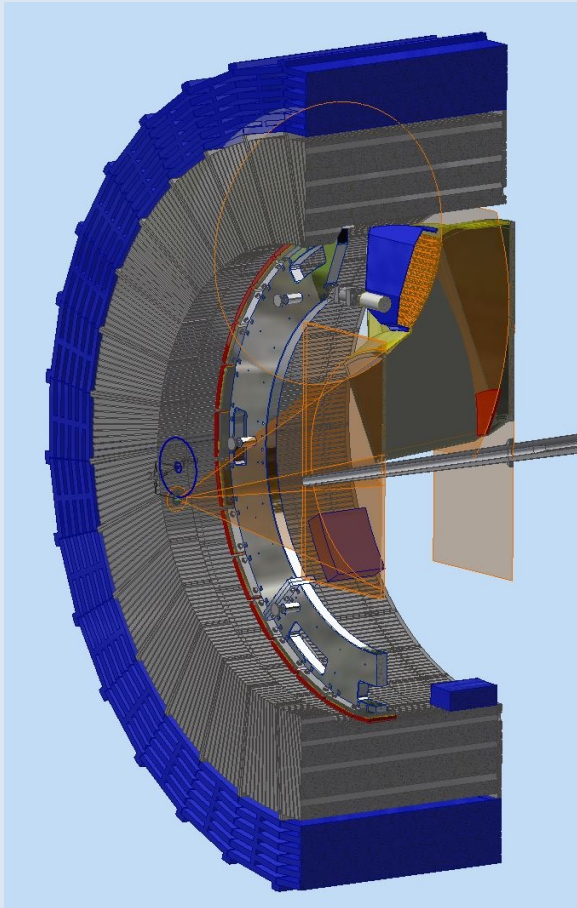
Reference readout from CLAS12 RICH:
H13700 MA-PMTs + ALCOR3 ToT chip



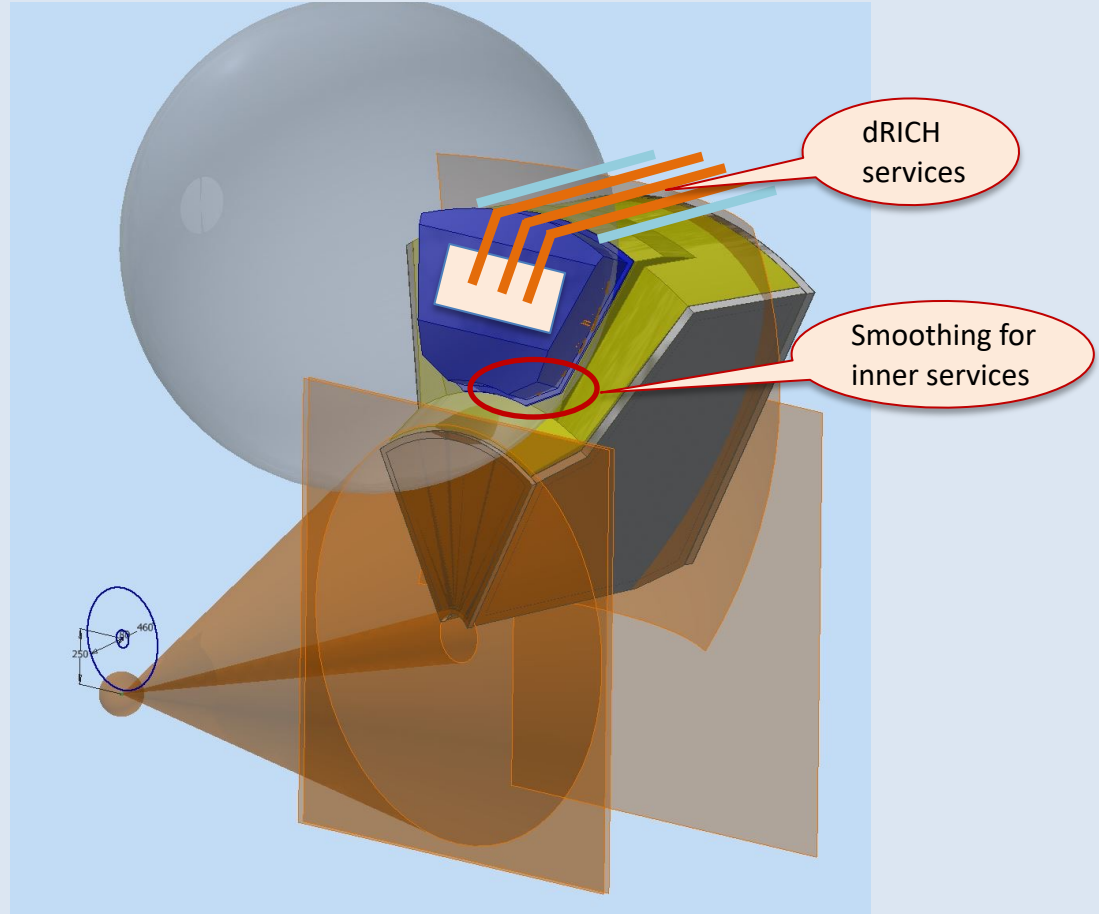
EIC-driven streaming readout:
SiPM Matrices + MAROC ToT chip



Scalable to the wanted shape



Baseline for the real-scale prototype



TDR Preparation

Preliminary version of specs & text layout in April

First draft in July

Second draft in October

pre-TDR (60 % readiness – no real-scale hardware test) at the end of the year

TDR (90 % readiness with real-scale hardware tests) mid 2025

Priority: technological solutions for structure/gas/integration/cooling/annealing/data stream

Test-beams

Focused on TDR → no need to rush

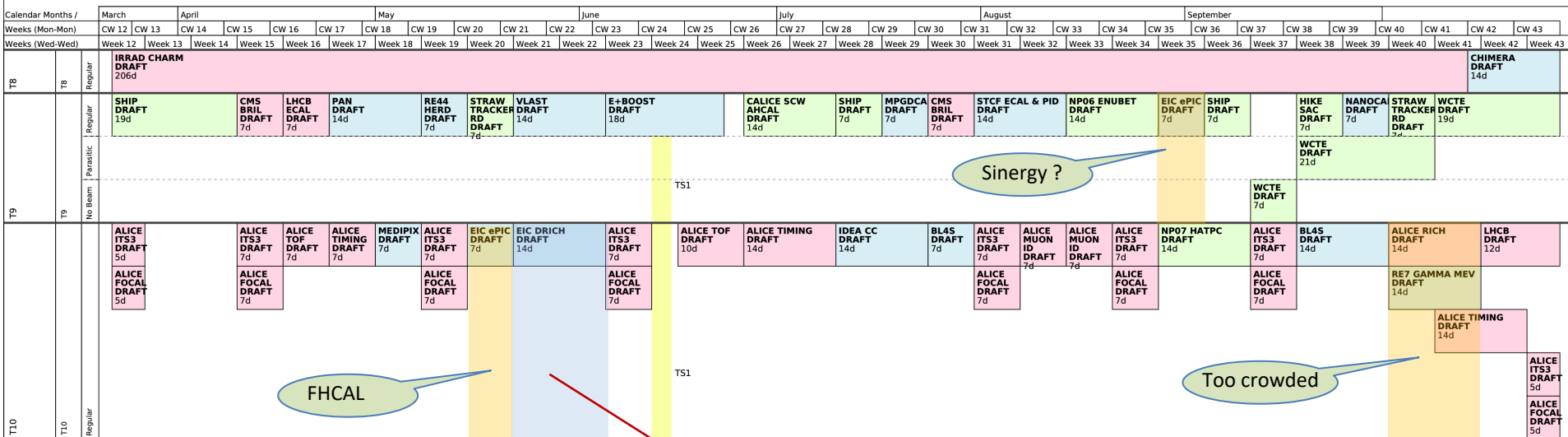
2-weeks PS test-beam in May 2024: performance with EIC-driven readout
study of thermal gradients (all in)
(+ alternate gas / new aerogel)

2-weeks PS test-beam in April 2025: real-scale demonstrators + RDO + realistic detector-box

opportunistic test beam in Fall 2024 ?

PS Current Schedule

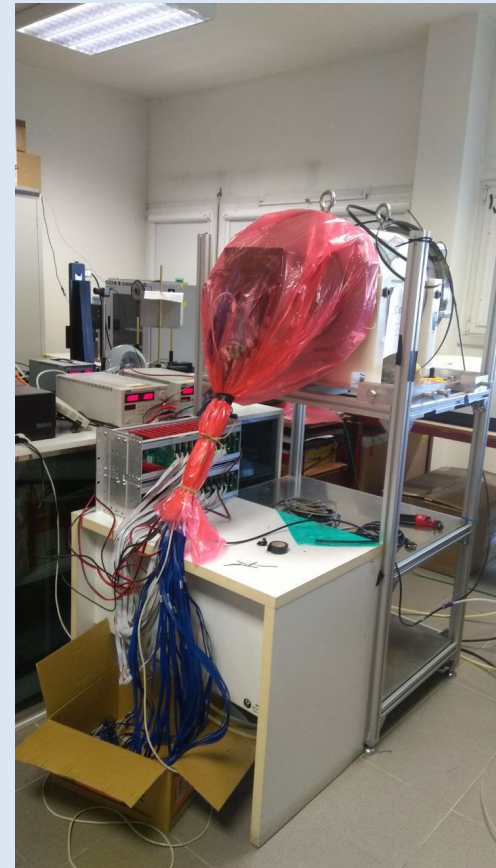
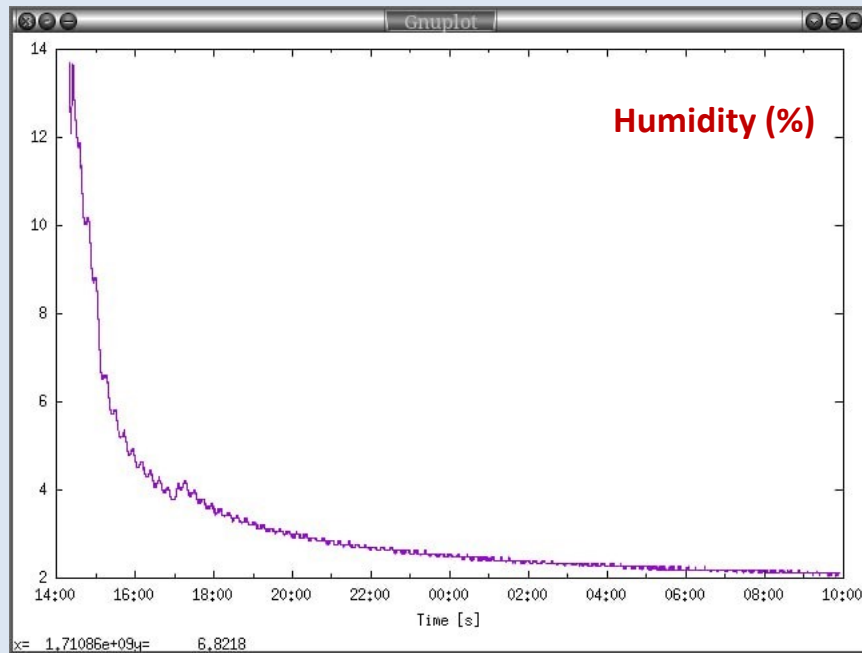
[DRAFT] Schedule Runs 0.7.0 :: Status 2024-02-27 08:23 (UTC)



CW18							CW19							CW20							CW21							CW22							CW23							CW24							CW25							CW26						
Week 18							Week 19							Week 20							Week 21							Week 22							Week 23							Week 24							Week 25							Week 26						
29	30	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30

Cooling and insulation tests started with the existing dRICH prototype & SiPM detector box

Plan to optimize humidity control and verify the induced temperature gradients in the gas volume by the cool SiPM plane



Personnel

https://docs.google.com/spreadsheets/d/1oJqh0BJalrs4dM7m6AA9_pCO_JSTAaDOWQeXLi9TV64/edit?usp=sharing

		20	21	22	23	24	25	26	27	28	29	30	31	1	2	3	4	5	6	Notes	
dRICH+SiPM		Mon	Tue	Wed	Thu	Fri	Sat	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Mon	Tue	Wed	Thu		
Marco C.	FE		travel	x	x	x	x	x	x	x	x	x	x	x	x	x	x	travel			
n PEOPLE		0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0		

Goal is to have
> 6 people on site