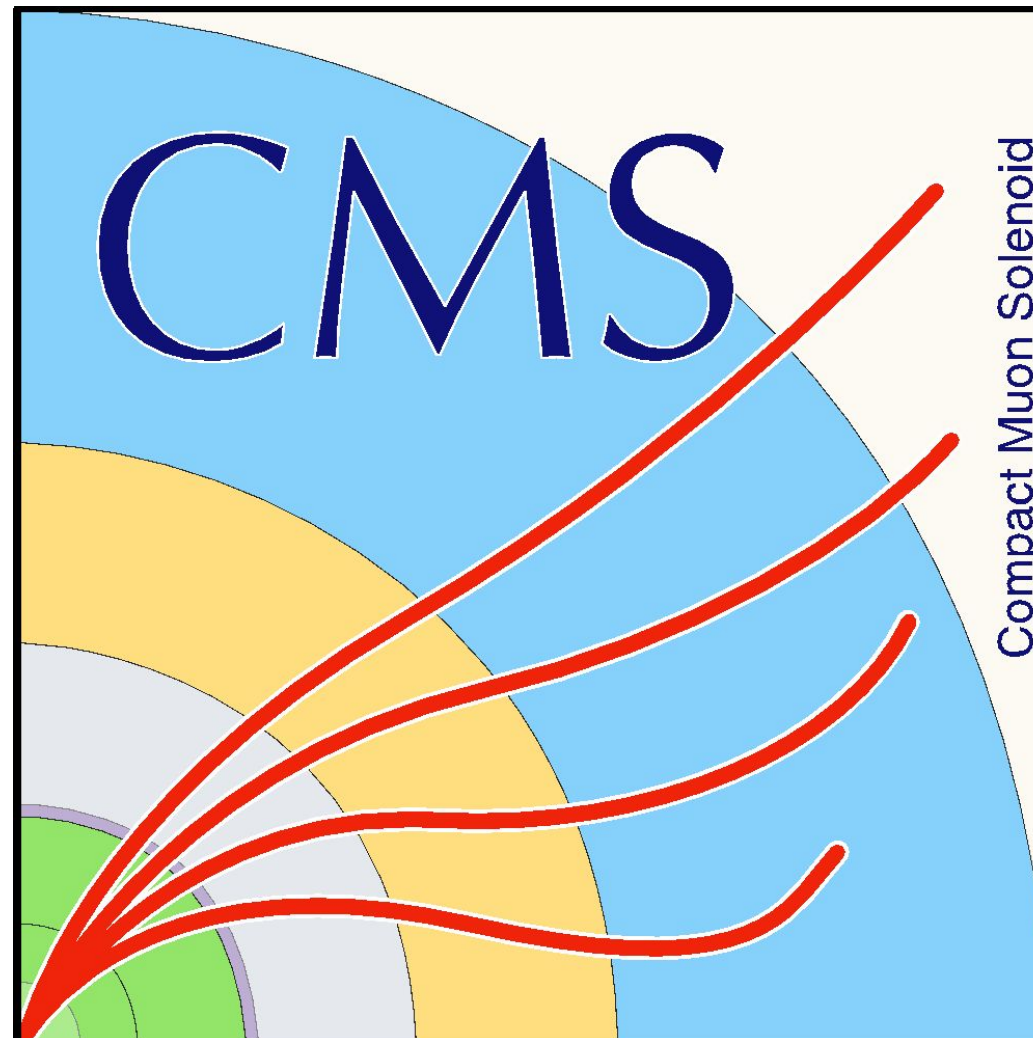


Preventivi 2025

Rosamaria Venditti

Università e INFN Bari

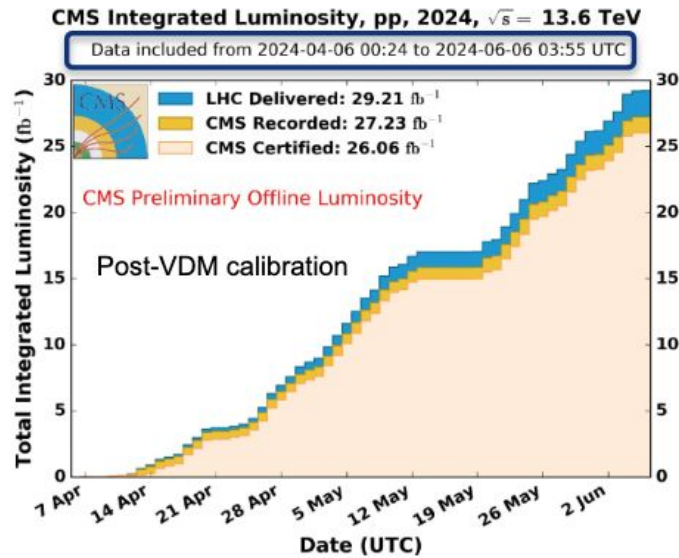


CMS Performance in 2024

Successful operations in 2024

- ~31 fb⁻¹ of integrated luminosity delivered to CMS in 2024
→ 26/29 fb⁻¹ certified as good
- Data taking efficiency in 2024: 92.8%
- No one subsystem causing major downtime

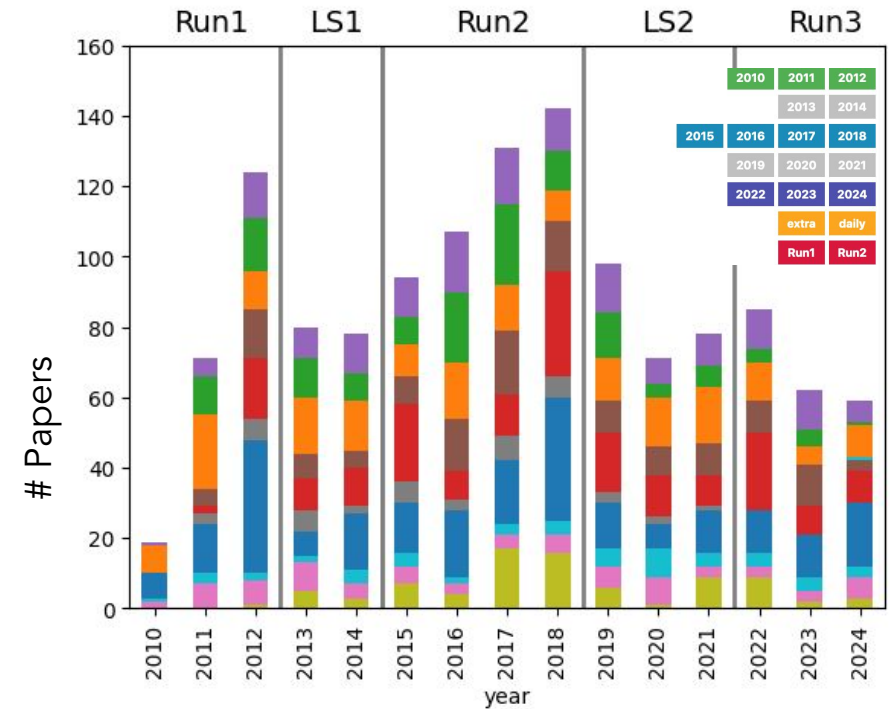
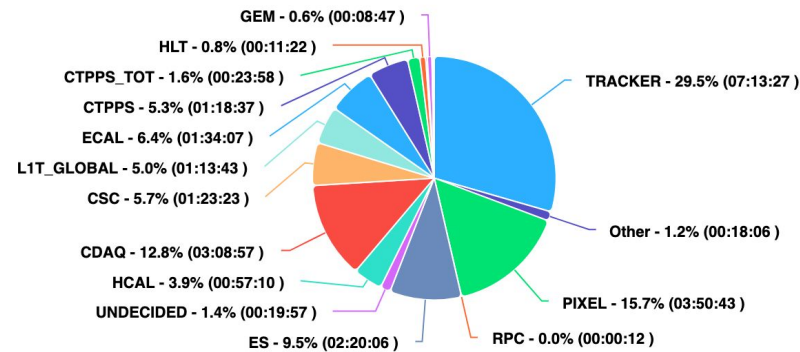
2024 CMS Certified data



Time lost - 3.5% (24:30:26)



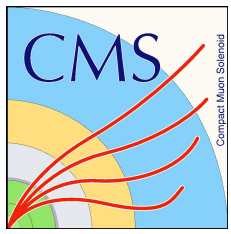
Time active - 96.5% (682:01:37)



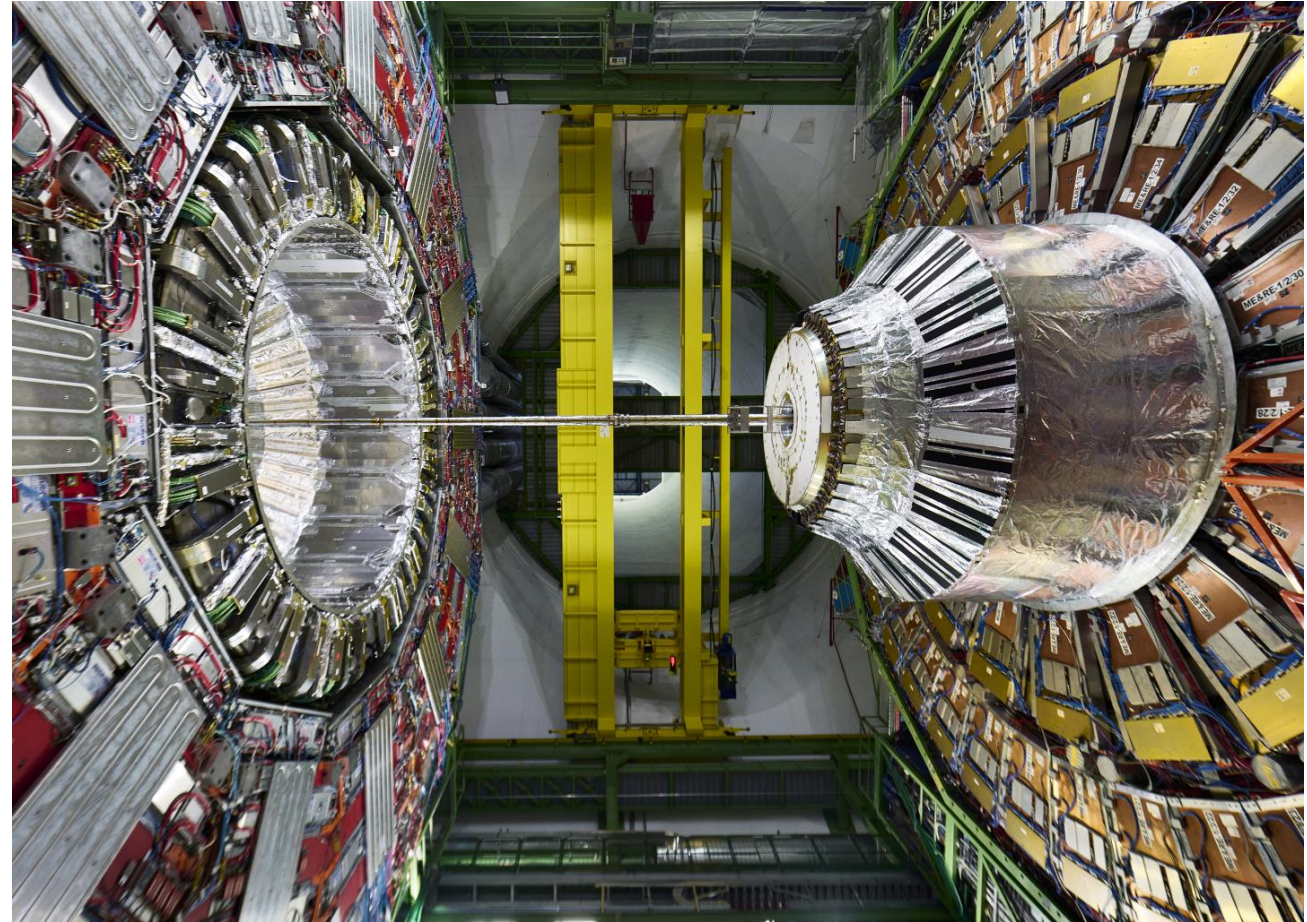
- 1299 papers on collision data
 - ~60 in 2024, 3 on Run3 data
- [Detector Paper for Run 3](#) was published in JINST in May

Responsabilità: L. Silvestris (Deputy SP, L0)

Summary attività

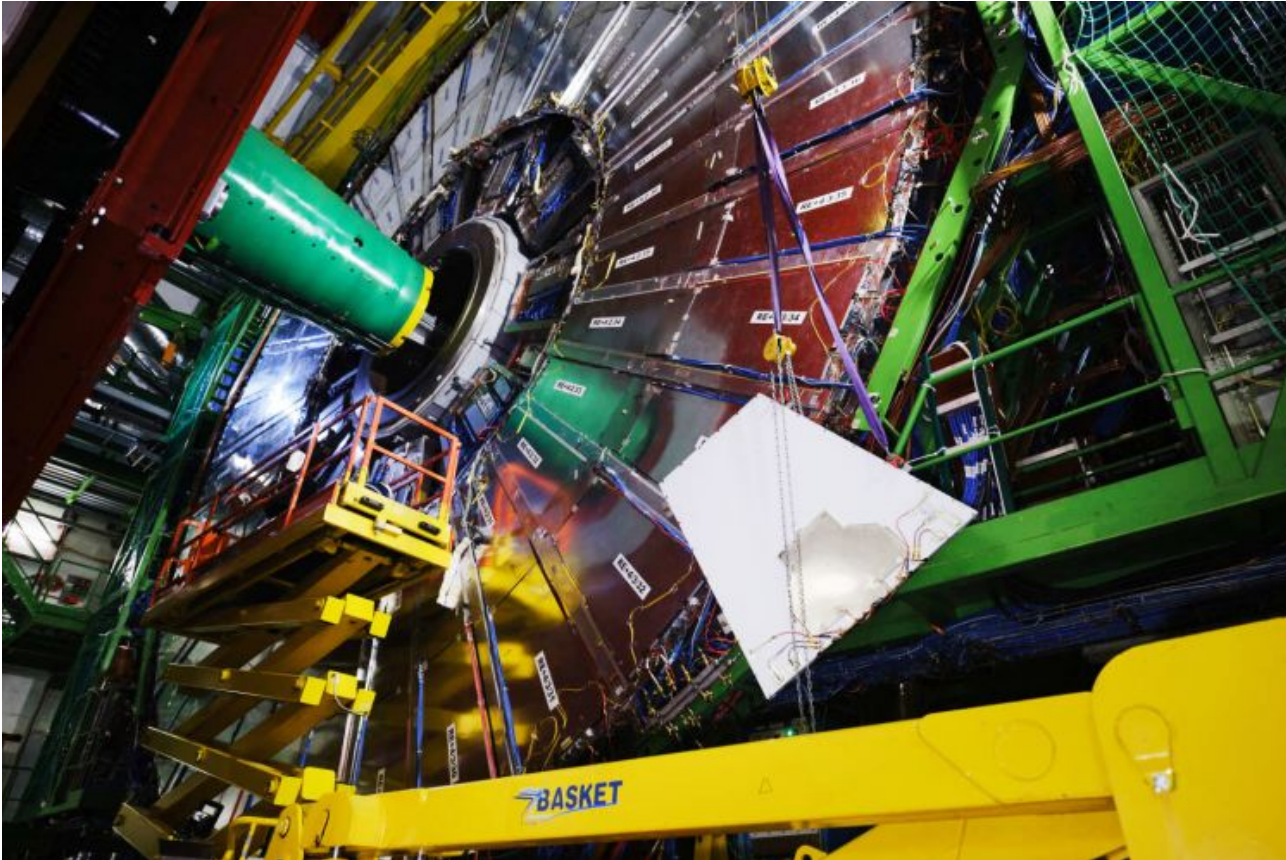


- **Apparato Sperimentale**
 - Run3 Operation
 - RPC, GE1/1 CT-PPS
 - GE2/1 e iRPC
 - Upgrade di fase II:
 - Produzione moduli Outer Tracker,
 - Produzione moduli GEM-ME0
- **Analisi dati**
 - Finalizzazione di analisi con i dati di Run-2 (Higgs, B-Physics)
 - Primi studi sui dati Run3: ricostruzione muoni, tracce, jet flavor tagging
- **Calcolo** Not covered
 - Ottima affidabilità del Tier2 di Bari, attualmente il primo Tier2 italiano per numero di risorse fornite all'esperimento
- **Outreach** Not covered
 - Contributi a ERN, Masterclass, Art and Science across Italy



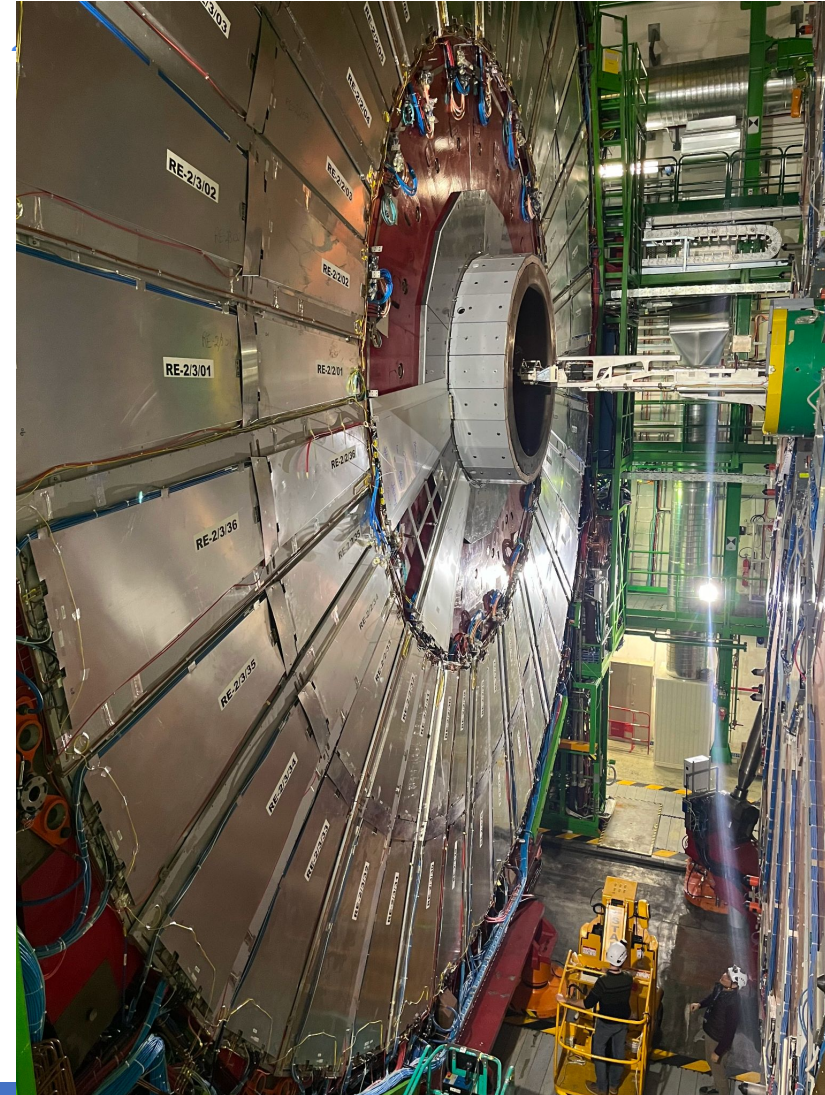
CMS Detector - Muon System

Installation of a new prototype of CMS RPC (2022)



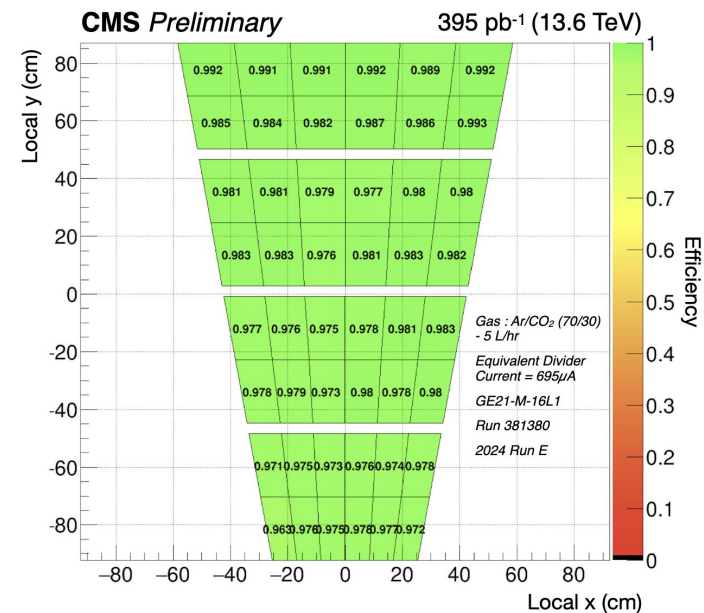
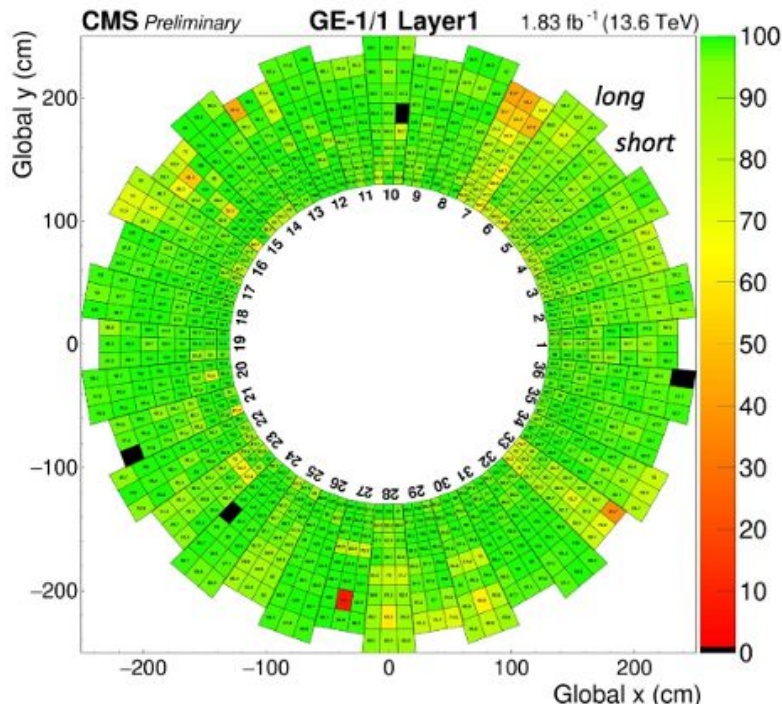
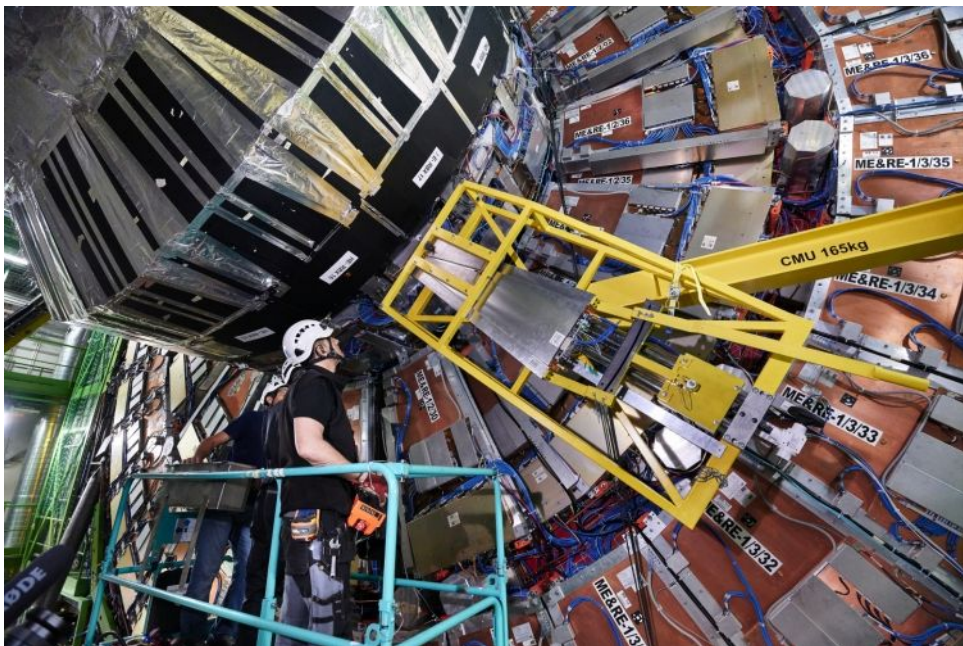
A Colaleo (MUON IB Chair, L1)
G. Pugliese (MUON Project Manager L1)

GE2/1 demonstrator installation



Muon system Run3
performance
presentation at
ICHEP24 (G.Pugliese)

Muon System Run3: GE11 Operations



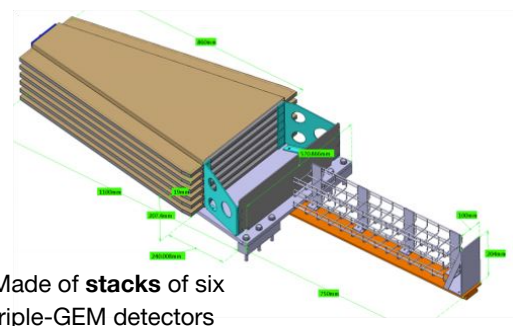
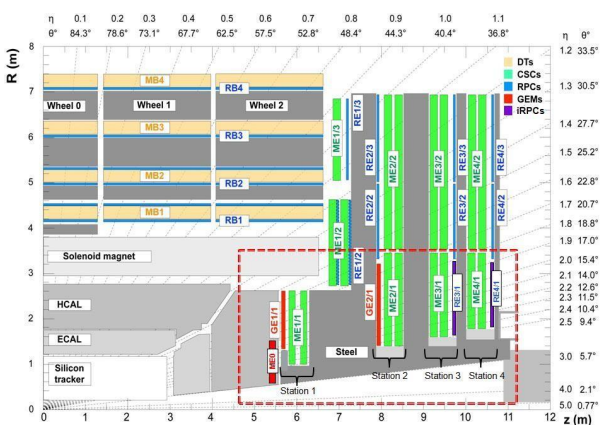
Presented at IWORLD24 (M. Buonsante)

- GE11 integrata nella presa dati 2024
 - detector efficiency > 95%, 90% live channel
 - integrazione in Level-1 Trigger ongoing
- Plans for 2025: GE11 will participate to the global runs;
 - Bari will lead operations and participates with DOCs

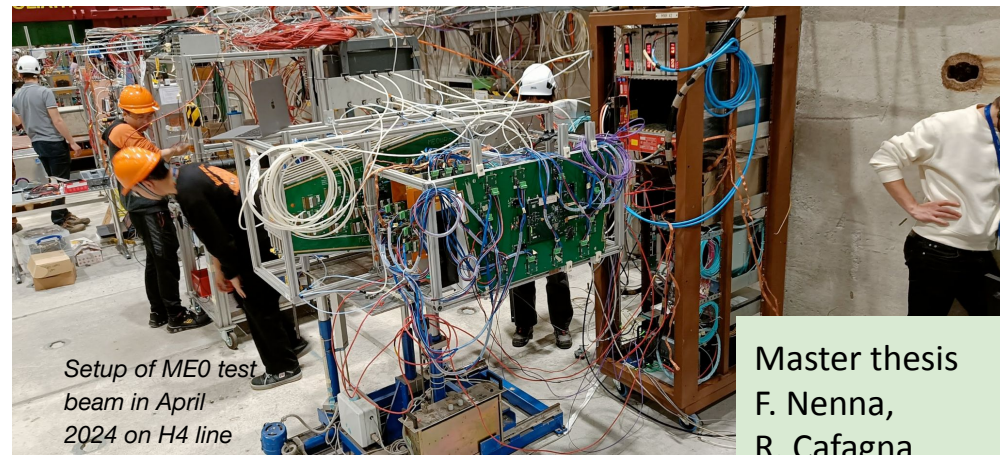
A. Pellicchia Deputy Run Coordinator (L2)

Muon System Upgrade: ME0 in 2024

Complementing and extending the CMS Muon system acceptance up to $|\eta| = 2.8$



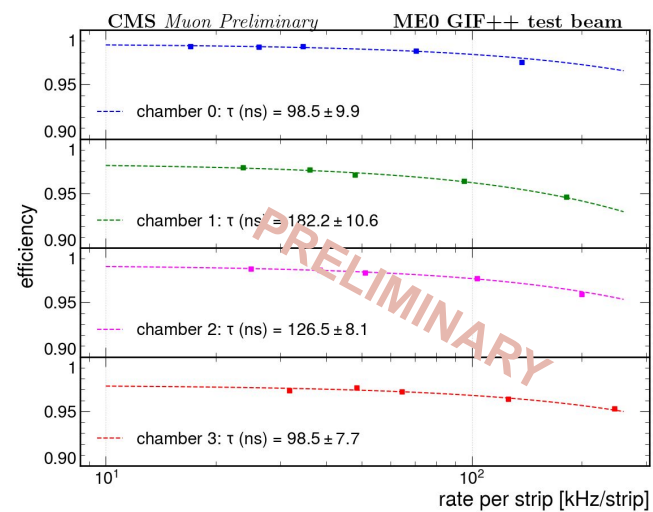
Attività 2024: misura di prestazioni su fascio e a GIF++



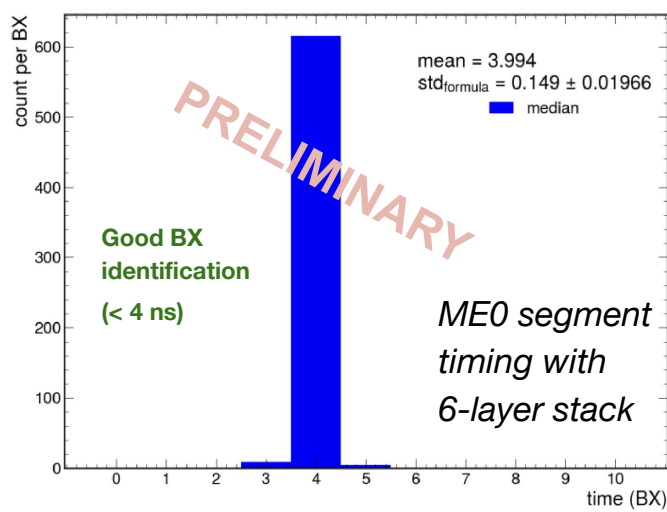
Leading role of Bari: **A. Pellecchia TB Coordinator**

Master thesis F. Nenna, R. Cafagna

Marcello Conversi Prize to A. Pellecchia for PhD thesis



Rate capability of 4 ME0 detectors in GIF++
~2.5% efficiency loss at 250 kHz/strip



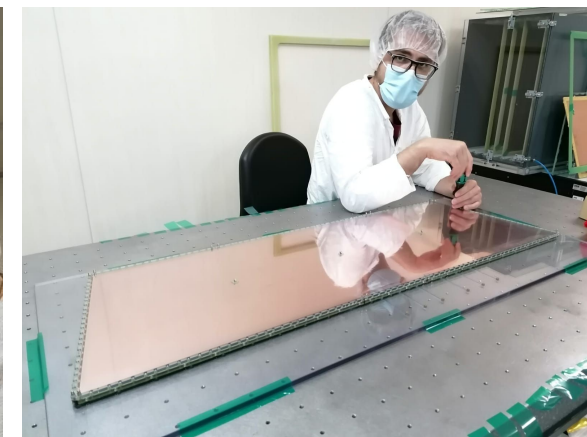
- Plans for 2024
- Measuring the segment timing and rate capability in high background with a 6-layer stack at GIF++
 - Production of 20 ME0 modules in Bari clean room and labs

Muon System Upgrade: ME0 in 2025

Bari is a qualified ME0 modules site production center

In Bari: production of ~30 ME0 modules in 2025

- Assembly in clean room
- Quality control and validation in lab
 - GEM foil training
 - Gas leak measurement
 - Linearity and Noise measurement
 - Effective Gain (x-ray)
 - Response uniformity (x-ray)
- Modules shipped to CERN



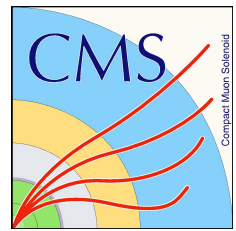
At CERN: construction of ME0 stack, electronics dressing and test at cosmic ray stand

Test beam with the first final stack at H4/GIF

Leading Roles:

- L. Longo: Deputy Hardware coordinator (L2)
- P. Verwilligen Upgrade Coordinator (L2)



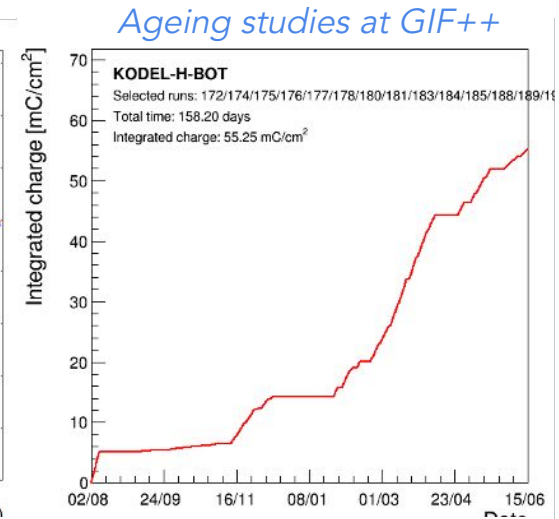
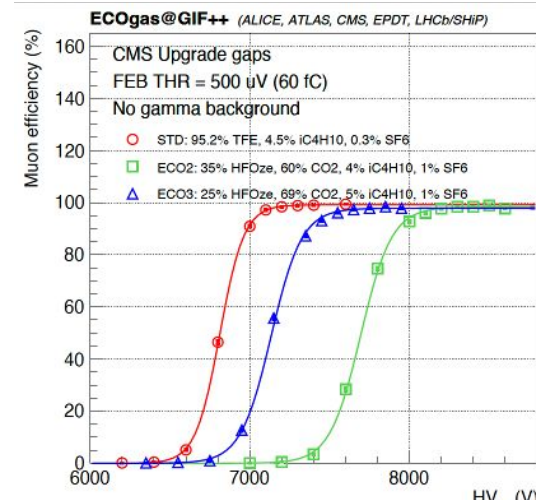


RPC Summary attività 2024

CMS RPC

1. Irradiation campaign for ageing studies of
 - a. legacy RPC with HFO
 - b. iRPC with CO₂.
2. R&D on new eco-friendly gaseous mixtures for RPC operation (beam tests at GIF++)
3. Monte Carlo simulations of GIF++ (CMS↔DRD1 WG4)

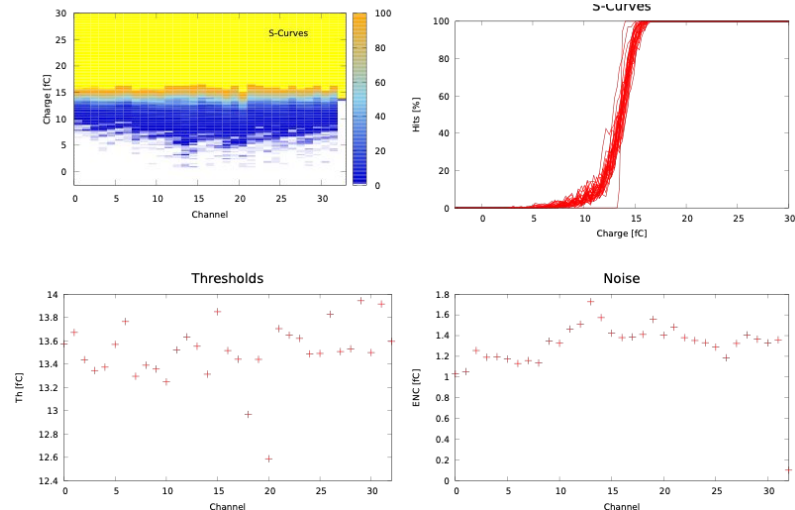
Presented at PM24,
IWORLD24, ICHEP24
(D.R. Lopez)



DRD1-RPC

1. Preliminary test of FATIC chip @ RPC Lab in Bari on double-gap glass RPC (1.4 mm gap and 1.1 mm electrode thickness) (DRD1 WP7B)
2. Production of four 50x50 cm² prototype gas gaps at Korea University (gas thickness: 0.52 mm) for fast timing RPC prototype (DRD1 WP7B)
3. Tests of thin RPCs operated with standard and eco-friendly gas mixtures. Long term performance studies ongoing at CERN GIF++ (RPC Ecogas@GIF++ Collaboration and AIDAINNOVA WP7.2.2→DRD1 WP1)

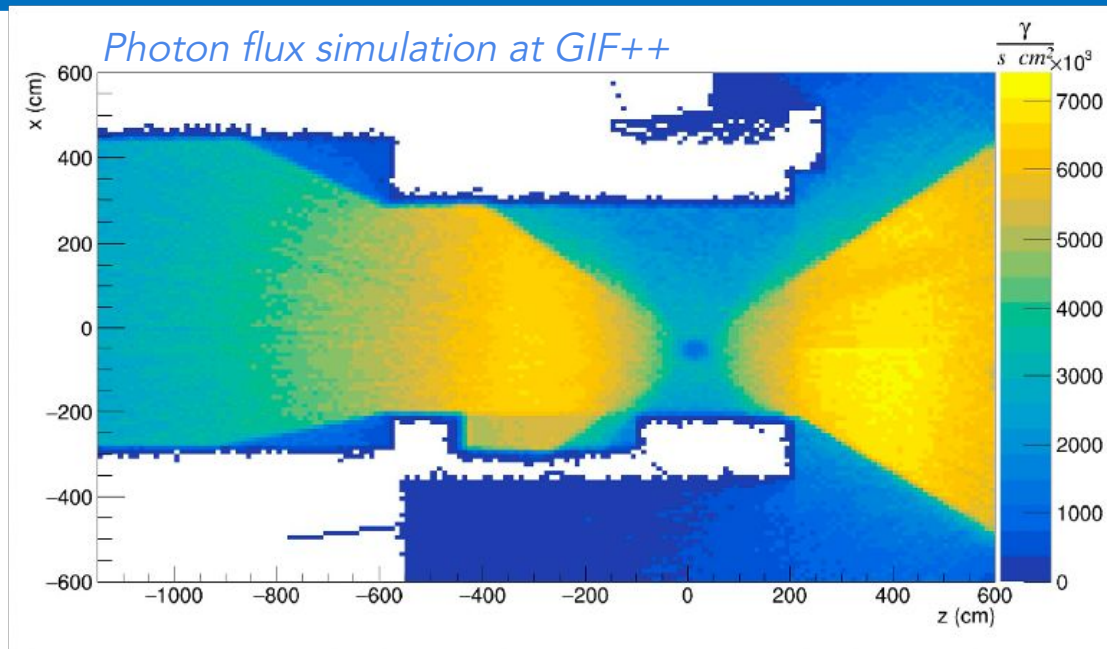
FATIC performance on Double Gaps RPC



RPC Attività previste in 2025

CMS RPC

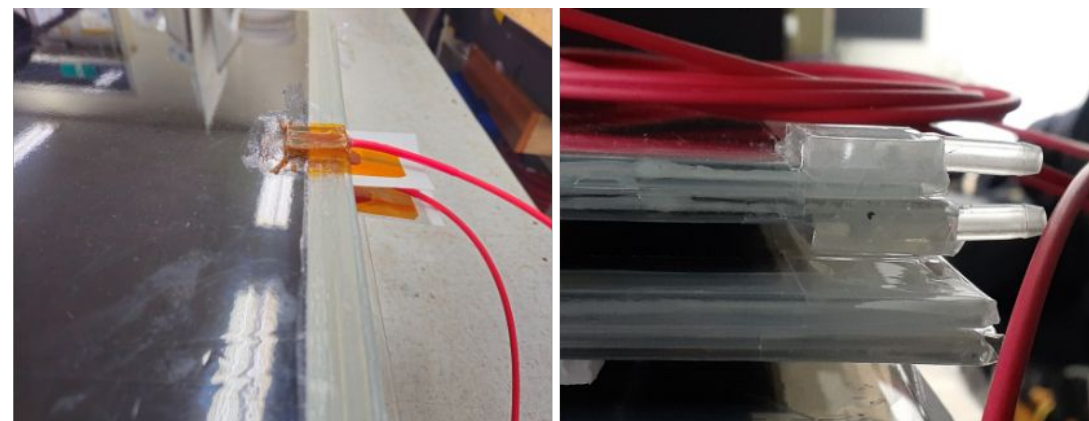
- Continue R&D on new eco-friendly gaseous mixtures for RPC operation (beam tests at GIF++).
 - Analysis and performance monitoring iRPC with HFO/CO2
 - Longevity studies
- Studies of Gamma flux, energy, dose with Monte Carlo simulations of GIF++ (dose measurement campaign)
- [Timing study](#) of ecological gaseous mixtures in Bari lab



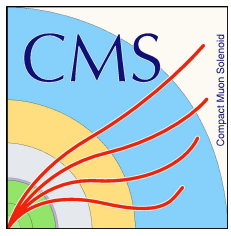
DRD1-RPC

- Fine tuning of prototype equipped with FATIC.
- Construction and performance study of fast timing RPC prototype in Bari lab and GIF++
- Training with [PETIROC](#) front-end for high timing performance test on RPC fast timing prototypes
- Ongoing tests of thin RPCs operated for long term operation

Fast timing RPC



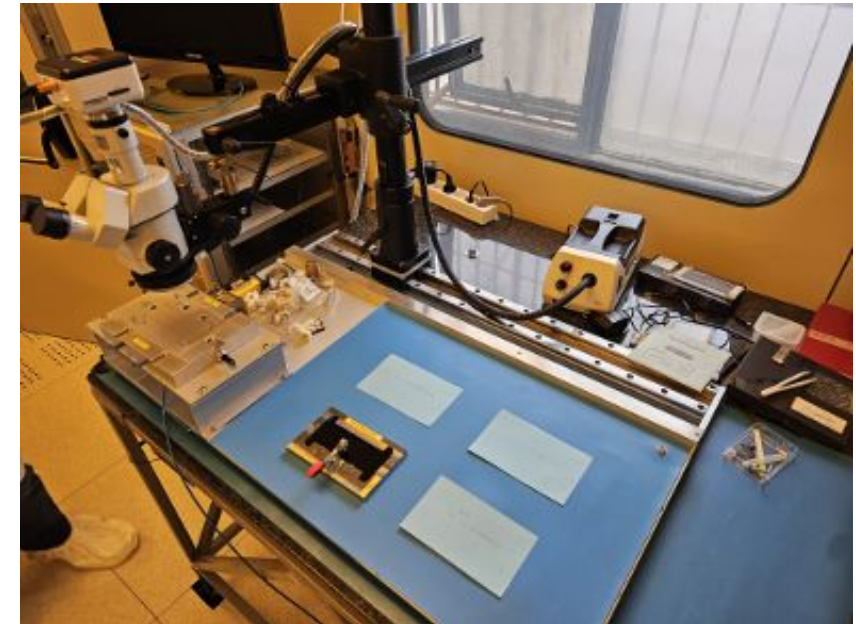
Tracker Phase II Upgrade: Status



Bari centro di produzione dei moduli Pixel Strip (PS) dell'outer tracker

- Finalizzata la richiesta di acquisto dei jigs di produzione per tutti i centri di assemblaggio
- Verifica dello stato della bondatrice Delvotec G5
 - Richiesta di un intervento di manutenzione
 - Richiesto un corso di apprendimento
- Implementazione software con interfaccia grafica utente per test moduli on-line e database storage dei dati dei moduli
- Cardboard exercise per validazione del workflow passato con successo!

Inizio pre-produzione
previsto a Settembre/
Ottobre 2024



Tracker Phase II Upgrade: 2025 activities

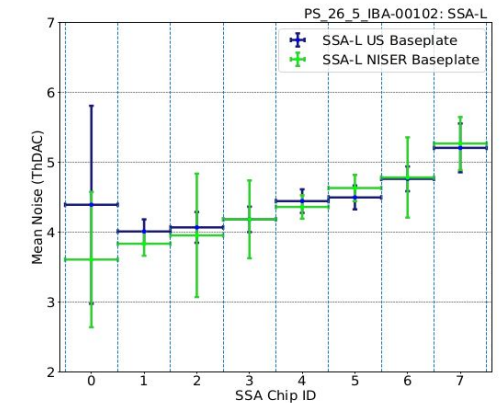
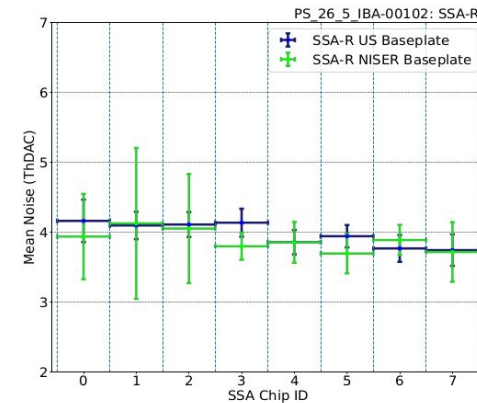
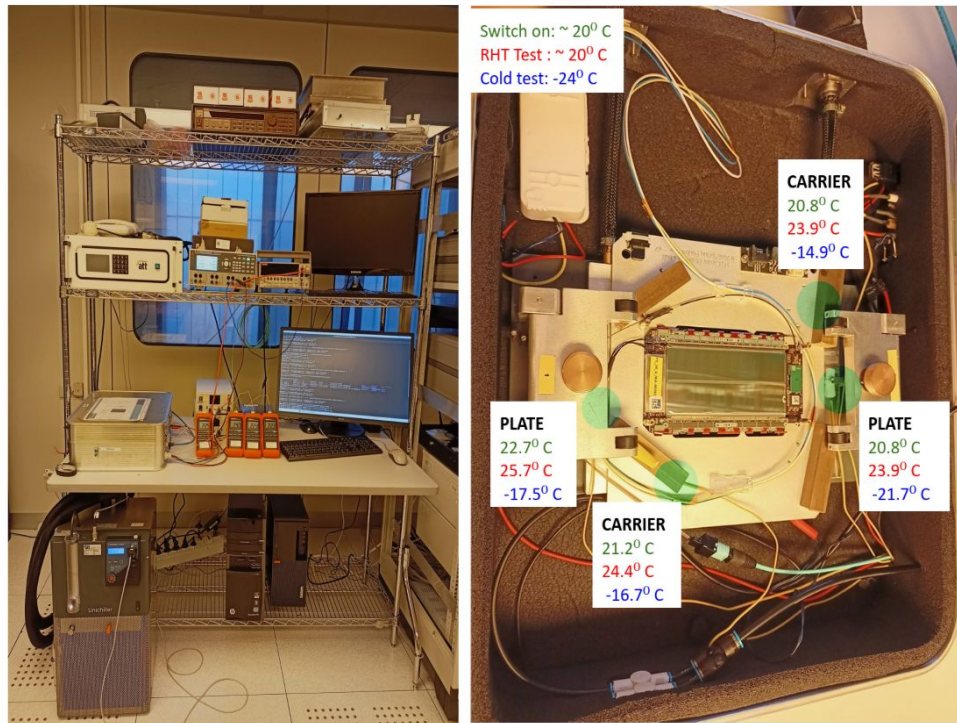
- Produzione di massa moduli PS (~1k moduli previsti)
- Assemblaggio e test di validazione in camera pulita

Set-up test at room and low temperatures (up to ~ -24°C)

Test di validazione

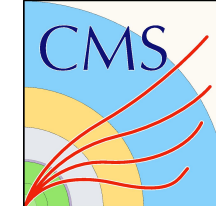
- Noise measurement
- I-V characterization before and after assembly of the sensors
- Calibration of the software and firmware (Ph2_ACF)

Kick-Off Noise results at RHT and ~ -24°C (HV=400V)



Test	RHT	-24°C
Mean noise value SSA-R at 400V (1 ThDAC=250 e)	3.97±0.20 Vcth	3.67±0.19 Vcth
Mean noise value SSA-L at 400V (1 ThDAC=250 e)	4.45±0.37 Vcth	3.89±0.27 Vcth
Leakage current I_{leak}	~ 12.85 μ A	~ 0.642 μ A
Noise strips ≥ 10 Vcth	2 (left side)	1 (left side)

Analysis



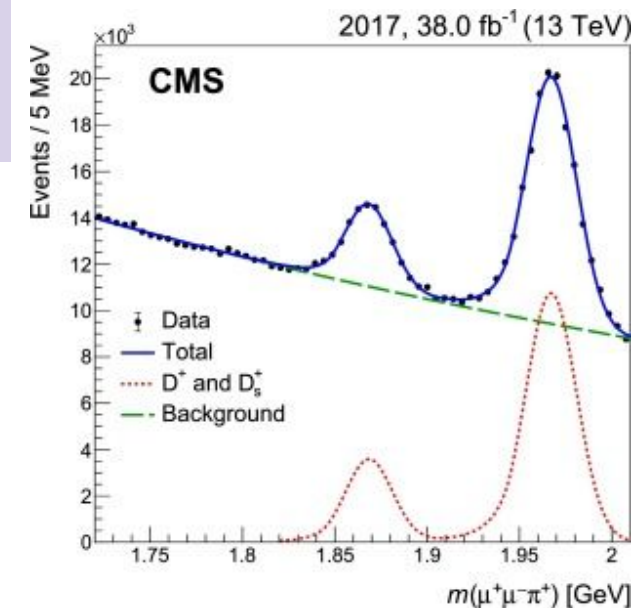
Impegno nelle ricerche di B-Physics e Higgs

Completamento analisi sui dati Run2

- Ricerca di Violazione del Flavor Leptonico nel decadimento $\tau \rightarrow 3\mu$: [paper pubblicato su PLB](#). Upper limit $BR(\tau \rightarrow 3\mu)$ competitivo con Belle [PhD thesis: C. Aruta, F. Simone]
- Spettroscopia del bottomonio [PhD thesis, V. Mastrapasqua]
- Higgs
 - $HH \rightarrow bb\mu\mu$: [PhD thesis ongoing, B. D'Anzi]
 - $HH \rightarrow bbZZ(4l)$: [PhD thesis ongoing, M. Louka]
 - VHH : [PhD thesis ongoing, M. Barbieri]

Presentation at ICNFP (M. Buonsante)
Invited talk at Topical workshop on LFV decays of the tau (F. Simone)

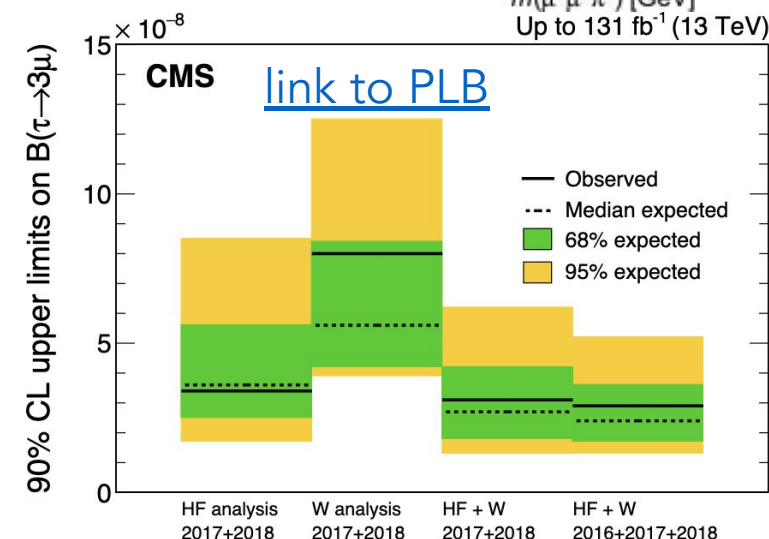
Presentation at QCD@work (V. Mastrapasqua)



Analisi preliminari sui dati Run3

- $\tau \rightarrow 3\mu$
- $B_s \rightarrow 4\mu$ (risonante e non) [PhD thesis ongoing, M. Buonsante]
- $H \rightarrow cc$, con Higgs prodotto da Vector Boson Fusion [PhD thesis ongoing, A. Zaza]
- Bc lifetime [PhD thesis ongoing, U. Solibzir]

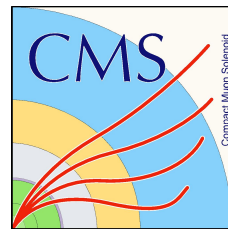
Presentation at SM24 (A. Zaza)



Responsabilità (L3):

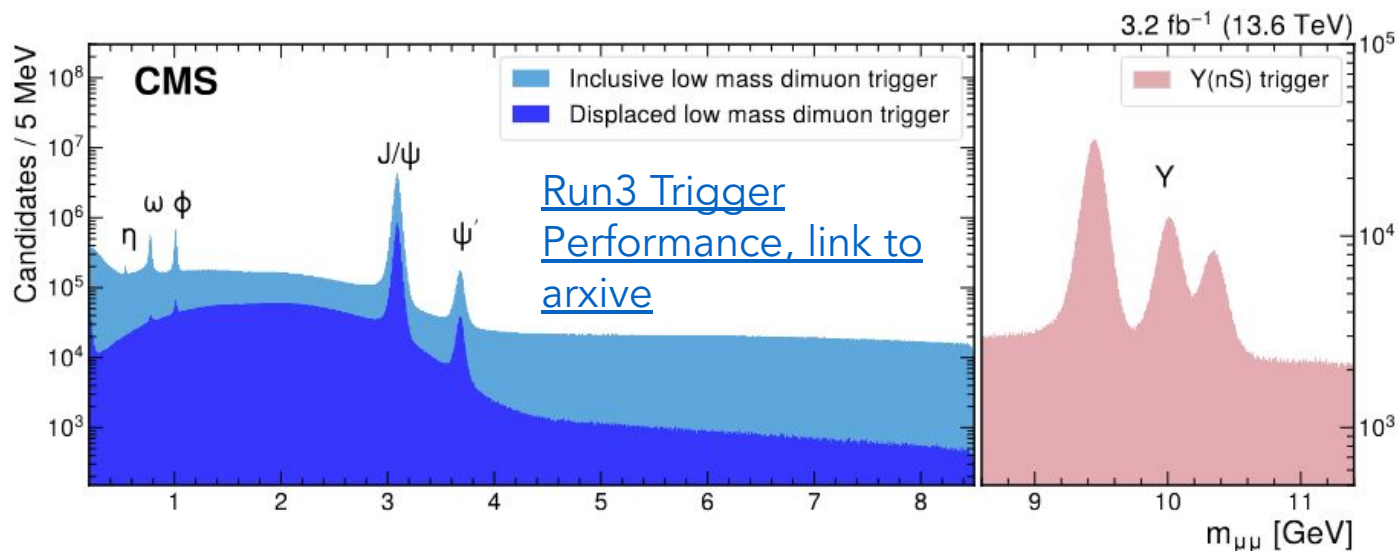
- F.M. Simone: B-Physics Rare Decays coordinator
- A. Pompili: Heavy Flavour LHC WG, B-Physics-TOP PubComm member

Analysis

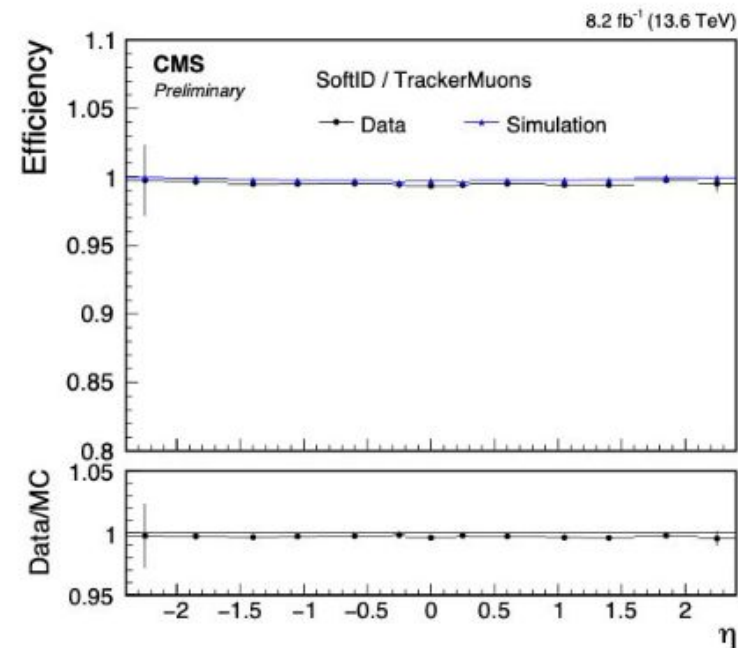


Performance di ricostruzione e identificazione sui dati Run3:

- Offline:
 - Muon identification
 - Jet flavor tagging [PhD thesis ongoing, D. Troiano] Presentation at Boost24 (D. Troiano)
 - Tracking efficiency ICHEP24 (B. D'Anzi)
- Trigger:
 - Tracking at high level trigger
 - B-Physics and B-tagging trigger performance and maintenance



[Run3 Trigger Performance, link to arxiv](#)



Muon reco/ID performance in 2022 data

Responsabilità (L3):

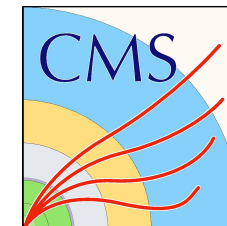
R. Radogna: MUON-POG Responsible for the core muon object identification

Anagrafica

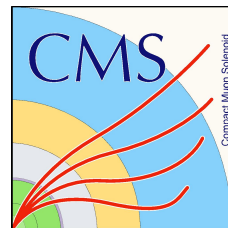
- 3 dottorandi entrati nel 2024
- 3 dottorati nel 2023 passano ad assegnisti
- 1 pensionamento
- Totale: **27.2 FTE**

Attese variazioni del 5-10%
(e.g. partecipazione ad AIDAINNOVA)

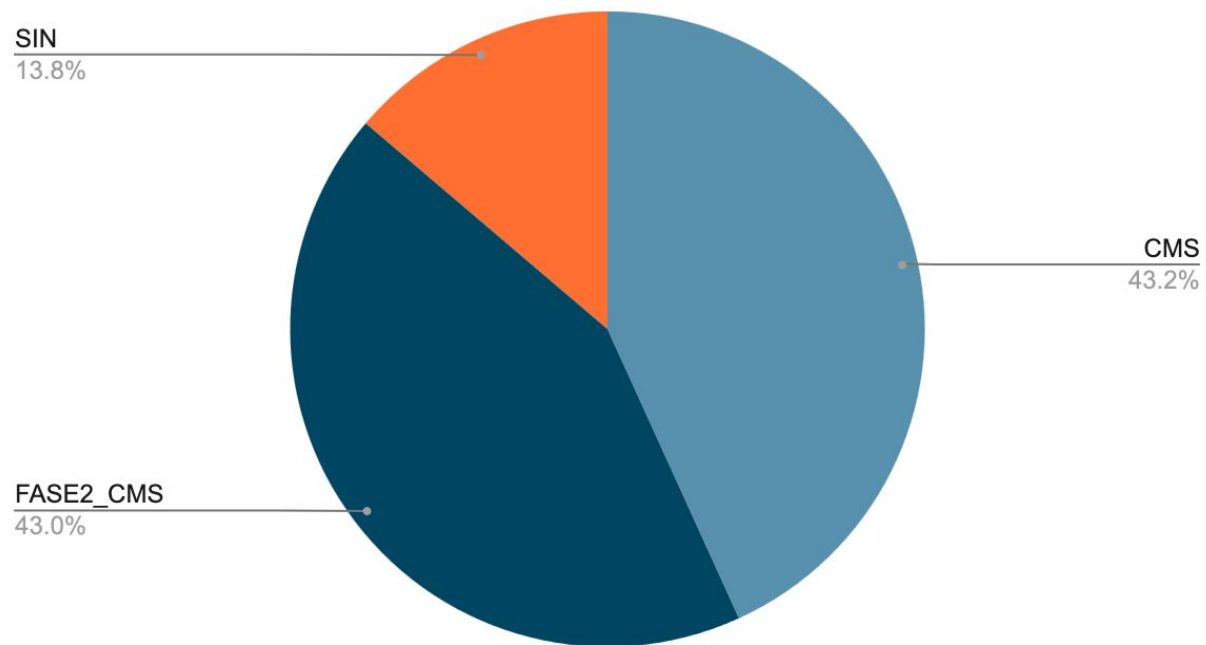
	Nome	Ruolo	% CMS (total)	% CMS	% CMS Fase 2	Sigla Sinergica	
1	Marcello Abbrescia	Ricercatore	80%	45%	35%		
2	Muhammad Ali	Dottorando	70%	10%	60%		
3	Michele Barbieri	Dottorando	70%	70%	0%		
4	Ciro Bermudez Marquez	Dottorando	50%	0%	0%	IGNITE	50%
5	Buonsante Marco	Dottorando	100%	70%	30%		
6	Francesco Cafagna	Ricercatore	50%	50%	0%		
7	Anna Colaleo	Ricercatore	70%	30%	40%		
8	Donato Maria Creanza	Ricercatore	70%	10%	60%		
9	Leonardo Cristella	Tecnologo	100%	0%	0%	PNRR_ICSCS2	100%
10	Nicola De Filippis	Ricercatore	75%	70%	0%	FE_AIDAINNOVA-EI	5%
11	Giuseppe De Robertis	Tecnologo	40%	0%	20%	1_IGNITE	20%
12	Giacinto Donvito	Tecnologo	10%	10%	0%		
13	Brunella D'Anzi	Dottorando	70%	70%	0%		
14	Walaa Elmetenawee	Assegnista	30%	30%	0%		
15	Nicola Ferrara	Dottorando	70%	30%	40%		
16	Luigi Fiore	Ricercatore	0%	0%	0%		
17	Giuseppe Iaselli	Ricercatore	70%	30%	40%		
18	Francesco Licciulli	Tecnologo	20%	0%	0%	1_IGNITE	20%
19	Flavio Loddo	Tecnologo	50%	0%	30%	1_IGNITE	20%
20	Luigi Longo	Ricercatore	70%	20%	50%		
21	Magdy Louka	Dottorando	70%	70%	0%		
22	Marcello Maggi	Ricercatore	70%	0%	70%		
23	Ilirjan Margjeka	Assegnista	70%	0%	70%		
24	Cristoforo Marzocca	Tecnologo	50%	0%	50%		
25	Vincenzo Mastrapasqua	Assegnista	100%	90%	10%		
26	Gianvito Matarrese	Tecnologo	80%	0%	80%		
27	Salvatore My	Ricercatore	70%	10%	60%		
28	Antonella Pellecchia	Assegnista	70%	20%	50%		
29	Alexis Pompili	Ricercatore	100%	70%	10%	PNRR_ICSCS2	20%
30	Francesco Procacci	Dottorando	10%	10%	0%		
31	Gabriella Pugliese	Ricercatore	70%	30%	35%	FE_AIDAINNOVA-EI	5%
32	Emilio Radicioni	Ricercatore	25%	25%	0%		
33	Raffaella Radogna	Ricercatore	70%	30%	40%		
34	Dayron Ramos	Assegnista	70%	30%	40%		
35	Federica Maria Simone	Ricercatore	100%	20%	0%	PNRR_ICSCS2	80%
36	Lucia Silvestris	Ricercatore	100%	35%	40%	PNRR_ICSCS2	25%
37	Umit Sozbilir	Dottorando	100%	80%	20%		
38	Anna Stamerra	Dottorando	70%	10%	60%		
39	Donato Troiano	Dottorando	100%	20%	0%	PNRR_ICSCS2	80%
40	Rosamaria Venditti	Ricercatore	70%	30%	40%		
41	Piet Verwilligen	Ricercatore	70%	20%	50%		
42	Angela Zaza	Dottorando	70%	30%	40%		



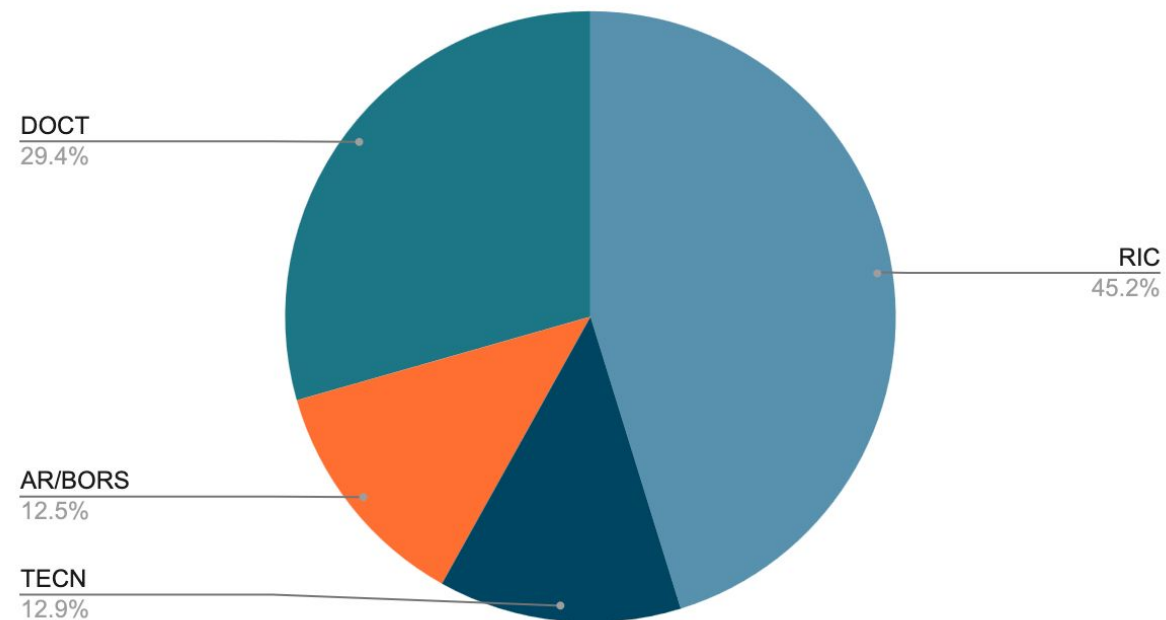
Summary anagrafica



Impegno nei sotto-progetti



Posizione



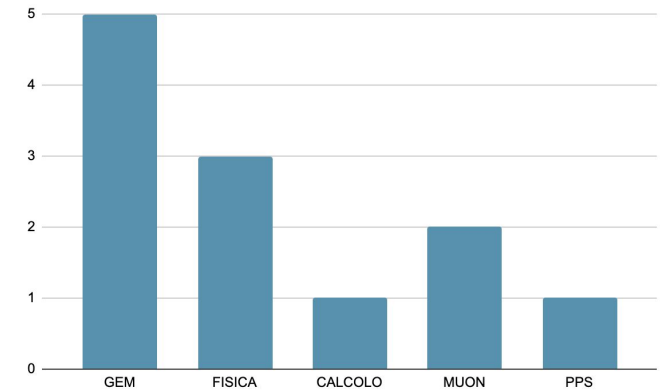
Overview responsabilità 2025

Ongoing →in DB

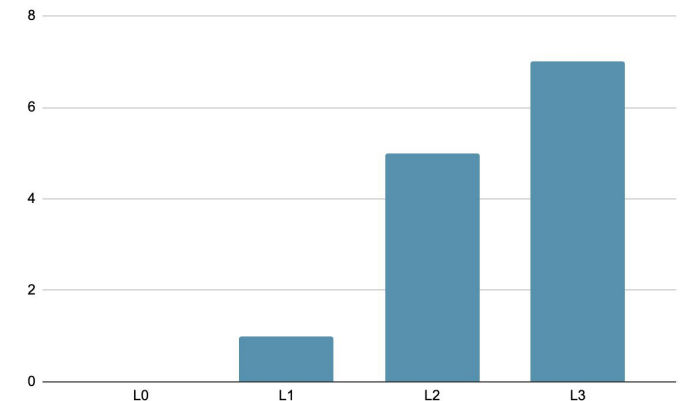
Nome/Cognome	Progetto	Descrizione	Livello	Data Inizio	Data Fine
Francesco Cafagna	PPS	PPS - Coordinatore dell'Online	2	01/03/2018	30/09/2025
Donvito Giacinto	CALCOLO	T2 site manager	3	01/01/2016	31/12/2025
Licciulli Francesco	GEM	GEM Electronics Coordinator	2	01/09/2023	31/08/2025
Alexis Pompili	FISICA	BPH-TOP PubComm member	3	01/10/2021	31/12/2025
Gabriella Pugliese	MUON	Muon Project Manager	1	01/09/2023	31/08/2025
Luigi Longo	GEM	GEM Bari Site Manager	3	01/07/2023	31/12/2025
Piet Verwilligen	MUON	Background studies coordinator	3	01/01/2022	31/12/2025
Luigi Longo	GEM	Deputy Hardware Coordinator	2	01/09/2023	31/08/2025
Antonello Pellecchia	GEM	Deputy Run Coordinator	2	01/09/2023	31/08/2025
Piet Verwilligen	GEM	Upgrade Coordinator	2	01/09/2023	31/08/2025
Raffaella Radogna	MUON	Selection and Identification coordinator	3	01/09/2023	31/08/2025
Federica Simone	FISICA	BPH Rare decays coordinator	3	01/09/2023	31/08/2025
Anna Colaleo	Muon	Muon IB Chair	1	01/09/20	31/08/24
Lucia Silvestris	CMS	Deputy Spokesperson	0	01/09/20	31/08/24
Flavio Loddo	TRK	Ph2 IT ASIC project coordinator	3	1/05/18	Fine 2024
Vincenzo Mastrapasqua	FIS	Trigger convener in TRK POG	3	01/03/2023	07/06/2024

Finisce nel 24→not in DB

Responsabilità per progetto



Livello Responsabilità



Richieste Servizi di Sezione

	Richieste Officina Meccanica	mp totali	mp @ CERN
RPC	riparazione leak	0.5	0.5
RPC	test RPC a GIF++ con Ecogas+ test & longevity legacy system GIF++	1	1
RPC	Realization of CAD Design works for RPC Lab (Cosmic Stand, ...)	1	0
GEM	testbeam ME0 at GIF++ (costruzione e supporto setup)	0.5	0.5
GEM	GE1/1 Extraction and Installation	0.5	0.5
GEM	Realizzazione tool assemblaggio ME0	1	0
GEM	Construction ME0 Transport trolley and stack storage	0.5	0.5
TRK	Realizzazione Tools di assemblaggio Moduli OT CMS	1	0
	Totale RPC	2.5	1.5
	Totale GEM	2.5	1.5
	Totale TRK	1	0
	Totale CMS (di cui al CERN)	6	3

	Richieste Progettazione Meccanica	m.p
RPC	Design Cosmic Setup RPC + Mechanical Structure for Testbeam	1
GEM	Design and modification construction Tools ME0	1
GEM	Small Design Projects GEM Lab (shelves in Darkbox)	1
TRK	Finalizzazione jig di produzione Moduli OT CMS	0.5
	Totale CMS	3.5

Richiesta inoltrata, in attesa di feedback

Richiesta inoltrata, in attesa di feedback

Richieste Servizi di Sezione

	Richieste Servizio Elettronico	mp totali	mp @ CERN
RPC	Assistenza su elettronica di lettura RPC	1	0
GEM	Stack construction and electronics testing ME0	1	1
GEM	Assistance in ME0 Assembly (SMD Soldering)	1	0
TRK	Assistenza su elettronica di lettura moduli	1	0
Totale CMS		4	1

Richiesta inoltrata e ricevuta
 → Previsto un taglio di un fattore 2 per pensionamento M. Papagni

	Richieste personale Camera Pulita	m.p
TRK	Camera Pulita - Costruzione moduli	10
GEM	Camera Pulita - Costruzione moduli ME0	1
Totale CMS		11

Richiesta inoltrata e ricevuta
 → in attesa di feedback per rinormalizzazione finale

Richieste Finanziarie a CSN1

Capitolo	Progetto	Tipo	Descrizione	Richiesta (kE)
CONS	TRACKER	META	Contributo per manutenzione camere pulite	4.0
INV	RPC	META	PicoTDC [DRD1 WP1 (T5-RPC Operations and Longevity with ecogas); WP7 Gaseous Timing Detectors (Optimize the amplification technology and Enhance rate capability)]	TBD
INV	RPC	META	Mass flow meter calibrated for HFO [DRD1 WP1 (T5-RPC Operations and Longevity with ecogas)]	5.0
CONS	RPC	META	Gas [DRD1 WP1 (T5-RPC Operations and Longevity with ecogas)]	2.0
SPSERVIZI	GEM	MOF-B	GEM MOFB	124.5
APP	GEM	CORE	Power System	188.0

Richiesta a CSN1

- 41 ke consumi da metabolismo
- 110 ke missioni metaboliche
- 32 ke missioni per responsabilità L1,L2

Altre richieste (da valutare con RA)

- 3ke per DAQ Board per Quality Control ME0
- 2ke per HV Board per per Quality Control ME0



Grazie per l'attenzione