

EIC_NET general meeting October 2023

P. Antonioli, INFN Bologna

community-oriented talk:

- Brief key news from EIC/ePIC Project (updates from “Corigliano” – June 2023)
- The INFN contribution to ePIC "high level"
- 2024 and CSN3 feedback
- Very miscellanea news:
 - Opportunities for early career scientists
 - Next ePIC meeting
 - EB and Publ. Comm. Elections
 - “restituzioni”



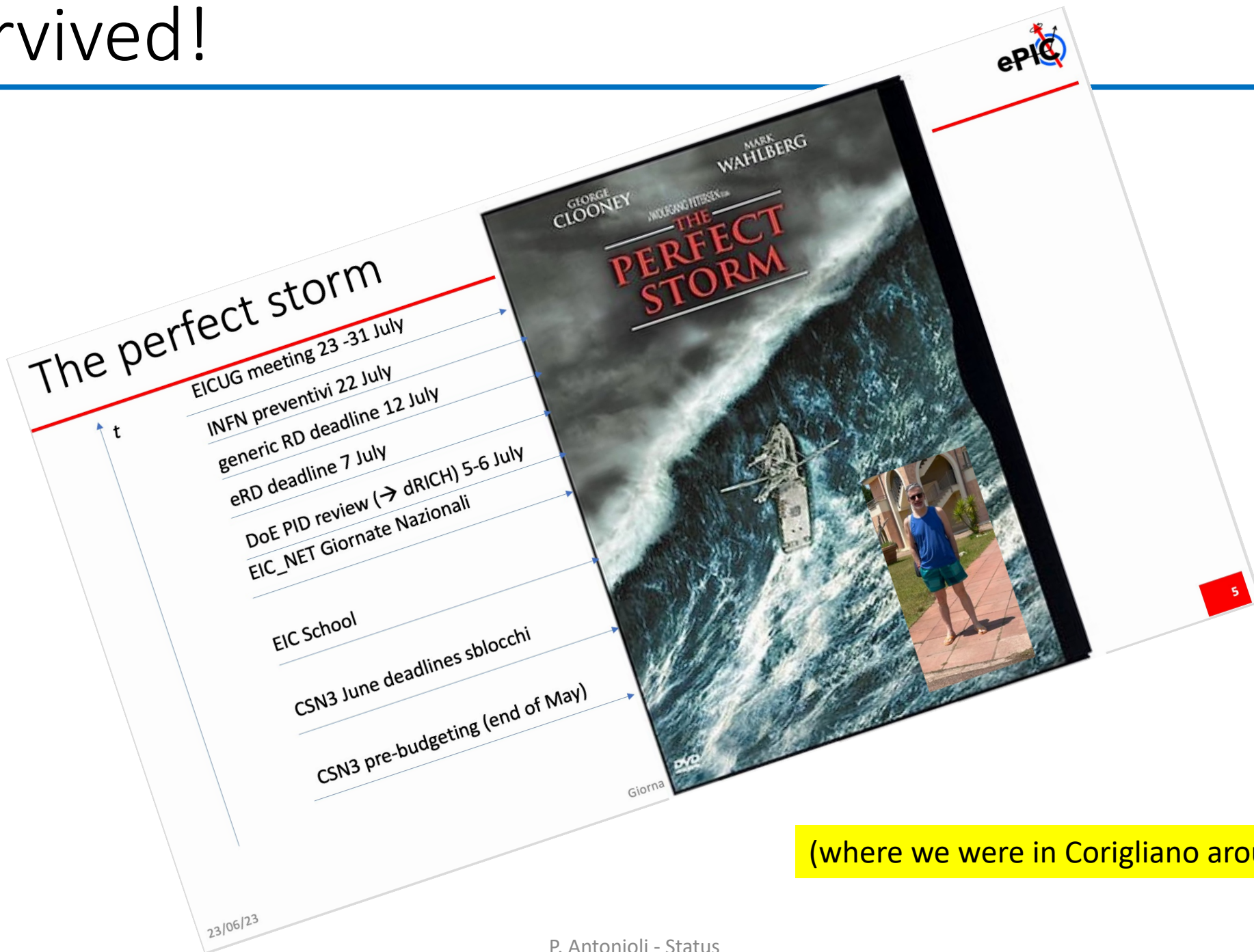
Background links for you:

EICUG/ePIC meeting ([Warsaw July 2023](#))

[EIC NET meeting with referees](#) (31/Aug/2023)

Trigger discussion/input

We survived!



(where we were in Corigliano around 23 June...)

EIC project is heading towards CD-3A!

- Significativo contributo INFN
- Passato CD-3A tutta la “pressione” si sposterà verso preparazione TDR!

A DENSE REVIEW CALENDAR

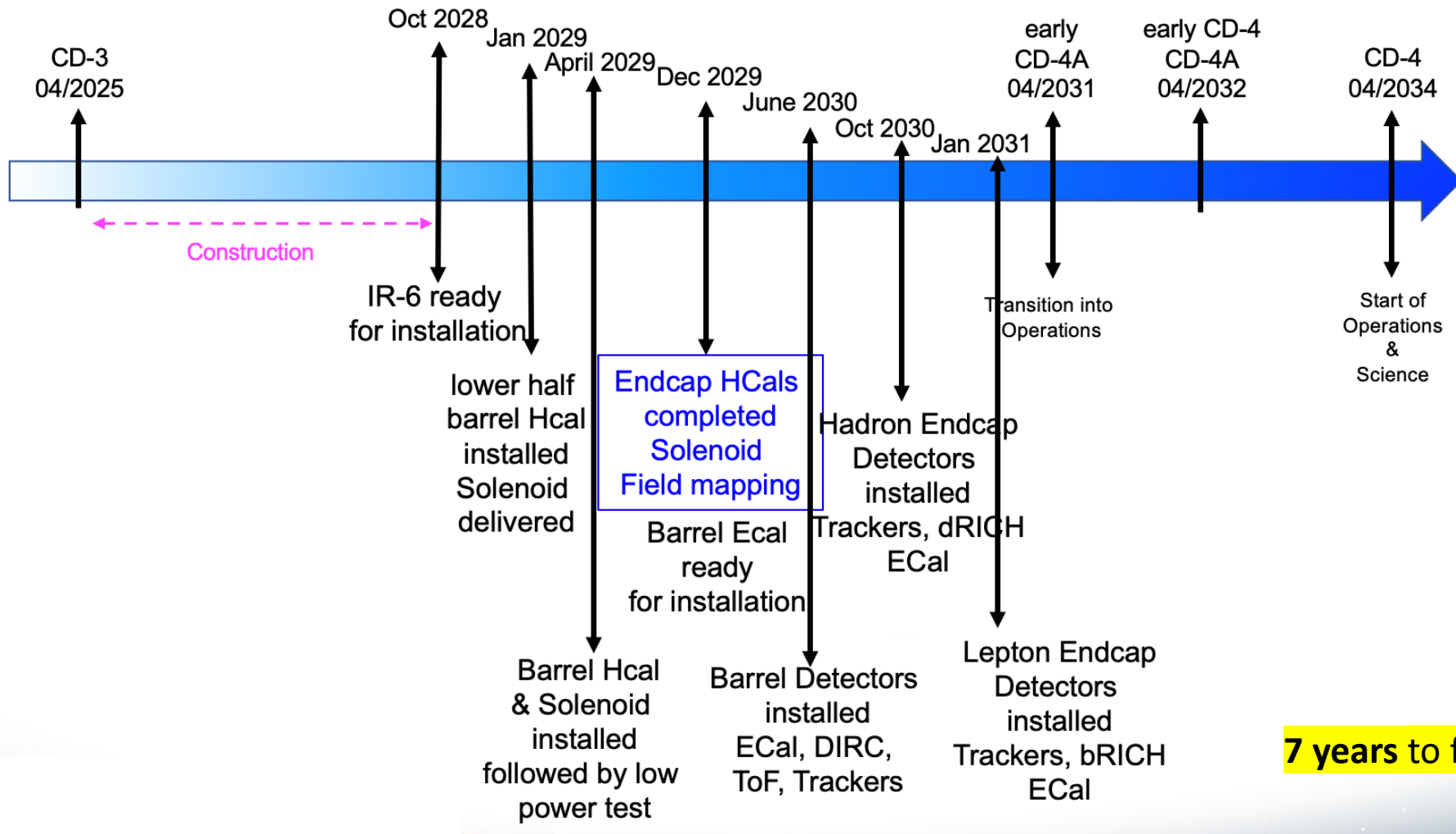
- ~~April 3 + 4: 1st Resource Review Board meeting @ SBU & BNL~~
- ~~July 5 + 6: Particle Id Detectors Interim Design Review~~
- ~~July 21: Final Design Review of the PbWO4 Crystals for the ePIC Backward EM Calorimeter~~
- ~~August 28 + August 31: DAC Review of Detector R&D~~
 - ~~FY23 progress and FY24 continuation requests~~
- ~~August 29 + 30: DOE CD-3A Design Review by DAC~~
- ~~September 13: Final Design Review of the SciFi for bECal & fECal~~
- ~~September 14: Final Design Review of the SiPMs for ECals, HCals & dRICH~~
- ~~September 25: Final Design Review of the forward HCal W & steel~~
- October 5 + 6: Final Design Review of Magnet (MARCO)
- October 10-12: DOE CD-3A Director's Review
 - Folds in Design Review reports of DAC, MAC, Infrastructure Committee;
 - Concentrates on CD-3A Long Lead Procurement Items and progress towards CD2/3
- October 19-20: ePIC Computing Model Review
- November 14-16: DOE CD-3A Independent Project Review
- December 7 + 8: 2nd Resource Review Board meeting @ Washington
- Dec23/Jan24 (TBD): Preliminary Design Review of Far-Forward/Far-Backward Detectors

ePIC Software & Computing Meeting at UIC

In view of the Computing model review

Computer model to be presented at the December RRB

ePIC barrel detector installation schedule



- Silicon vertex: **June 2030**
- Gaseous tracker: **June 2030**
- dRICH: **October 2030**

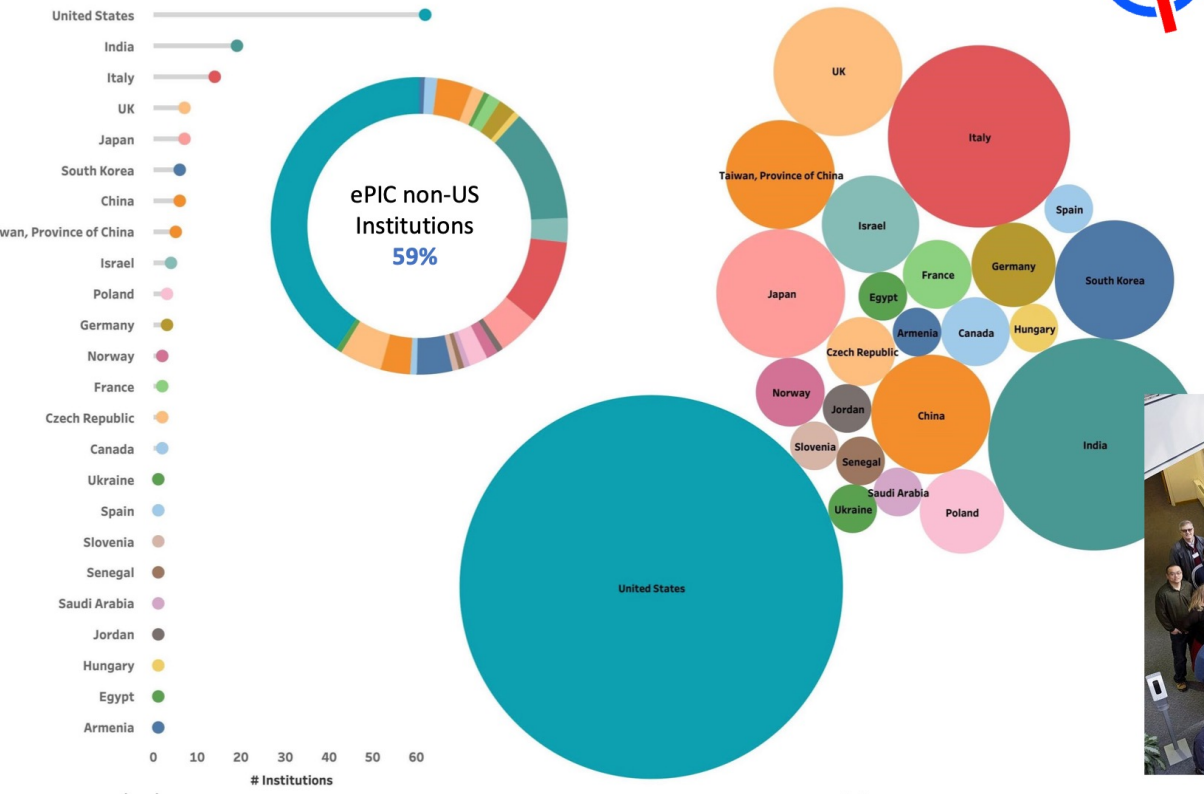
7 years to finalize design, build and install

- Solenoid and Barrel HCal by Jan 2029
- all other subdetectors need to be ready between 06/29 to 06/30

ePIC is growing (and meeting)



The ePIC Collaboration



171 institutions
24 countries

500+ participants

*A truly global pursuit for
a new experiment at the
EIC!*



- Three “in-person” meetings so far: Stony Brooke (July 2022), JLab (Jan 2023), Warsaw (July 2023) [12 from INFN]
- Meetings foreseen in 2024: ANL/Chicago (January), Lehigh University/Philadelphia (July)

A lot of activities going-on



All ePIC “on-going flux” of work

Tech. Integration	Mon @ 3:00 PM
Streaming and comp.	Tue @ 3:00 PM
SVT	Tue @ 6:00 PM
dRICH	Wed @ 2:00 PM
dRICH simulation	Thu @ 4:00 PM
track reco	Thu @ 4:00 PM
General Meeting	Fri @ 4:30 PM (bi-weekly)
PID group	Fri @ 2:30 PM (on announcement)
DAQ & electronics	Thu @ 3:00 PM
Collaboration Council	Fri @ 4:30 PM (on announcement)

- + all coordination meetings for Silvia, Salvatore, MarcoB, MarcoC
- + all additional review meetings the EIC project is generating...

Conferences this Summer (since June):

SaR Wors, HADRON, HEP-EPS, TIPP, TWEPP, IPRD, MENU, ...(?)..

Since Corigliano....:

- Neutron irradiation of SiPM at LNL (August)
- dRICH test beam (August) → aerogel
- dRICH test beam (October) → SiPM
- + all. Lab activities...

Planned:

- B measurement of LAPPD (Genova/CERN?)
- irradiation @TIFPA

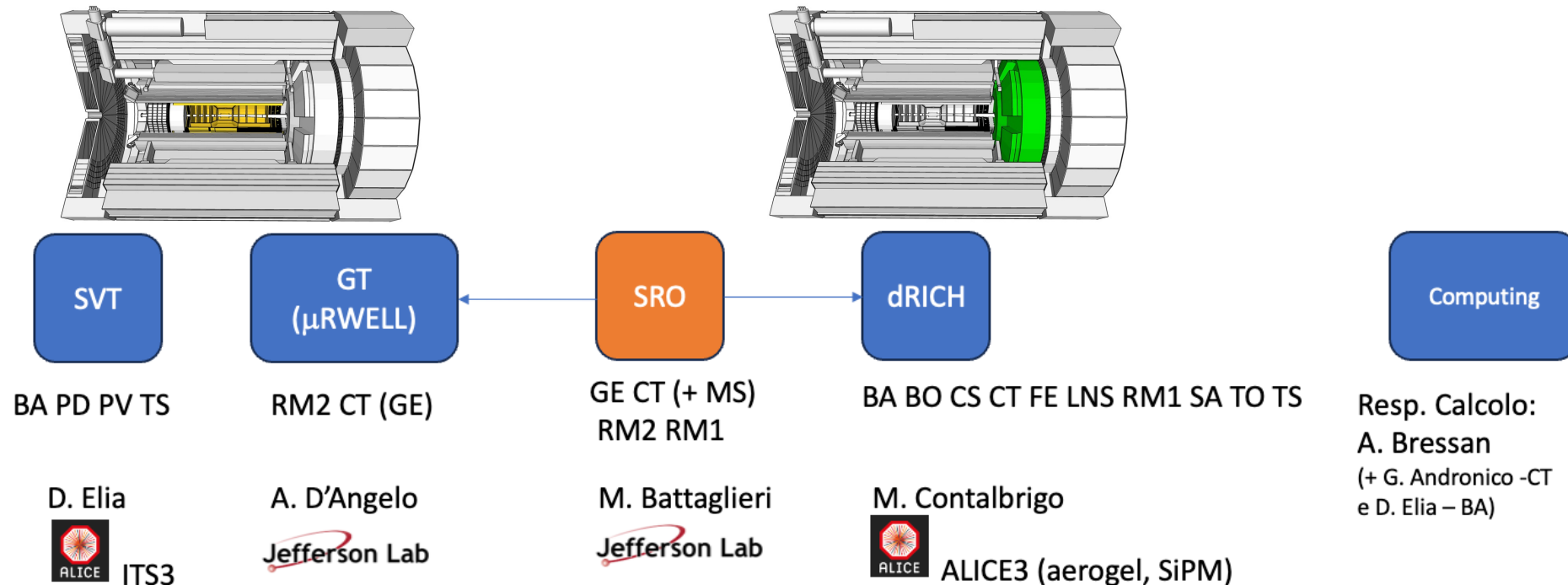
Additionally:

- EICUG with MarcoR as chair, now Marta in the SC
- NuPecc LRP (MarcoR, Silvia, Pietro, AnnalisaD in various sub-groups)

ePIC organization and INFN contribution



- dRICH team leaders (all INFN + Duke + Niser) indicated **Marco Contalbrigo** as DSSL (I acted as facilitator/some how convener in the process) (TO GE TS FE BO BA RM1 RM2 CT LNS CS SA are members of dRICH DSSC)
- EIC Silicon Consortium morphed in Silicon Vertex Tracker DSC → **Ernst Sichtermann** as DSSL (LBNL) (PD BA TS PV are members of SVT DSSC)
- Gaseous Trackers (MPGD) → **Kondo Gnavno** (JLab) is DSSL (RM2 + GE/CT)



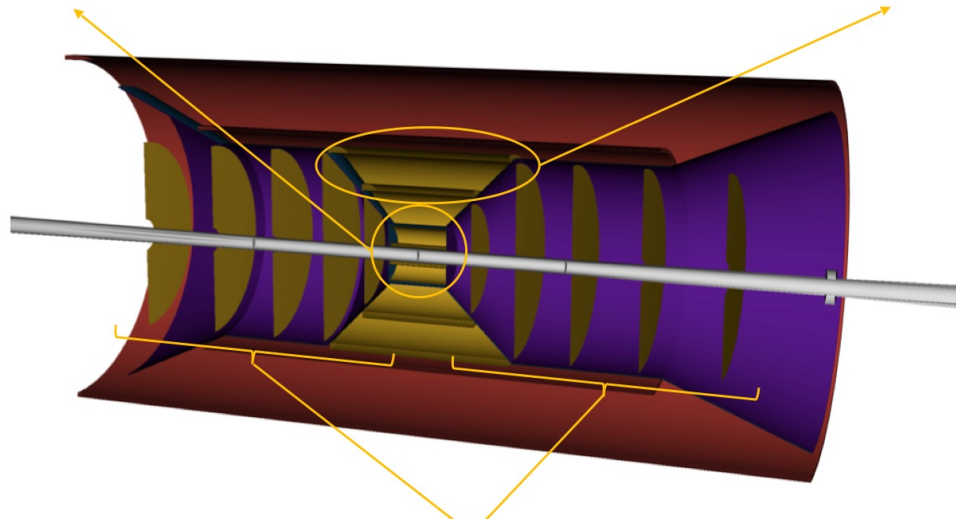
- Responsabile nazionale role is changing: less “coalescence” work, more “pure INFN coordination” work
- Detector sub-system oriented presentations towards our referees last 31st August

Few highlights specifically on SVT and μ RWELL
(dRICH & SRO highlights in the following talks)

ePIC tracking: SVT and MPGD (GT)

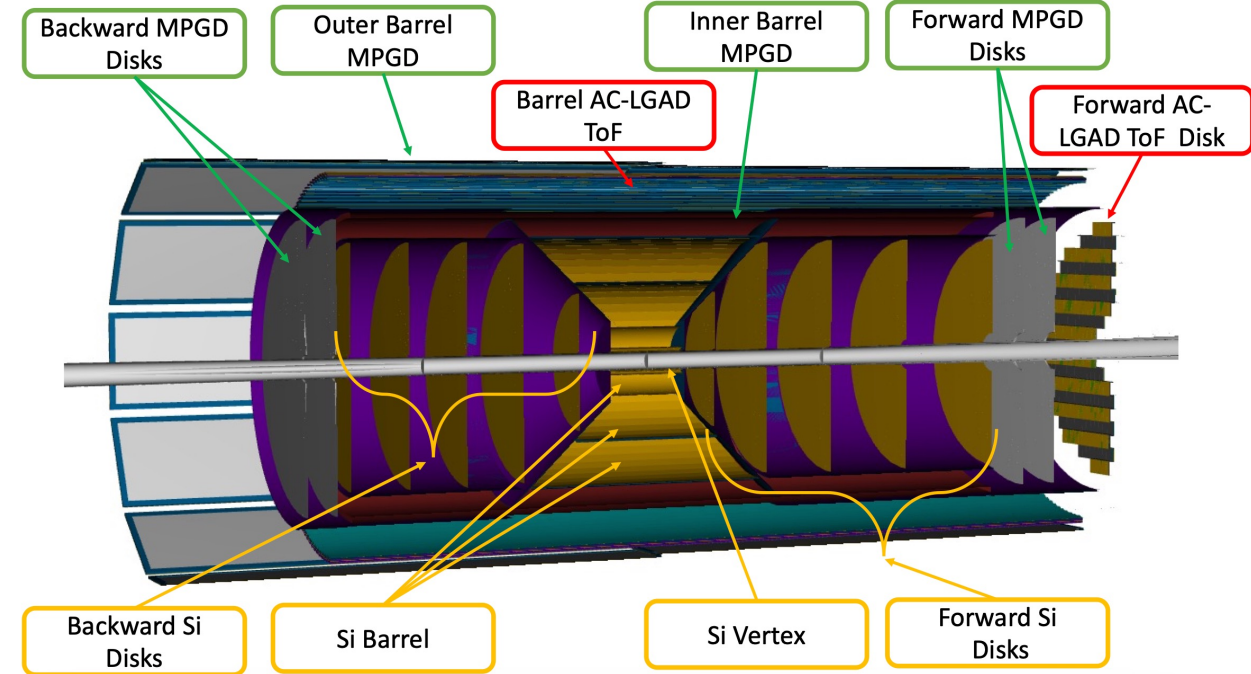
Inner barrel (IB): 3 layers

Outer barrel (OB): 2 layers

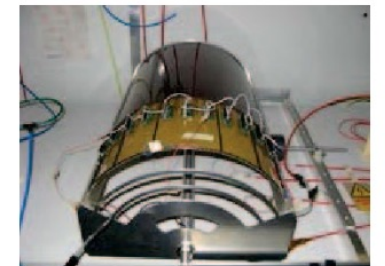


Electron/Hadron Endcaps (EE,HE)
5 disks on either side of IP

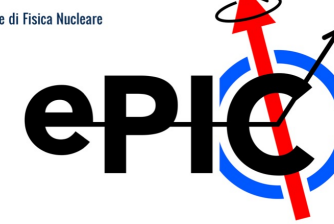
- one technology: MAPS @ 65 nm (ALICE ITS3)
- IB: First layer @ $R \sim 3.6$ cm - Material: $0.05\% X/X_0$ / layer
- OB: Material: $0.55\% X/X_0$ / layer
- EE/EH Material: $0.24\% X/X_0$ / layer
- pixel size $O(10 \times 10 \mu\text{m}^2)$
- Total area 8.5 m^2



- additional hit points for track reconstruction ($\sim 150 \mu\text{m}$)
- fast timing hits for background rejection ($\sim 10\text{-}20$ ns)
- provide hit point over large angular range for PID
- new ASIC SALSA for readout (derived from ALICE SAMPA for TPC)



ePIC SVT layout and concept

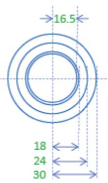


ePIC SVT Inner Barrel (IB) layers

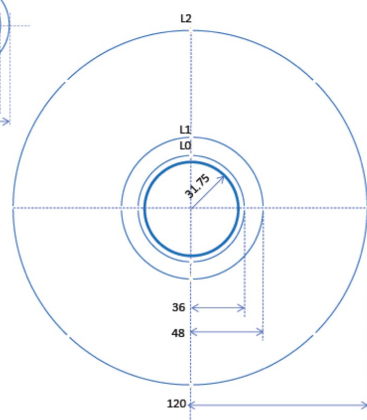
• Re-use ITS3 wafer-scale sensor

- L0: 3x12 RSU + endcaps
- L1: 4x12 RSU + endcaps
- L2: 5x12 RSU + endcaps

ALICE - ITS3



ePIC - SVT



• Number of sensors per layer

- L0: 4
- L1: 4
- L2: 8

ePIC SVT IB	r [mm]	l [mm]	X/X0 %
L0	36	270	0.05
L1	48	270	0.05
L2	120	270	0.05

Laura Gonella | ePIC SVT kickoff meeting | 9 June 2023

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ePIC SVT Outer Barrel (OB) layers and disks

- EIC-LAS sensor = 1 segment with N RSU + endcaps.
- N to be defined based on yield and cost, acceptance and coverage, manufacturing constrains.
- Possibly add some changes in the endcaps.
 - e.g. if needed for powering and data transmission.

ePIC SVT OB	r [mm]	l [mm]	X/X0 %
L3	270	540	0.25
L4	420	840	0.55

ePIC SVT Disks	+z [mm]	-z [mm]	r_out [mm]	X/X0 %
Disk 0	250	-250	240	0.24
Disk 1	450	-450	420	0.24
Disk 2	700	-650	420	0.24
Disk 3	1000	-900	420	0.24
Disk 4	1350	-1150	420	0.24

Disks nomenclature:
ED0 - ED4 in electron going direction (-z)
HD0 - HD4 in proton going direction (+z)

Disk inner opening:
beam pipe radius + clearance for beam pipe bake out (5 mm),
offset wrt disk center where beam pipe fans out

Laura Gonella | ePIC SVT kickoff meeting | 9

BA PD TS PV



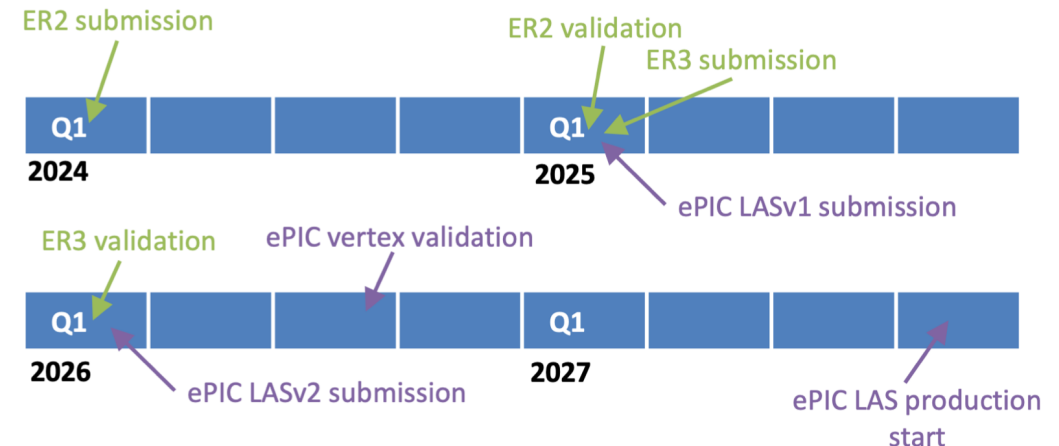
display a menu

INFN contribution in the inner barrel layers
Expertise from ALICE-ITS3

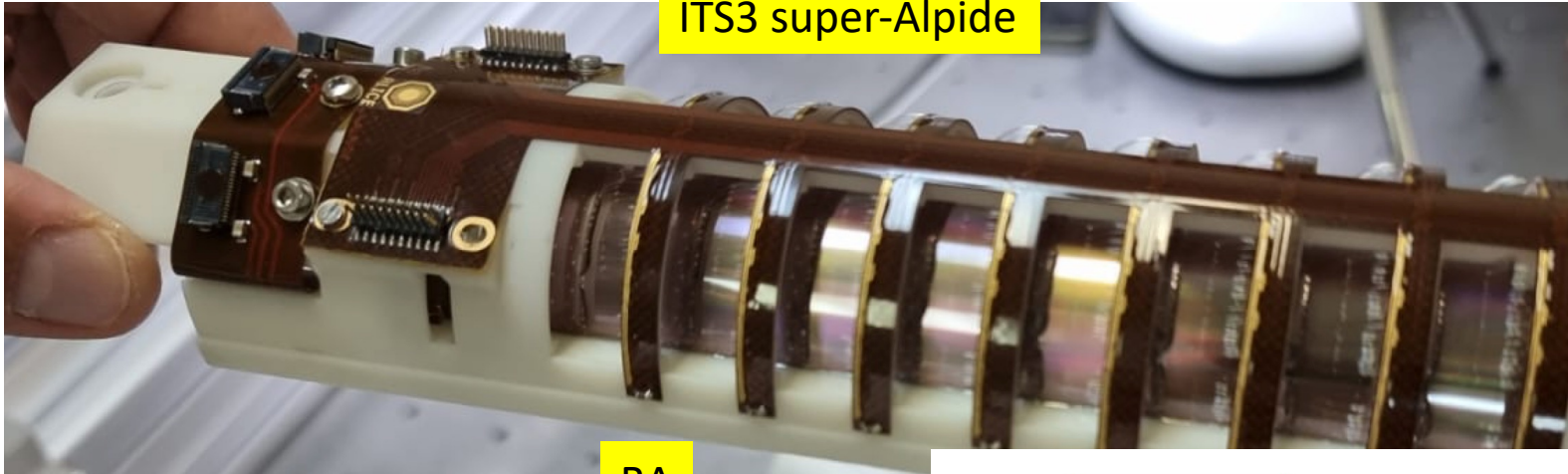
Submission plans organized with ALICE-ITS3 for inner layers

“But we start to differentiate” (for example different radius!)

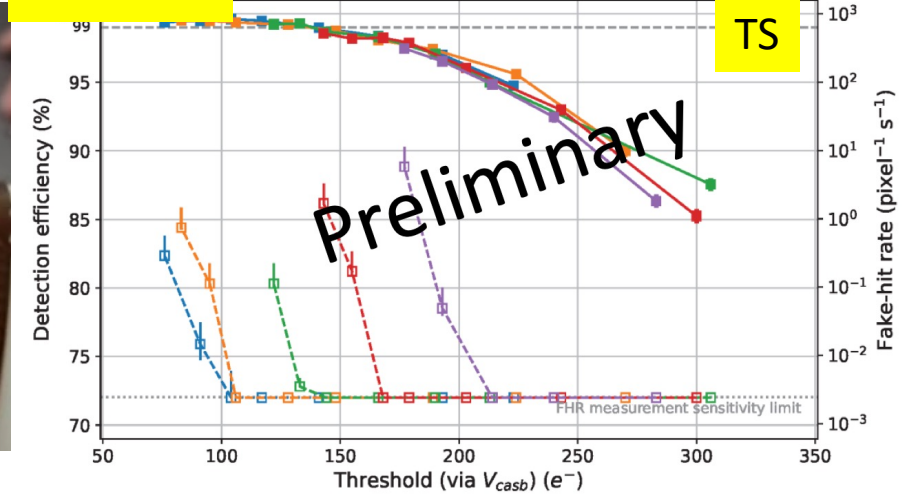
[D. Elia report to referees](#)



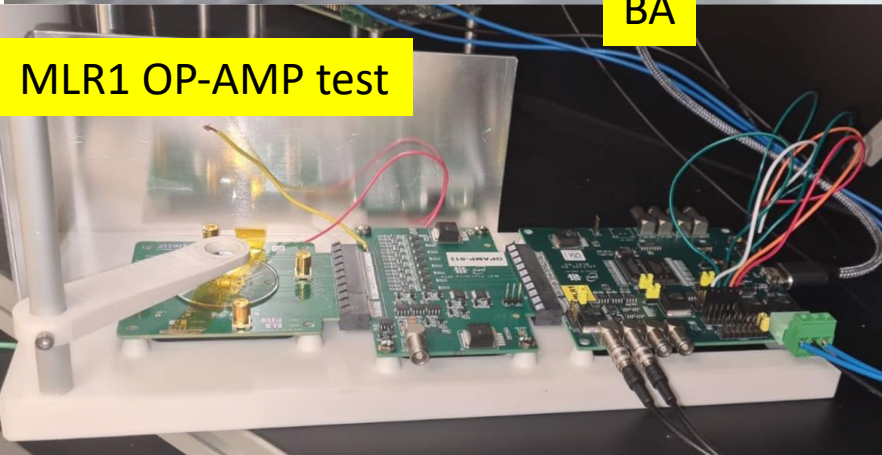
SVT highlights of R&D by INFN groups



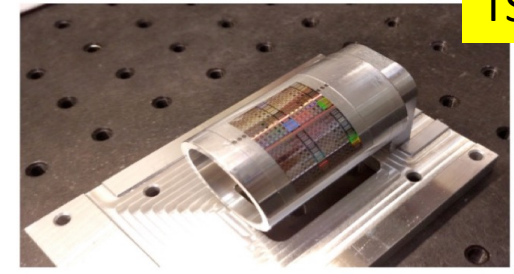
DPTS test



BA

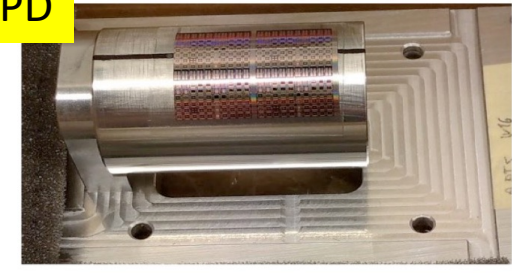


TS-001 bent along long edge



TS PD

short edge

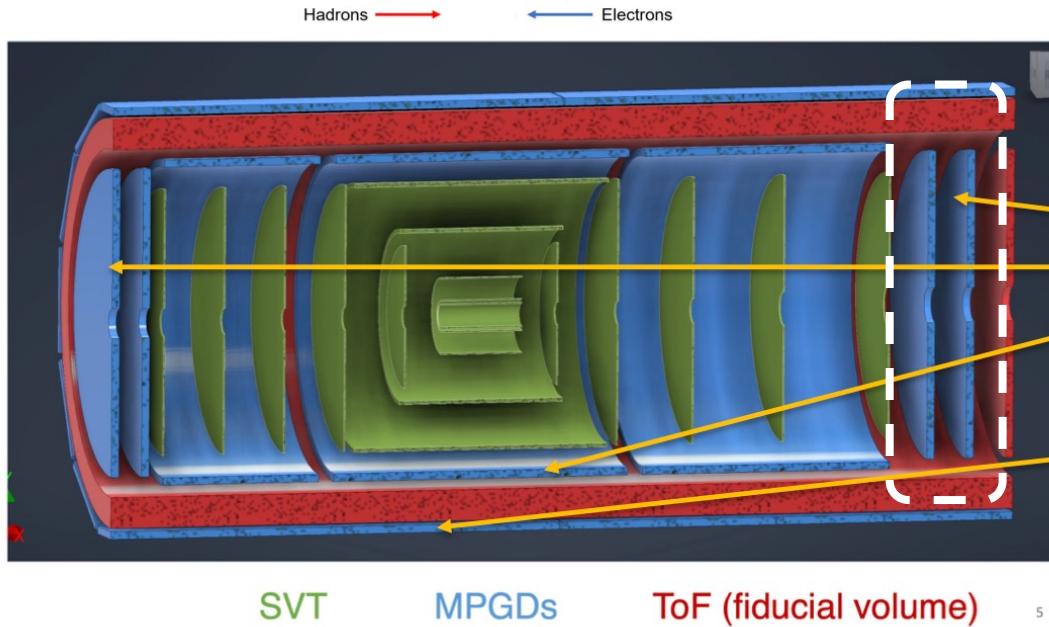


MLR1 bent APTS SF

DoE funds got in 2023 (eRD111 + eRD113 + genericRD): 109 k\$
 PV will join efforts in 2024 (thermal ageing)

The time everything is financed via ITS3 is coming to an end...

Gaseous tracker: μ RWELL



Colour code:

green \rightarrow Silicon Vertex Trackers

red \rightarrow Time of Flight

light blue \rightarrow MPGDs

- Two forward discs
- Two backward discs
- Cylinder inside the ToF, segmented in three longitudinal sectors
- Barrel inside the DIRC: same DIRC segmentation in planar tiles, divided into two longitudinal sectors

Cylindrical barrel: CEA

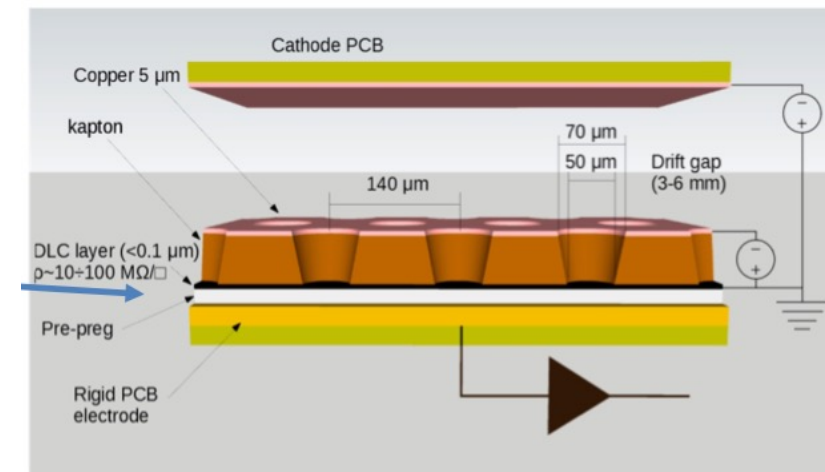
Disks (forward): INFN

+ BNL/JLAB, Virginia, Florida, Temple, ...

New activity: RM2 (CT GE)

- Bring an INFN-invented (\rightarrow [G. Bencivenni et al.; 2015 JINST 10 P02008](#)) technology to EIC
- Synergy with JLab12: RM2 working on it already
- More specific role in EIC for some Italian groups
- Nice “synergy” of Italian contribution: vertex+tracking+PID

[A. D’Angelo report to referees](#)



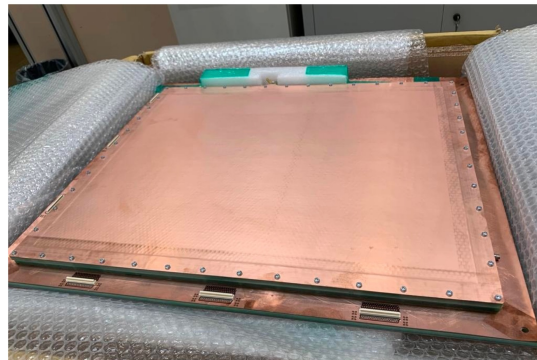
μ RWELL: R&D highlights of INFN groups

RM2 joined eRD108 (MPGD) and DRD1

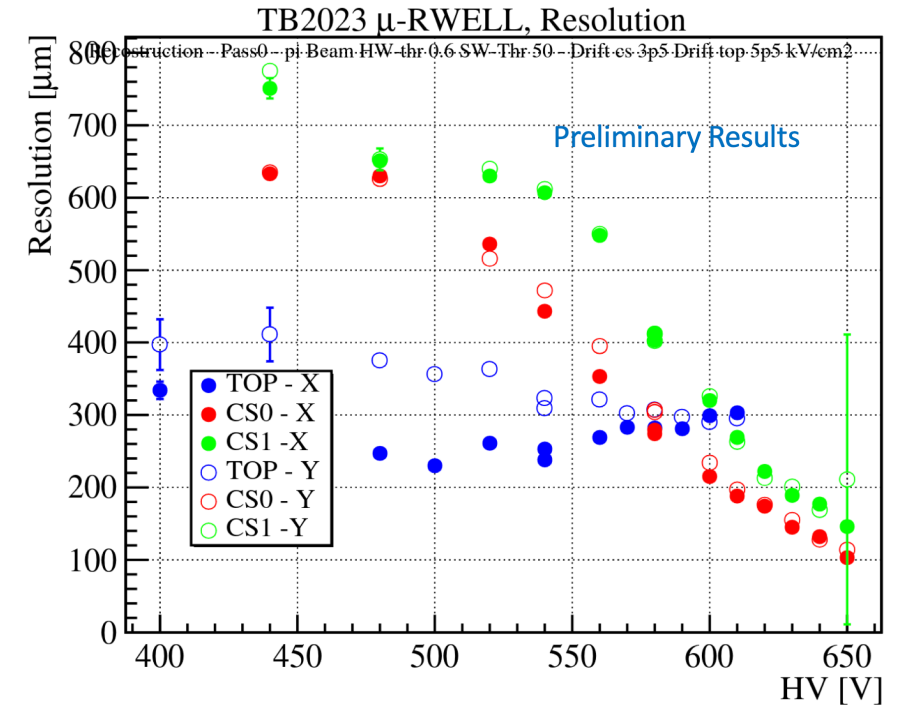
R&D Studies for EIC disks within eRD108 (in collaboration with TU)

- **readout segmentation:** radius and azimuthal coordinates vs. (X,Y) geometry;
- **reduced number of readout channels:** capacity sharing vs. traditional charge collection;
- **2D-readout optimization:** charge sharing among 2 readout layers vs. two 1D readout layers;
- **performance impact of electronics position layout:** on-detector vs. off-detector using flex cabling.

Large area prototype delivered to RM2



2023 test beams (in collaboration with LHCb): testing different 2D- readout schemes (charge sharing vs TOP layer)



CSN3 funding (2024)

	Asked (kEU)	Got (kEU)	Cut
RM1	5	5	0%

Activity well received, in future more resources
2023/2024 critical year to consolidate

1. EIC, the ePIC Collaboration and EIC_NET

- 1.1 The Electron Ion Collider and the CSN3 EIC_NET initiative
- 1.2 The international project and the ePIC Collaboration
- 1.3 The EIC_NET contribution to the ePIC Collaboration
- 1.4 EIC_NET Collaboration: status and responsibilities
- 1.5 EIC governance and relevant contacts within INFN
- 1.6. EIC_NET Internal Organization, Giornate nazionali 2022 and 2023
- 1.7 The First European School on the Physics of the EIC

2. EIC_NET R&D activities (Jan 2022 - June 2023)

- 2.1 Physics and software/computing coordination
 - 2.1.1 Spectroscopy programme at the EIC (GE, RM2)
 - 2.1.2 Exclusive processes: partonic imaging in coordinate space (CS)
 - 2.1.3 Software and computing coordination (BA TS)
- 2.2 Detector simulation (BA SA TS)
- 2.3 Detector R&D: dual RICH activities (BA BO CS CT FE GE LNS RM1 SA TO TS)
 - 2.3.1 dRICH prototype
 - 2.3.2 SiPM studies and readout electronics
 - 2.3.3. The ALCOR ASIC as SiPM front-end
 - 2.3.4 LAPPD studies
 - 2.3.5 High pressure Argon as gaseous radiator
 - 2.3.6 Aerogel studies
- 2.4 Detector R&D: Si-Vertex (BA PD TS)
- 2.5 Detector R&D: streaming readout (CT GE RM2)

3. 2024 Activity planning

- 3.1 Introduction to EIC_NET requests for 2024
- 3.2 Physics, software and simulation studies
 - 3.2.1 Semi-inclusive DIS (PV)
 - 3.2.2 Diffractive physics - Partonic imaging in coordinate space (CS)
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Appendix A: Synergies with other INFN initiatives

Appendix B: Draft multi-year financial plan

Appendix C: Proposed milestones 2024 (and 2023 update)

Appendix D: Note on missions budgeting



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INFN-CSN3-QA-EIC_NET-
523.00

Rev.
1.0

Validità
Final

Data 24/07/2023

EIC_NET 2023 Annual Report Activity plan for 2024

<https://cernbox.cern.ch/index.php/s/KGlCmDq8nEl1M26>

CSN3 September meeting: <https://agenda.infn.it/event/36812/>

Requested resources for 2024 for 842 kEU → given 531 kEU
35% cut but we need to put things in context....

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Appendix A: Synergies with other INFN initiatives

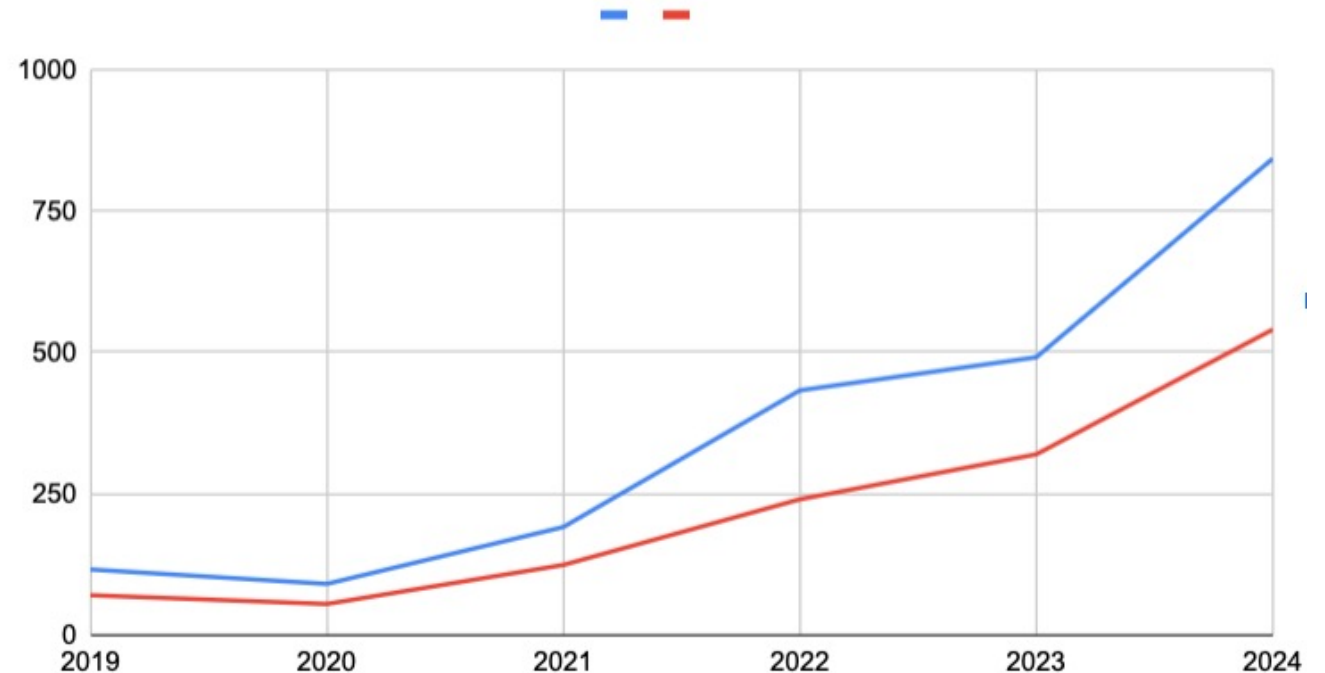
Appendix B: Draft multi-year financial plan

Appendix C: Proposed milestones 2024 (and 2023 update)

Appendix D: Note on missions budgeting

Requested resources for 2024 for 842 kEU → **given** 540 kEU

35% cut but we need to put things in context.... In two years we increased by 100% the assigned funds, with a 57% increase of FTE



Some details about the funds





Referee generally funded all activities (not all 100% obviously) with three main exceptions:



- Xilinx FPGA to test AI algorithms for dRICH pattern recognition (RM1)
- LAPPD activities (GE TS)
- ALCOR packaging (TO) : it will crucially depend on the final actual “preventivo”

Missions might be critical but it will depend on actual participation at January meeting (this could create savings and then more opportunities for Summer meeting)

Much more details about planning for next year in our meeting with referee (31/8/2023)

<https://agenda.infn.it/event/37193/>

11:00	→ 11:30	EIC_NET status e introduzione a richieste 2024 Speaker: Pietro Antonioli (Istituto Nazionale di Fisica Nucleare)  20230831-referee.p...
11:30	→ 11:50	dRICH: organizzazione e quadro generale Speaker: Marco Contalbrigo (Istituto Nazionale di Fisica Nucleare)  dRICH_Referees_23...
11:50	→ 12:10	dRICH: ALCOR Speaker: Fabio Cossio (Istituto Nazionale di Fisica Nucleare)  20230831_referee...
12:10	→ 12:30	dRICH: electronics integration and SIPM Speaker: Roberto Preghenella (Istituto Nazionale di Fisica Nucleare)  [20230831]EIC_NE...
12:30	→ 12:45	dRICH: LAPPD Speaker: Silvia Dalla Torre (Istituto Nazionale di Fisica Nucleare)  meeting_29230831...
12:45	→ 13:00	dRICH: aerogel studies Speaker: Giacomo Volpe (Istituto Nazionale di Fisica Nucleare)  AerogelReferee202...

14:00	→ 14:40	gaseous tracker: uRWELL Speaker: Annalisa D'Angelo (Istituto Nazionale di Fisica Nucleare)  EIC_2023_uRwell_re...
14:40	→ 15:20	silicon tracker: MAPS Speaker: Domenico Elia (Istituto Nazionale di Fisica Nucleare)  D. Elia - Status R&D ...
15:20	→ 15:40	Streaming readout Speaker: Marco Battaglieri (Istituto Nazionale di Fisica Nucleare)  SRO-Battaglieri.pdf

P. Antonioli - Status

Il collegio referale osserva che le attività dell'esperimento **sono in forte accelerazione**. Nel 2024 è prevista la stesura del TDR, per cui sia le attività di networking che quelle per l'R&D ricoprono un'importanza notevole. *È anche presumibile che la pubblicazione del TDR segni il passaggio dallo stato di networking a quello di sigla.*

[...]

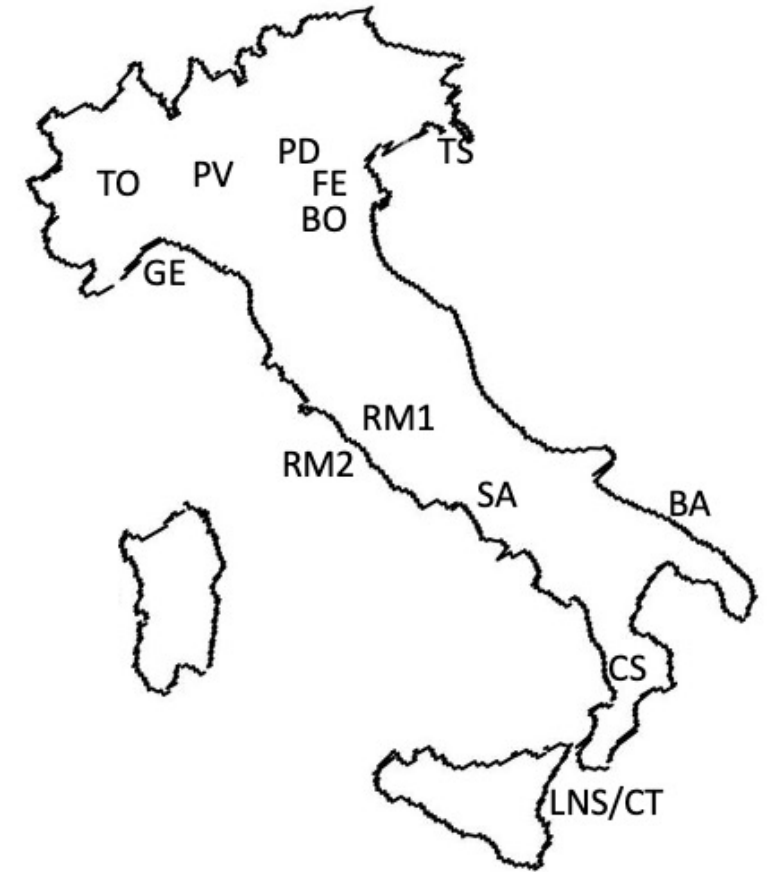
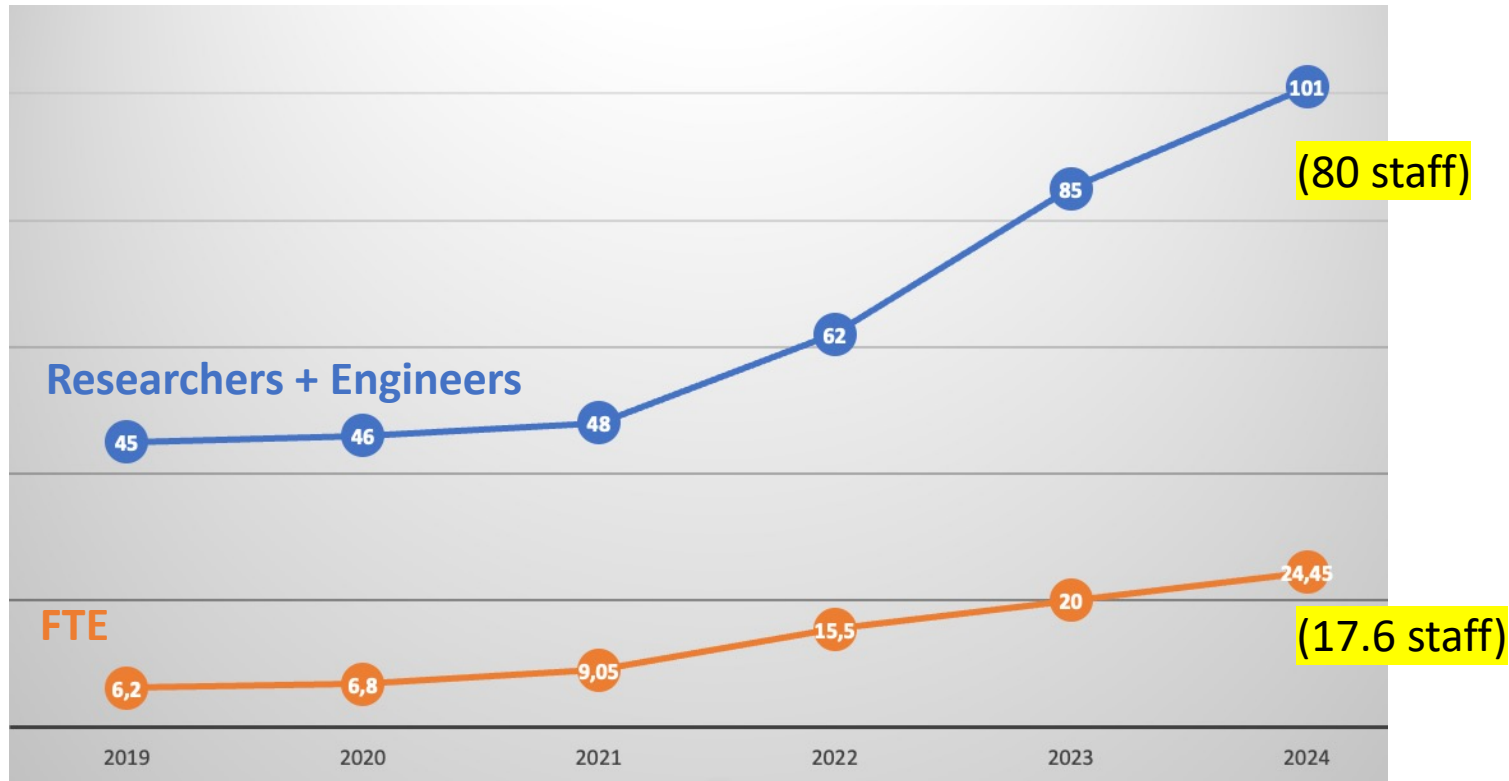
La componente italiana è ben inserita nel progetto, dove occupa diverse posizioni apicali, ha la capacità di attrarre fondi esterni alla CSN3 ed ha all'attivo diverse sinergie. Le milestone previste per il 2023 sono raggiungibili entro la fine dell'anno, con l'eccezione della milestone sui sensori CMOS per il SVT, rallentata dal ritardo con cui sono giunti i prototipi stitched.

[...]

Le richieste finanziarie per missioni per il 2024 superano del 40% quelle del 2023, mentre le richieste per le altre voci sono più che raddoppiate. Considerando la forte accelerazione delle attività, l'incremento non è inatteso. Considerati i limiti imposti dalla situazione generale del budget di CSN3, si è ritenuto di privilegiare le attività più strategiche per l'INFN, considerando anche che alcune attività in fase di conclusione, come quelle sulle LAPPD, potranno beneficiare delle sinergie con altre sigle.

Excerpts from CSN3 minutes (referee)

EIC_NET community (I)



- RM1 is back with a large group
- PV has now also joined experimental part
- CS, CT passed 1.0 FTE threshold (include involvement of ME)
- LNF left

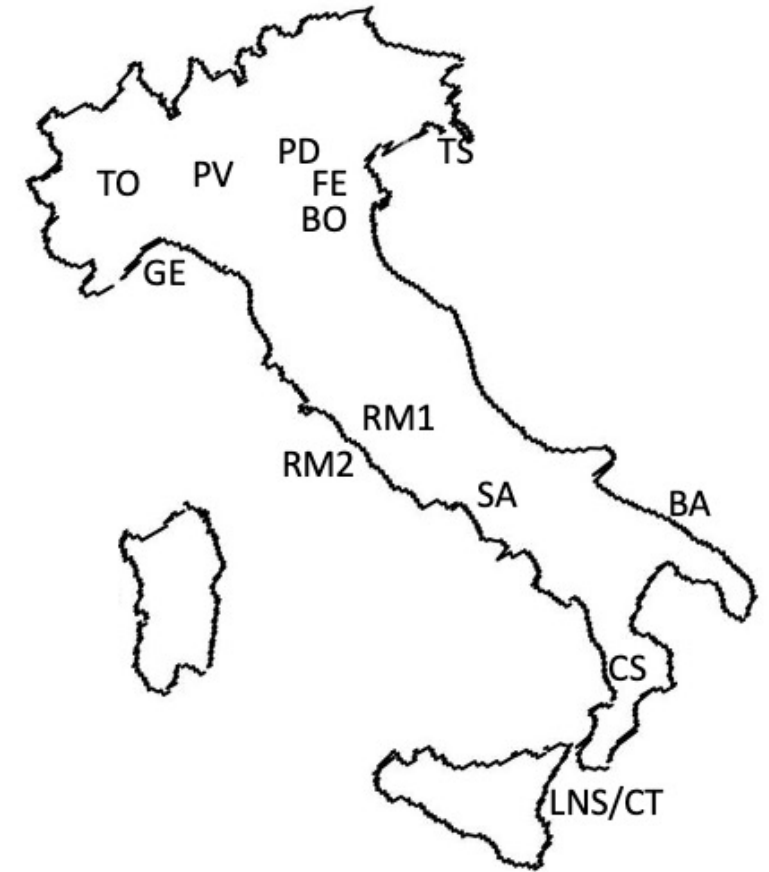
Large number of people interested, ratio FTE/personnel to increase when we will move to sigla/construction
But note CSN3 requirements for “sigle in costruzione”

EIC_NET community (II)

- Large community but distributed and **from different background/CSN**: ALICE, AMBER, ATLAS, CMS, JLab12, JUNO,
- Small groups have more troubles **transitioning** from one (running) experiment to a new one
- Publication mathematics makes the transition more complicated than in the past (especially for University positions and for early career scientists)
- The **different rules of different (running) experiments + CSN3 rules + “FTE requests”** makes the whole operation delicate
- Positions hired via DoE funds will further “stress” the system

Commissione valuteranno l'applicazione delle regole per i singoli casi.

8. La partecipazione di dottorandi/e e borsisti/e post-laurea ai programmi di ricerca deve essere al 100% sull'attività/esperimento che corrisponde al lavoro per la tesi di dottorato o al tema della borsa. La partecipazione di assegnisti/e e borsisti/e in possesso del titolo di dottore di ricerca deve essere chiaramente polarizzata ($\geq 70\%$) sull'attività per la quale l'assegno o la borsa sono stati richiesti.
12. Per gli esperimenti di tipo “networking” e per le nuove sigle in fase di costruzione e R&D le percentuali di minima partecipazione indicate ai punti 6 e 10 sono rispettivamente 10% (ricercatori), 5% (tecnologi), 30% (RN) e 20% (RL). La CSN3, nella riunione precedente alla presentazione dei preventivi (giugno-luglio), indicherà quali sono gli esperimenti a cui questa norma potrà essere applicata per l'anno seguente.



- CSN3 said they will update clause 8 in such a way for PhD a sharing of FTE is allowed (this is happening already... but not in all corners!)
- CSN3 about clause 12 restates 50%—50% is ok! Discussion with ALICE RN (F. Antinori) on-going

Per quanto riguarda il manpower, a fronte di un aumento costante nel tempo del numero di ricercatori e di FTE, la frazione di FTE per ricercatore rimane limitata intorno al 25% e si aspetta un consistente aumento di questa frazione, in particolare per la componente di personale strutturato che garantirà la continuità nello sviluppo del progetto a lungo termine. Ci si aspetta un incremento significativo della frazione di FTE per ricercatore al termine della stesura del TDR.

(excerpts from referee report/minutes)

- we expect to secure several contracts in 2023/2024 → going in FTE, good!
- the message is however clear: we need to increase average FTE of staff for 2025

Miscellanea

EIC opportunitites for early career scientists

Several contracts in place/being funded via EIC (DoE) funds.

Since 2022 (EIC_RD and EIC_RD23 fondi esterni) funded or in preparation by 2023, early 2024

- co-funding of “assegni di ricerca” (RM2, BO, TO, TS, BA, CS, GE)
- co-funding of PhD positions (PD, BO)
- co-funding of “tempo determinato” positions (FE, TS)

Some of these contracts being awarded in the coming months!

Highlight from 2023: EIC School!

Our best investment for the future

1st EUROPEAN SCHOOL ON
THE PHYSICS OF THE
ELECTRON-ION COLLIDER

18-22 Jun 2023
Cortiglione, Rosignano, Italy



- nice mix of experimental and theoretical communities
- 28 participants: 2 from India (+1), 1 from Poland, 1 from Germany, 3 "from fisica applicata + chemistry", the rest (22) from INFN at large (participants: 33%F – 67%M, lecturers: 40%F – 60%M, organizers: 45%F – 55%M) – 3 undergraduates
- excellent synergies among Universities and groups, good sponsorships, a superthank to Abhay and CFNS



P. Antonioli - Status

Deadline: 25 October 11:45 PM ET →

Executive Board candidates (3 positions):

- Yulia Furletova (JLab)
- Taku Gunji (U.Tokyo)
- Or Hen (MIT)
- Jin Huang (BNL)
- Barbara Jacak (UC-Berkeley/LBL)
- Paul Newman (Birmingham U)

Publications Committee: (chair and vice-chair)

- Rene Bellwied (U.Houston)
- Spencer Klein (LBL)
- Annalisa Mastroserio (INFN Bari/U. Foggia) (as vice chair only)
- Paul Reimer (ANL)
- Mural Sarsour (GSU)

Joint ECFA-NuPECC-APPEC Activity Workshop "Synergies between the EIC and the LHC"

14–15 Dec 2023
DESY, Hamburg
Europe/Berlin timezone



Overview

Local Organizing Committee

Scientific Programme

Registration

Workshop fee

Call for Abstracts

Book of Abstracts

Speaker List

Preliminary Timetable
(still in preparation)

Participant List

Workshop Venue

Social dinner

Accommodation

Secretaries

Sponsors / co-organizers



A Joint ECFA-NuPECC-APPEC activity (<http://www.nupecc.org/jenaa/>) on the topic of exploring the synergies between the EIC and the LHC has recently started. For the Expression of Interest, see <https://indico.ph.tum.de/event/7004>

This Workshop, taking place in person, follows the kick-off meeting held at CERN in June 2022 (<https://indico.ph.tum.de/event/7014/>) and aims to continue the discussion and promote further fruitful exchanges between the theoretical and experimental communities involved in LHC, EIC, and astroparticle physics.

In the days before this Workshop, the XVI Meeting of the Physics at the Terascale Alliance will also take place in the same venue. For registrations to the latter, please visit <https://indico.desy.de/event/41133/>

CLUSTER OF EXCELLENCE
QUANTUM UNIVERSE

Forschungsgruppe FOR 2926/2

Next Generation Perturbative QCD for Hadron Structure:
Preparing for the Electron-Ion Collider



Still space to send contributions

<https://indico.desy.de/event/41404/>

Specifically for Responsabili Locali!

Today is deadline to indicate “restituzioni” to me → then to CSN3

Aware of potentially some savings in PD, LNS, SA, BO (missions): others?

Jan 9-13, 2024 @ ANL

- 3 days of parallel sessions and workfests
- followed by 2 days of plenary sessions
- DSC/WG leadership had been invited to submit proposals for the workfests with deadline on Sept. 22nd
 - Great feedback from the collaboration: (10 + 1) proposals

ePIC general meeting, October 5, 2023

- Stay tuned @ TODAY 4:30 PM ePIC general meeting for news
<https://indico.bnl.gov/event/20857/>
- 12 INFN trips per se funded checks on going with RL!



Parallel sessions and Workfests, proposals received

Proposal	Proponents
Barrel ECAL DSC	Maria Zurek, Sylvester Joosten
SVT DSC	Laura Gonella, Ernst Sichtermann
Tracking	Ernst Sichtermann, Matt Posik
Jets & HF (Particle Flow)	Brian Page, Olga Evdokimov, Derek Anderson
Jets & HF (Vertex)	Brian Page, Olga Evdokimov, Shujie Li, Barak Schmookler
Streaming Computing Model, electronics and DAQ	Fernando Barbosa, Jin Huang, Jeff Landgraf, Marco Battaglieri, Markus Diefenthaler
FFWD, FBKWD & Exclusive, Diffractive and Tagging, eA	Raphael Dupre, Rachel Montgomery, Alex Jentsch, Kong Tu, Simon Gardner, Nathaly Santiesteban, Dhevan Gangadharan, Nick Zachariou
Backgrounds	Kolja Kauder, Elke-Caroline, Aschenauer, Shujie Li
AC-LGAD TOF DSC	Alessandro Tricoli, Alexander Jentsch, Wei Li, Zhenyu Ye
Common PID	Thomas Ullrich, Oskar Hartbrich

+

- software and simulation readiness for the TDR
- Tutorials ?



Work ongoing to identify synergies (when appropriate) and elaborate an agenda to house the rich proposal panorama coming from the collaboration

EIC_NET/ePIC @ a turning point

- I vari gruppi della sigla stanno transendo in modalità “esperimento”, entro 1 anno responsabilita’ gruppi e impegno INFN in ePIC “definite”
- Siamo sigla networking, ma alcune attivita’ approssiano ormai quelle di R&D/costruzione. **TDR fra 1 anno**, “Detectors on the floor” **fra 7 anni**
- Prossimo update: **venerdi’ 15 dicembre ore 10:30 – 12:30 (piu’ auguri!)**
[post – RRB !]

