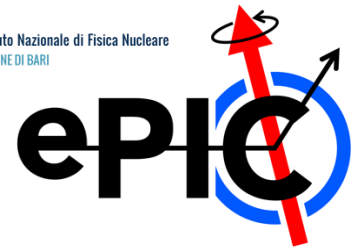




Istituto Nazionale di Fisica Nucleare
SEZIONE DI BARI



EIC community in Italy

- history of INFN interest in EIC: from EIC_NET to ePIC Italy
- current INFN involvement in ePIC
- summary and prospects

Domenico Elia (INFN Bari)
on behalf of **ePIC Italy**

History of INFN interest in EIC

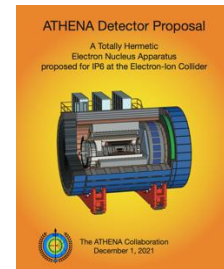
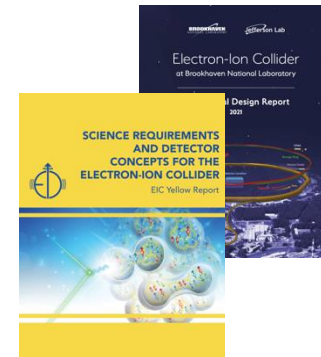
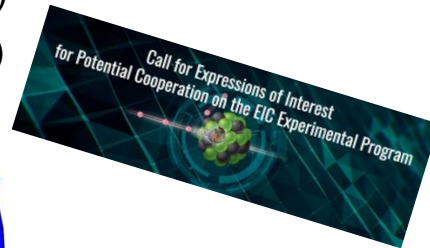
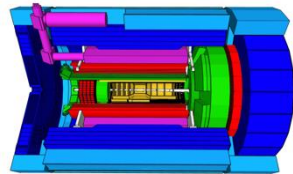


Growing of the INFN community and main steps:

- INFN EIC community started to coalesce in 2016-2017:
 - ✓ EICUG meeting in Trieste July 18-22, 2017
- network initiative approved since 2019 (“EIC_NET” @ INFN Nuclear Physics Committee)
 - ✓ invaluable seminal work by Silvia
 - ✓ excellent leadership by Silvia (2019-2021) and then Pietro (2021-2024): **super thanks!**
- **active participation in the main steps of the EIC project since the beginning:**



- ✓ INFN Expression of Interest (2020)
- ✓ EICUG Yellow Report (2020-2021)
- ✓ ATHENA proposal (2021-2022)
- ✓ ePIC (2022→)

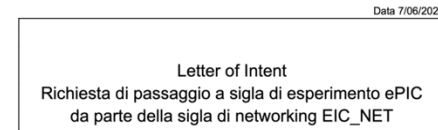


History of INFN interest in EIC



Growing of the INFN community and main steps:

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- **active participation in the main steps of the EIC project since the beginning:**
 - ✓ EoI (2020), Yellow Report (2020-2021), ATHENA proposal (2021-2022), ePIC (2022→)
- **latest (bureaucratic) developments on June 2024:**
 - ✓ Letter of Intent to become “ePIC” submitted to INFN NPC on June 7
 - showing community is big enough, describe intended IKC and financial effort
 - ✓ **INFN NPC granted experiment status to ePIC on June 18**
 - ✓ implies multi-year INFN commitment to support ePIC Italy to deliver IKC → iCRADA to follow

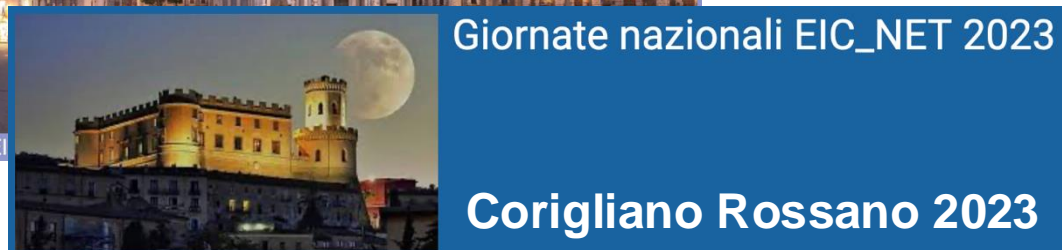
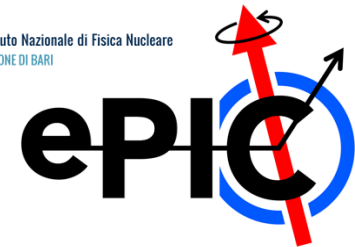


History of INFN interest in EIC

A long path to ...



Istituto Nazionale di Fisica Nucleare
SEZIONE DI BARI



History of INFN interest in EIC

A long path to ...

First “ePIC Italy” meeting!

<https://agenda.infn.it/event/39909/>



Giornate Nazionali EIC_NET 2024 - Bologna



Domenico Elia

EIC France 2024 / IJCLab Orsay 9.10.2024



INFN involvement in ePIC

Contribution to the ePIC detector at a glance:

- focused on 3 sub-detectors (SVT, μ RWELL-ETC, dRICH) + SRO



Sub-system

SVT

μ RWELL-ECT

SRO

dRICH

Leading persons

D. Elia

A. D'Angelo

M. Battaglieri

M. Contalbrigo

Sinergies



ITS3



ALICE3 (aerogel, SiPM)

- but also

Computing

A. Bressan, D. Elia



Theory

M. Radici



INFN involvement in ePIC

Contribution to the ePIC detector: dRICH

- M. Contalbrigo (INFN Ferrara) dRICH DSC Leader

dRICH Collaboration

Compact cost-effective solution for particle identification in the high-energy endcap at EIC

dRICH

INFN BA, BO, CS, CT, FE, GE, LNS, RM1, RM2, SA, TO, TS

Jefferson Lab

Duke

BAMAHIA UNIVERSITY OF APPLIED SCIENCES

NISER

श्रीमती अज्ञेय देवप्रियामा
CENTRAL UNIVERSITY OF HARYANA

ePIC

EIC RICH Consortium

Brookhaven National Laboratory

Stony Brook University

PURDUE UNIVERSITY

TEMPLE UNIVERSITY

Univerza v Ljubljani

Forward particle detection

Hadron ID in the extended 3-50 GeV/c interval

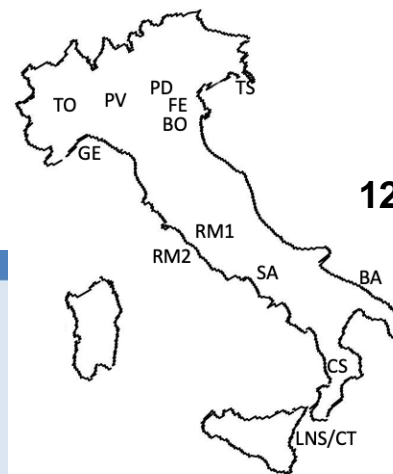
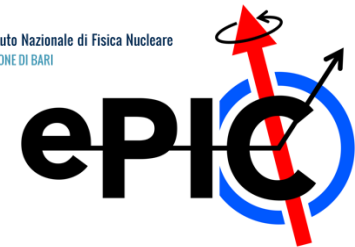
Support electron ID up to 15 GeV/c

Main challenges:

Cover wide momentum range 3 - 50 GeV/c -> dual radiator

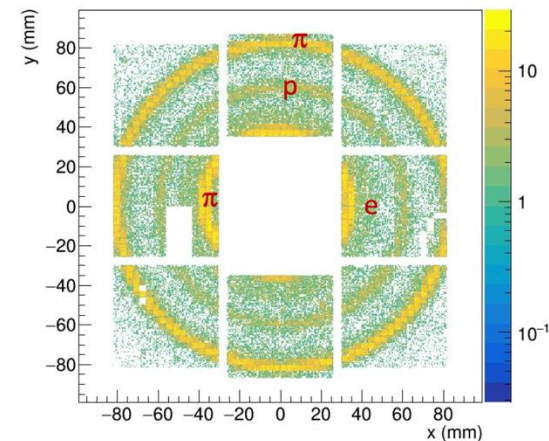
Work in high (~ 1T) magnetic field -> SiPM

Fit in a quite limited (for a gas RICH) space -> curved detector



12/14 units involved

Aerogel + C₂F₆ radiators, positive beam, 8 GeV/c



- ✓ ePIC dRICH will be world first with SiPM
- ✓ key INFN expertise is converging on the project

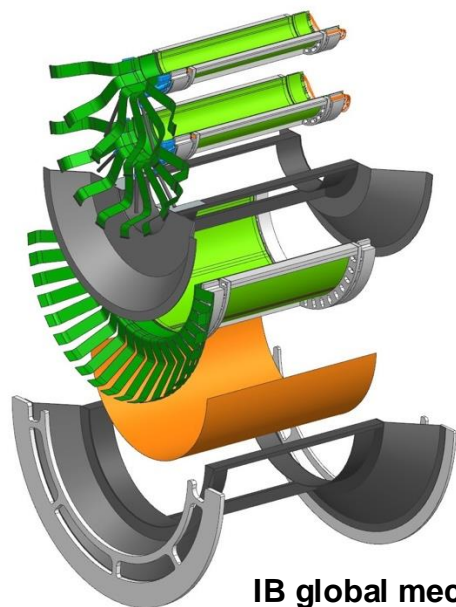
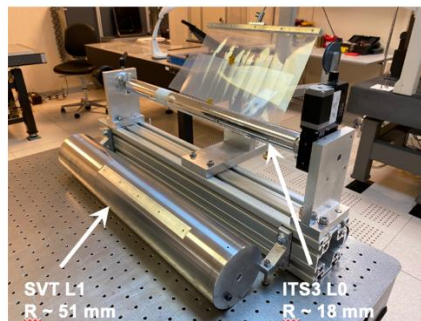
INFN involvement in ePIC

Contribution to the ePIC detector: SVT

- D. Elia (INFN Bari) WP4 co-convener, IB coordinator
- L. Gonella (Univ. and INFN Trieste) DSC Technical Coordinator

- ✓ MAPS 65 nm technology
- ✓ strong synergy with ALICE ITS3 (and NA60+)

L0-L1 bending and interconnection



IB global mechanics

Domenico Elia

- sharing of the responsibilities within the INFN groups: **4/14 units involved**
 - ✓ **BA**: leading IB project, main assembly centre of the two innermost layers
 - ✓ **PD**: development and production of the global SVT IB mechanics and backup assembly/production centre for the two innermost layers
 - ✓ **PV**: test of the special gluing of the sensors with support structure (climatic chamber), development of dedicated transport boxes and shipping/handling to BNL
 - ✓ **TS**: qualification, test and production of the SVT IB FPC

INFN involvement in ePIC

Contribution to the ePIC detector: μ RWELL-ECT

- A. D'Angelo (INFN Roma2) GEM μ RWELL-ECT coordinator

3/14 units involved

INFN coordinates the GEM- μ Rwell MPGD ECT – for both the Hadron and Lepton Disks
INFN will provide the Hadron Disks and related electronics (FEB, not the ASIC)
as In-kind contributions

Roma Tor Vergata

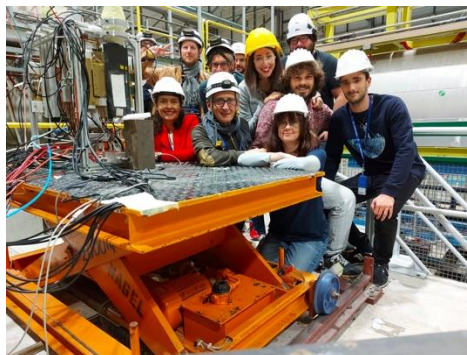
Coordination
Detector Hardware and QA
Simulation & Reconstruction
FEB Electronics

Genova

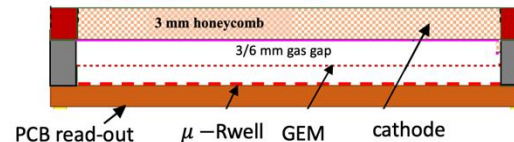
FEB Electronics

Catania

Simulation & Reconstruction



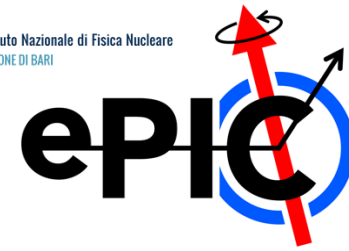
GEM - μ Rwell Technology



- ✓ this IKC brings an INFN technology to ePIC
- ✓ strong synergy with JLab12

The work will be performed in close connection with: the group of Gianni Bencivenni @ INFN LNF (μ RWELL inventor!) and with the JLab detector group (Kondo Gnanvo, Seung Joon Lee)

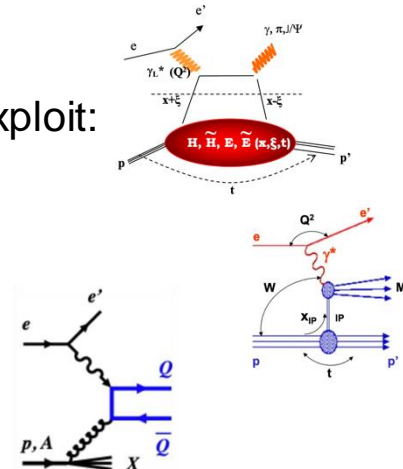
INFN involvement in ePIC



Interests for the ePIC physics:

- still being developed, with some basic orienting pillars:
 - ✓ connection to contributions on the sub-detectors
 - ✓ expertise from our communities (JLab, COMPASS, ALICE + ZEUS and HERMES in the past)
 - ✓ expertise from our theory community
- some potential and leading experience to exploit:
 - ✓ TMDs and SIDIS (BO, CS, PV, SA, TO, TS)
 - ✓ diffractive PDFs at HERA (CS, TO)
 - ✓ exclusive processes and GPDs (CS)
 - ✓ hadronisation in CNM, HF and Jets, production of light nuclei in ep (BA, BO, PV)
 - ✓ hadron spectroscopy (GE)
- expertise/infrastructure for HP/HT Computing (WLCG, OSG)

S. Fazio (Univ. and INFN CS)
analysis co-coordinator



ANALYSIS COORDINATORS

Salvatore Fazio (Cosenza)
Rosi Reed (Lehigh)

INCLUSIVE PHYSICS

Tyler Kutz (MIT)
Claire Gwenlan (Oxford)

SEMI-INCLUSIVE PHYSICS

Charlotte Van Hulse (Alcala)
Stefan Diehl (UConn)

JETS AND HEAVY FLAVOR

Brian Page (BNL)
Olga Evdokimov (UIC)

EXCLUSIVE, DIFFRACTION AND TAGGING

Raphael Dupre (Orsay)
Rachel Montgomery (Glasgow)

BSM AND PRECISION EW

Ciprian Gal (JLab)
Michael Nycz (Virginia)

Summary and prospects

INFN community in EIC fully committed:

- contributing to the main steps towards ePIC@EIC since the beginning
- bringing expertise and IKC on 3 sub-systems + computing & physics
- well engaged in the EICUG/ePIC Collaboration chart:
 - ✓ ePIC: SP office, DSCs, CC WGs, EC, MC, PC etc
 - ✓ EICUG SC

looking forward to exciting time ahead with ePIC:

- finalize signing of formal agreements (iCRADA and PPDs)
- contributing to the TDR in many sections
- entering the detector construction phase
- aiming to grow and expand our interests (eg on physics)

D. Elia new INFN PI-elect

(effective since Nov. 1st 2024) for a 3-year term, working with Pietro for an orderly handover.

Big thanks to Pietro from all of us!



Summary and prospects

Looking forward to welcoming you in Frascati

Thank you!

January 2025 Collaboration Meeting

- After very careful consideration by the CC Office, Executive Board, and the Coordinators, we have decided to accept the proposal from University of Rome Tor Vergata & INFN to host the January 2025 ePIC Collaboration Meeting.

- University of Rome Tor Vergata & INFN
 - Via Frascati (Roman Hills)
 - Trains from Fiumicino Airport and Roma Termini
- Villa Mondragone
 - Rooms available at 3-4 star hotels in Frascati
 - Conference fee covers coffee breaks, lunches, shuttle buses:
 - Remote participants and students fee waived (up to 20%)
 - Minimum 100 in-person attendees
 - Social dinner (additional cost)
 - Plenary Room (160 people)
 - 3 parallel session rooms
 - AV support

