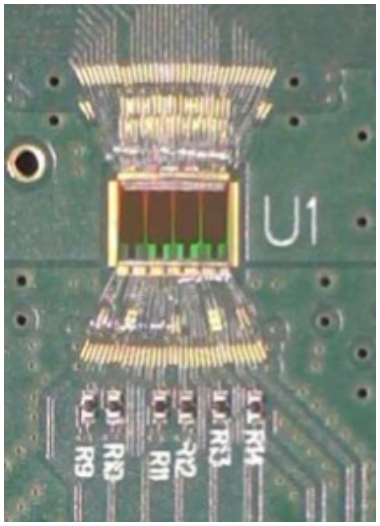
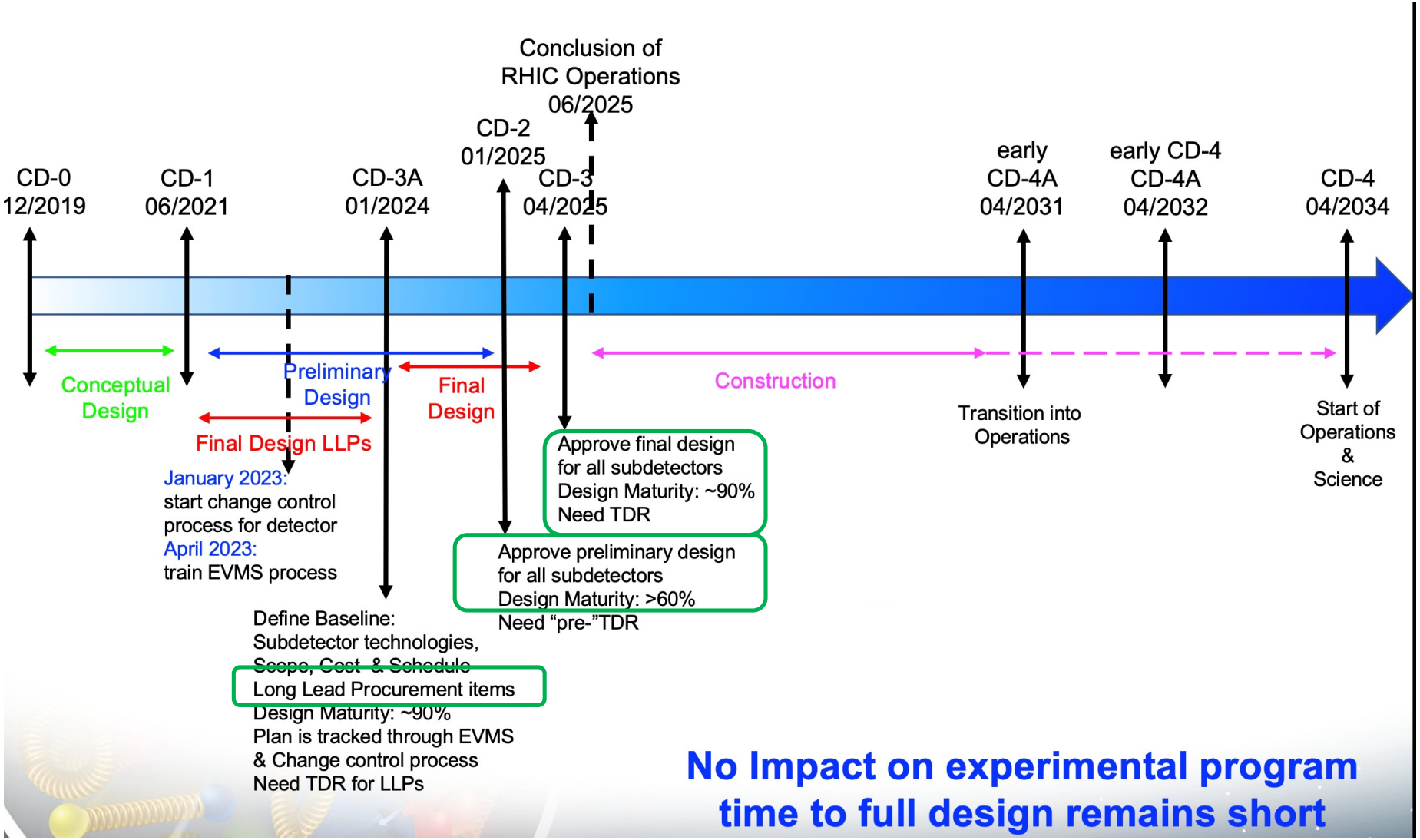


"ALCOR for EIC" day
Introduction

ePIC status, schedule, impact on ALCOR

ePIC

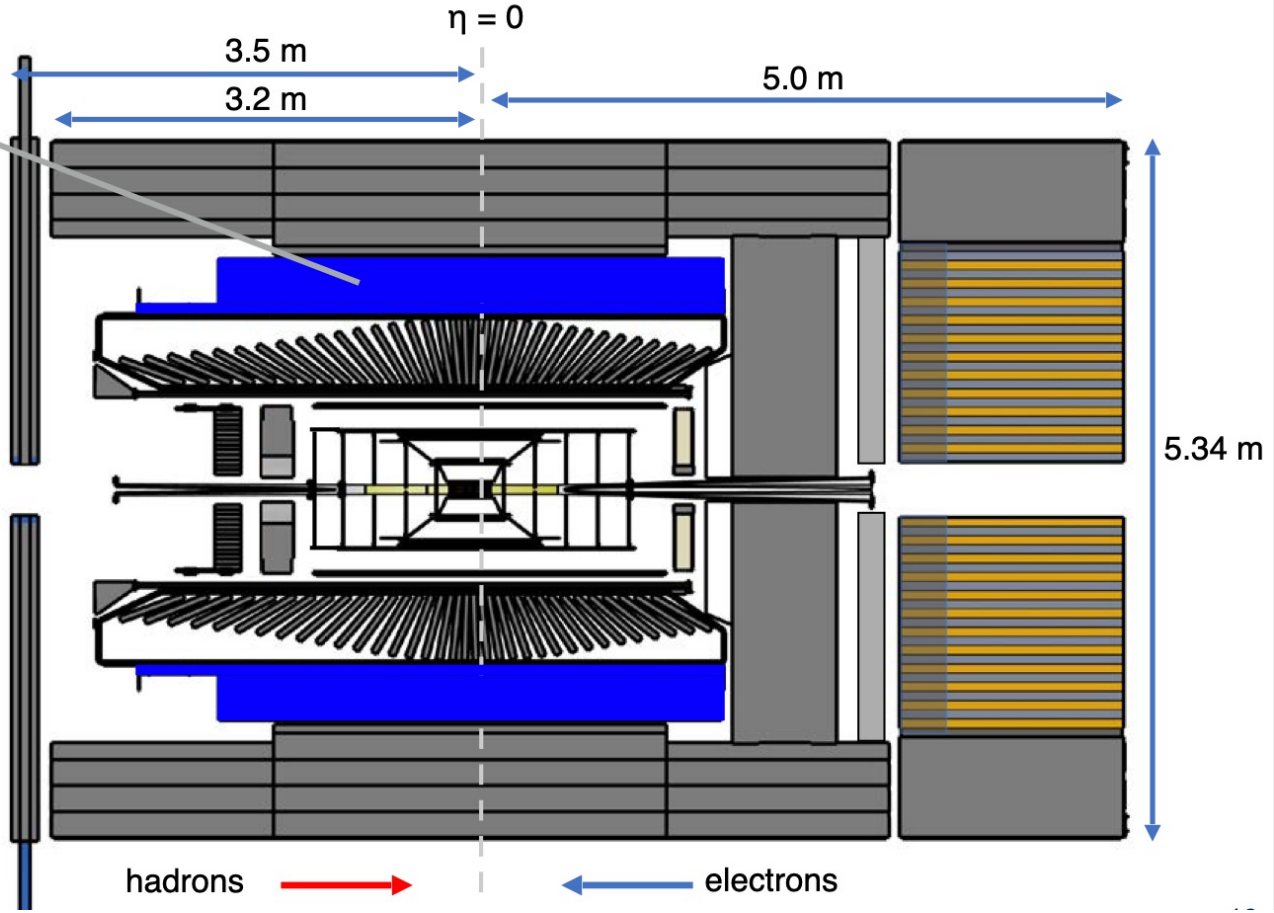
EIC timeline: 8 years and 2 months from starting oprerations



EPIC - Baseline Design

Magnet

- New 1.7 T SC solenoid



EPIC - Baseline Design

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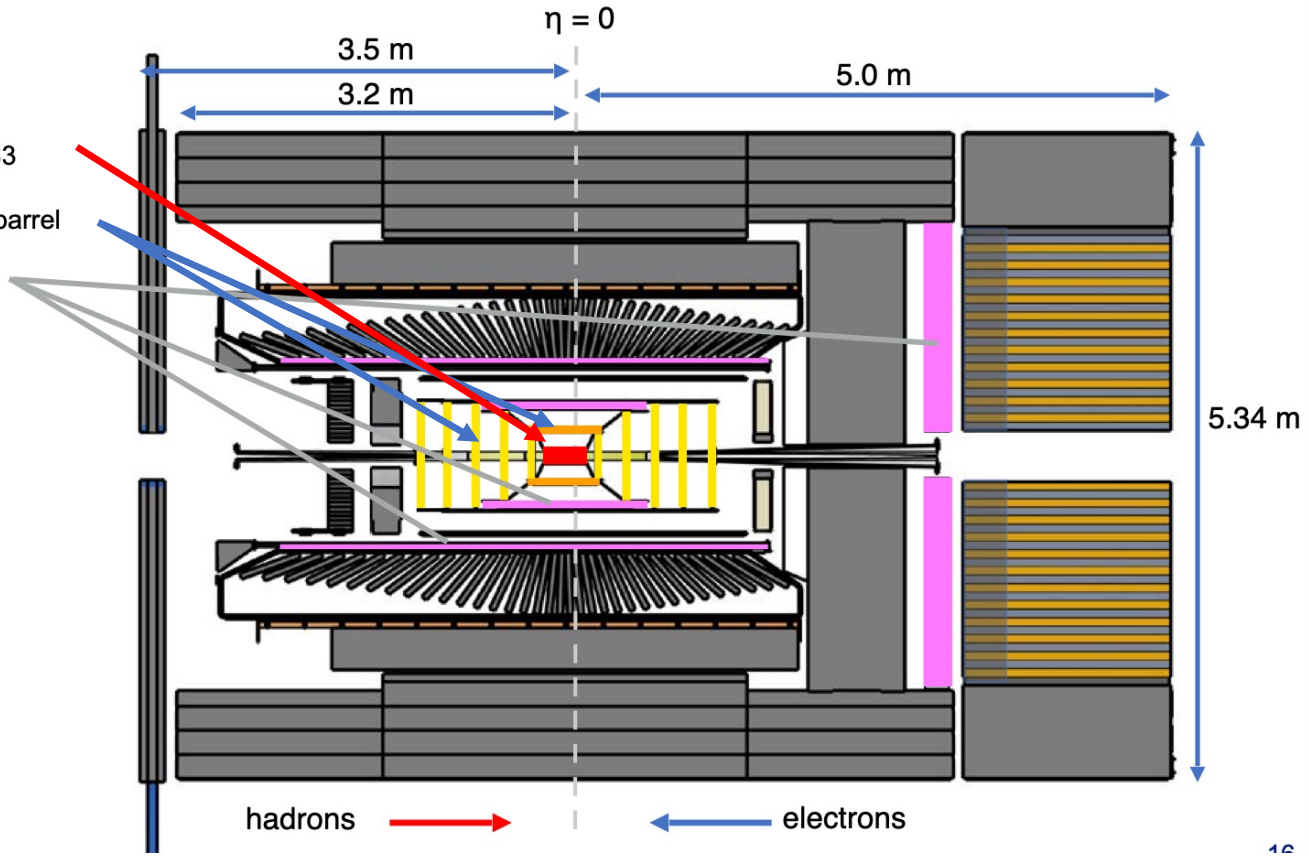
Tracking

- Si Vertex Tracker MAPS/ITS3 wafer-level stitched sensors
- Si Tracker MAPS/ITS3/EIC barrel and disks
- MPGDs (μRWELL/MMG) cylindrical and planar



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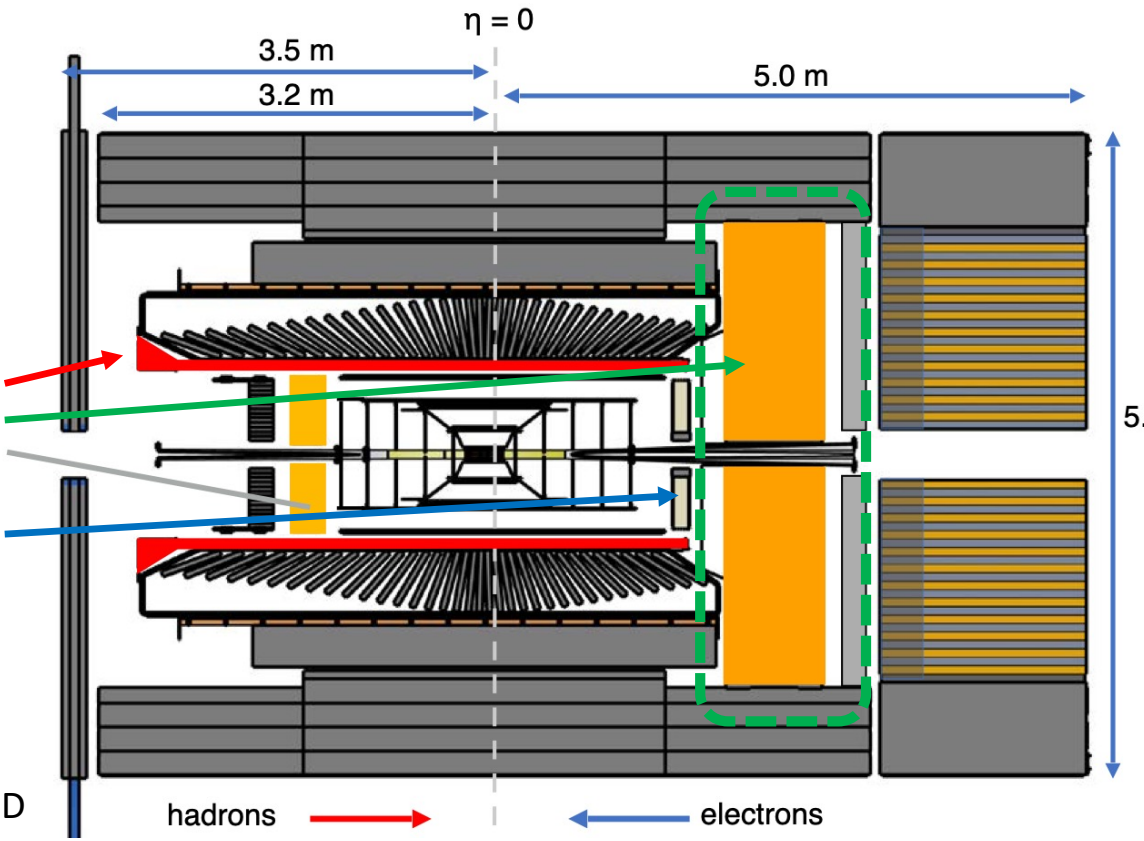
PID
- high performance DIRC (hpDIRC)
- dual RICH (aerogel + gaseous)
- aerogel RICH/modular w/ Fresnel **or** proximity focussing RICH
- ToF using AC-LGAD

nota su FAST



per dRICH:
317440 canali O (3 m2)
3x3 mm^2 pzel

315000 canali →
~5000 ALCOR 64ch

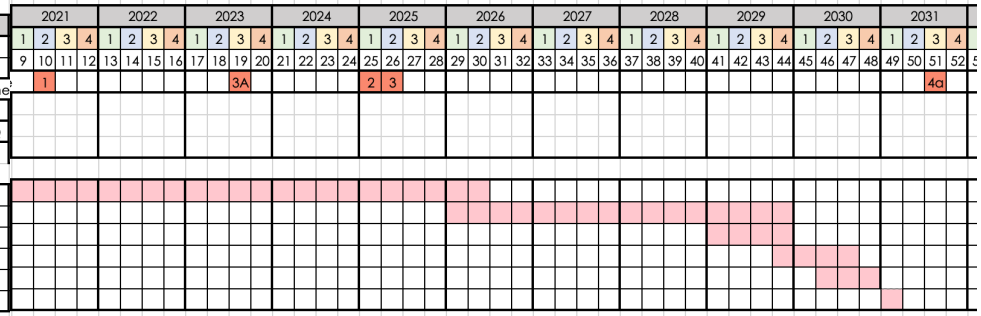
Per backward RICH e' stata scelta tecnologia LAPPD (nota su ALCOR)

dRICH schedule (adapted from ATHENA, shifted of one year)
assumes "in-house" assembly & test in Italy in one year and assembly and test in one year @ BNL + 1 quarter for "insertion"
CAVEAT: note this “primordial” schedule was done really in hurry and limited consultation

Gantt chart: ePIC Detector Sub-System Quarterly Schedule

Starting date	01/01/19
Year:	2019
Quarter:	1

ID	Task	Start Time	Year	Quarter	Start Time nQ	End Time	Year	Quarter	End Time nQ	Duration Q
1	dRICH R&D	01/01/20	2020	1	5	30/06/26	2026	2	30	25
2	dRICH Procurement	01/01/25	2025	1	25	31/12/28	2028	4	40	15
3	dRICH Assembly (In-House)	01/01/28	2028	1	37	31/12/28	2028	4	40	3
4	dRICH Assembly (in-situ)	01/10/28	2028	4	40	30/09/29	2029	3	43	3
5	dRICH Test (in situ)	01/06/29	2029	2	42	31/12/29	2029	4	44	2
6	dRICH Installation	01/01/30	2030	1	45	31/03/30	2030	1	45	0



SiPM targeted for early procurement: some pressure to choose soon the sensor
How ALCOR would fit in this Gantt?

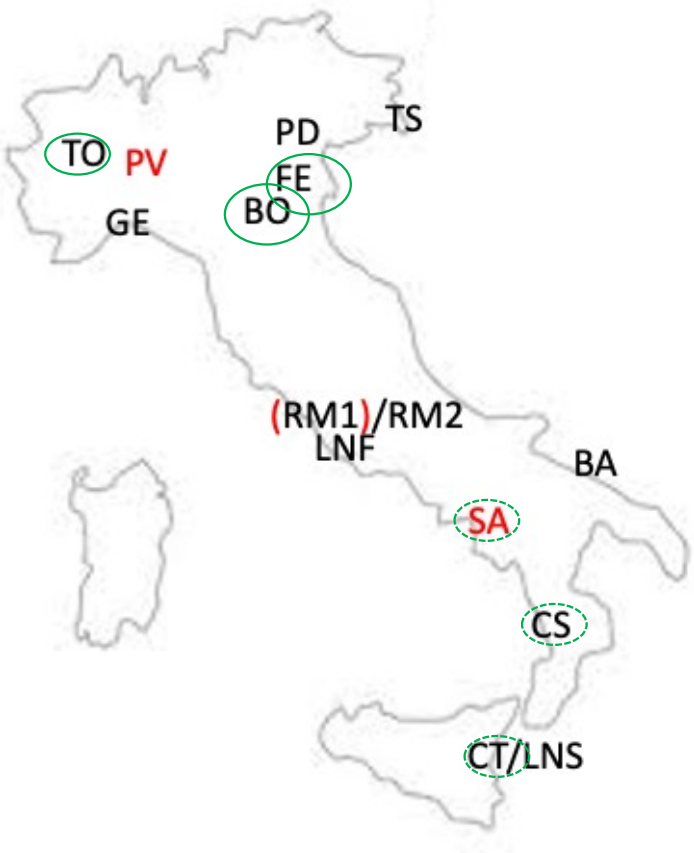
2023: v2 tests
2024: v3 proto (including packaging) + electronics proto?
2025: production? -→ 6000 (packaged/tested....)
2026 is ultimate deadline to define electronics

Who is using/will use ALCOR4EIC?

BO currently coordinating electronics development

TO → ALCOR "card" + ASIC
BO → carrier card
FE → adapter card
BO → readout à la ARCADIA (break-out board)

- setup under developments in SA/CS/CT
- On the long-run potentially "two centers for assembly" ?
- TO-site: natural candidate for ALCOR production & test, “ALCOR” card production, functional test -→
- On the long-run potentially "two centers for assembly" ?
- "portable setup"



- ALCOR used for characterization after irradiation/annealing (in 2022 only at BO, we hope to achieve ”South Cluster” by 2023
- ALCOR used during test beam 2021 (unsuccessfull) and 2022

(quite successfull, "bug" limited – and also noise...)

Relevant eRD projects (DoE funded) and CSN3 planning – relevant milestones for ALCOR

project	topic	FY	
eRD102	dRICH	22	• Realistic implementation of dRICH into the EIC detector (02/23), subject to the release of a common simulation framework, agreed by Detector-1 Collaboration, by 10/22 • Initial assessment based on the first test beams (12/22) • **Realization of a suitable detector plane for the dRICH prototype (03/23)**
eRD110	photosensors	22	• **Automated setup for SiPM characterization in climatic chamber (9/2022)** • **Comparative assessment of commercial (and prototypes not yet available on the market) of SiPM performance after irradiation 2/2023 (interim results available at 9/2022)** • **Definition of an annealing protocol 2/2023**
eRD102	dRICH	23	• Initial characterization of realistic mirror and aerogel components (04/23) • Projected performance of the baseline detector as integrated into EPIC (06/23) • **Assessment of the dRICH prototype performance with the EIC-driven detection plane (10/23).**
eRD109	ASIC	23	• **Inhibit paradigm studies on ALCOR v1: 1/2023** • **Qualification of ALCOR v2: 7/2023** • **Results above presented for the draft TDR of EIC Detector 1: 9/2023** • **Design of ALCOR v3: 9/2023**
eRD110	photosensors	23	• **Timing measurement of irradiated (and annealed) sensors [6/23]** • **Comparison of the results achieved with proton and neutron irradiation sources [8/23]** • **Study of annealing in-situ technique with a proposed model selected as baseline for the draft Technical Design Report (TDR) [9/23]**

Non potevamo piu' aspettare quindi siamo andati con MWP (solo 50 ALCOR v2) ma ora "finestra engineering run" (in 2023)

Milestones Concordate

Data	Descrizione
31-07-2023	Sottomissione su rivista di risultati ottenuti in campagna di irraggiamento SiPM
30-11-2023	Realizzazione di una ampia superficie di rivelatori SiPM per la lettura ottica del prototipo dRICH basata su readout ALCOR.
31-12-2023	Presentazione schema di ottimizzazione delle dimensioni dei sensori CMOS 65 nm stitched per EPIC tracker sulla base della resa di produzione da ER1 ITS3
31-12-2023	Contributo a simulazioni Detector 1 (in particolare per Si-Vertex e dRICH) per pre-TDR Detector 1
31-12-2023	Contributo a studi di physics performance per Detector-1 nei canali esclusivi attraverso EpIC generator
31-12-2023	Organizzazione giornate nazionali EIC
31-12-2023	Misura in campo magnetico delle performance di prototipo LAPPD.

Punti per discussione / "desiderata" / requirements / misure da fare per ALCOR

2023 e' anno in cui si presenta piano finanziario a INFN per ePIC (a luglio 2023) e draft TDR (ottobre 2023):

→ stima costi

→ planning Gannt

Non potevamo piu' aspettare LNGS quindi siamo andati con MWP
(solo 50 ALCOR v2) pero' ora "finestra engineering run" (in 2023) che fare?
Parte discussione oggi