UNIVERSITÀ DEGLI STUDI DI TORINO

INFN Istituto Nazionale di Fisica Nucleare
SEZIONE DI TORINO

CGEM Software Status

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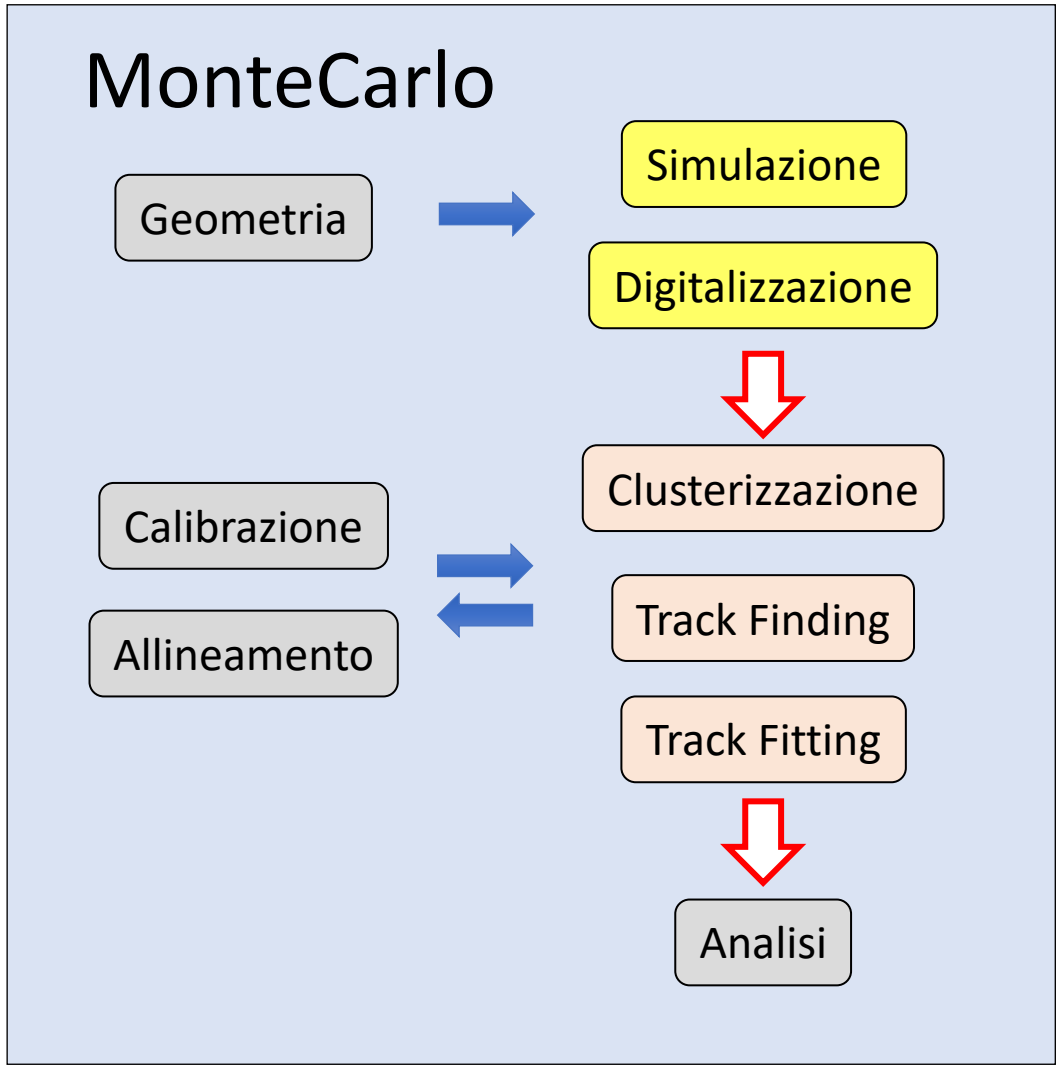
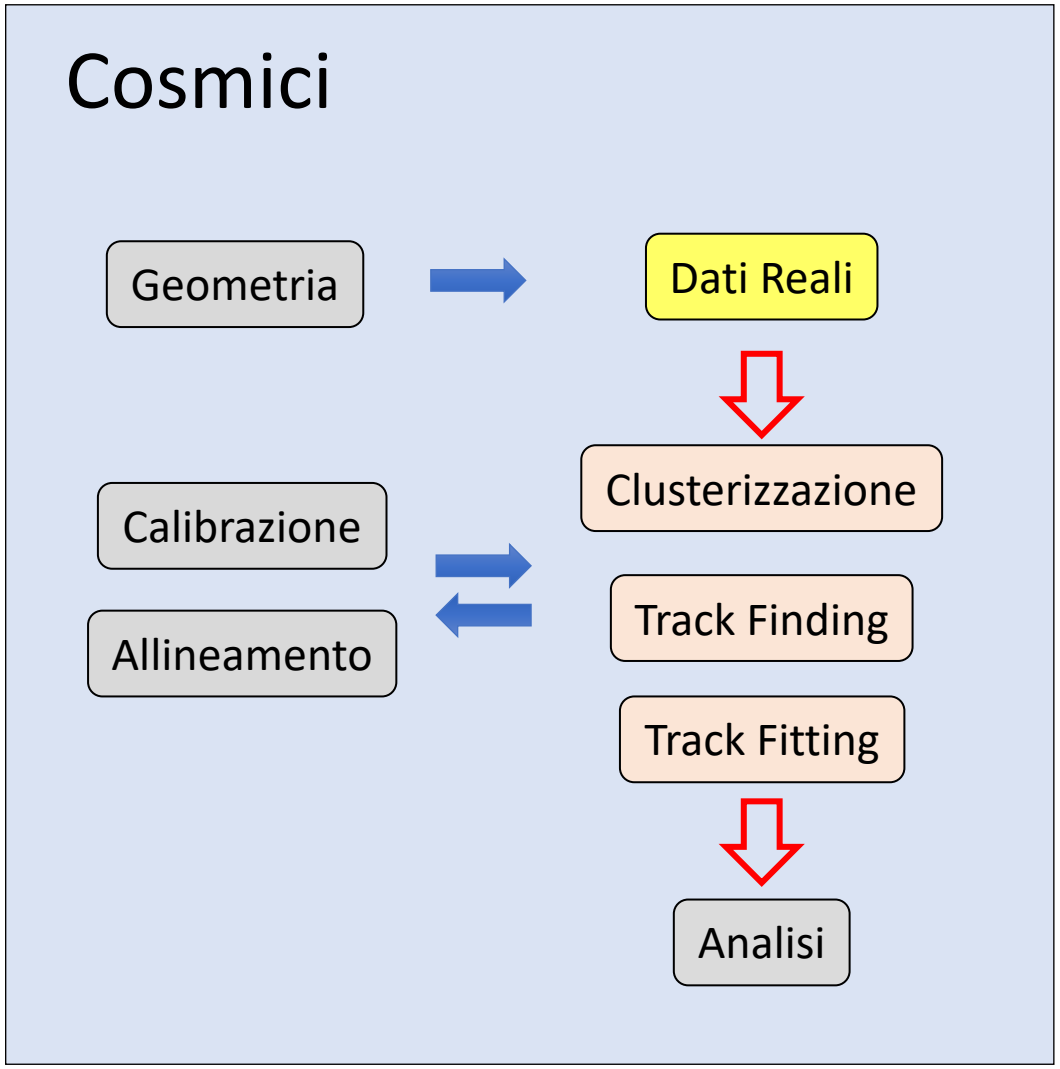
BESIII Italia - Ferrara, Italia - 11 Novembre 2021

Cgem BESIII Offline Software System

Ultima release: CgemBoss665g

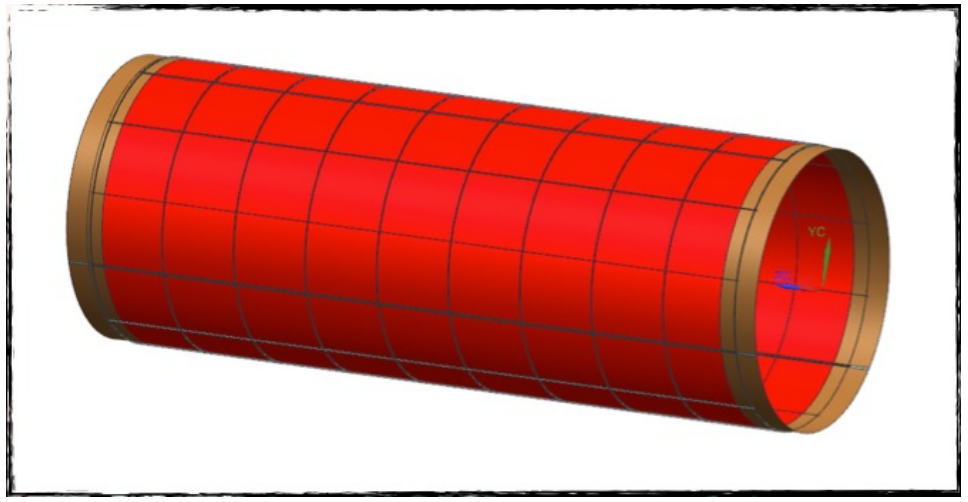




Geometria

La geometria completa è implementata da diverso tempo,
con passivi, strutture di supporto, cavi….

Layer 3 ha bisogno di un aggiornamento!

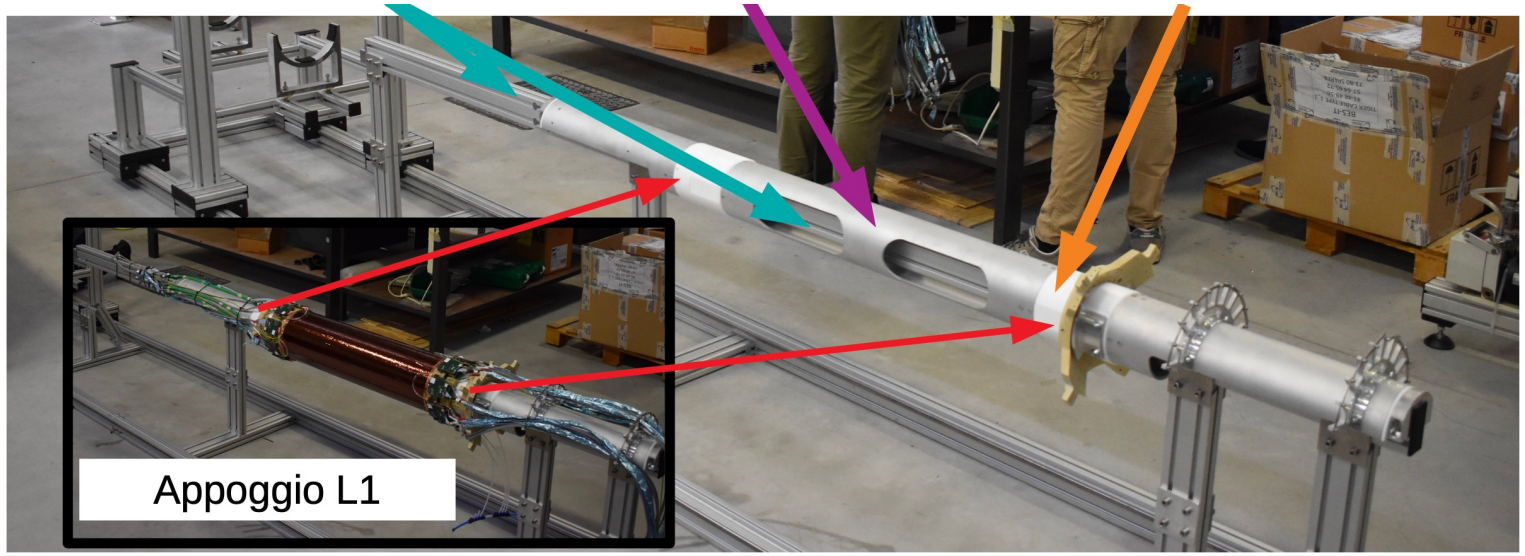


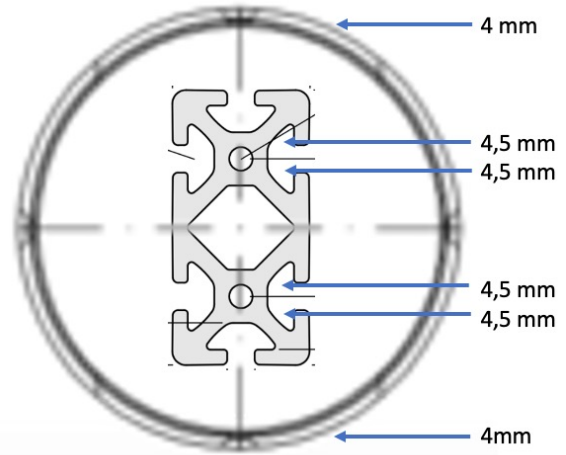
- Update degli spessori e materiali
- Implementare griglie nella geometria
- Effetto su radiation length, performance…
- Task al momento abbastanza urgente
- Task ancora non assegnato, buono per un laureando IMO

Geometria – parte II

E’ stato richiesto dai cinesi di implementare il ”palo” in CgemBoss

Utile per verificare in maniera complete effetti su risoluzione secondari, etc…





- Task non urgente ma utile
- Nessuno assegnato a questo task, buono per un laureando IMO

Digitalizzazione

Dopo in pratica due anni di pausa, ripresa dei lavori sul fronte cinese

Radiation Detection Technology and Methods (2020) 4:174–181
https://doi.org/10.1007/s41605-020-00166-0

ORIGINAL PAPER

Check for updates

Digitization modeling of a CGEM detector based on Garfield++ simulation

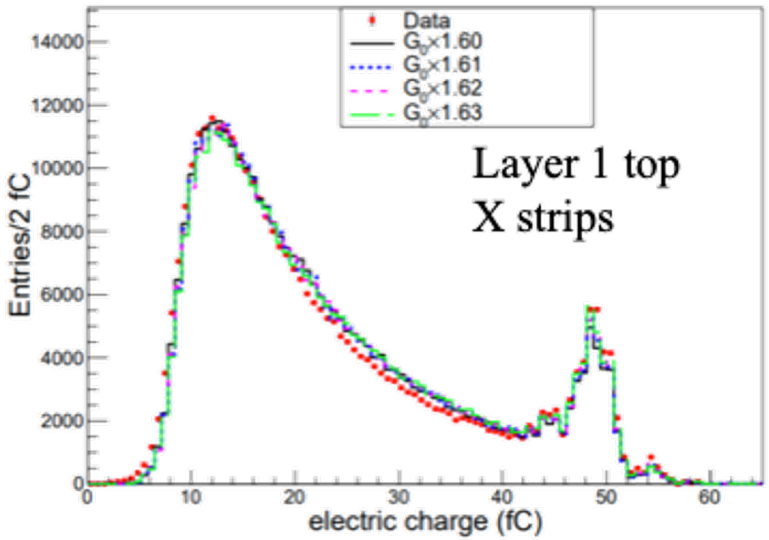
Jing-Yi Zhao[1,3] · Nan-Nan Miao[1,2] · Ling-Hui Wu[1,2] · Liang-Liang Wang[1,2] · Tong Sun[1,2] · Zhen Huang[1,2] · Ryan Mitchell[3] · Wei-Guo Li[1,2] · Huai-Min Liu[1,2] · Xin-Chou Lou[1,2,4] · Sheng-Sen Sun[1,2] · Ye Yuan[1,2] · Yao Zhang[1,2]

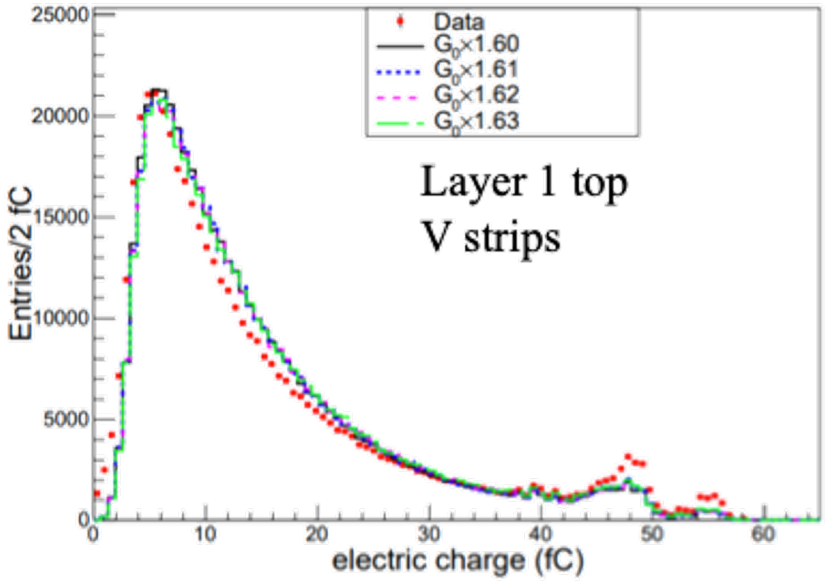
Received: 16 December 2019 / Revised: 5 February 2020 / Accepted: 19 February 2020 / Published online: 10 March 2020

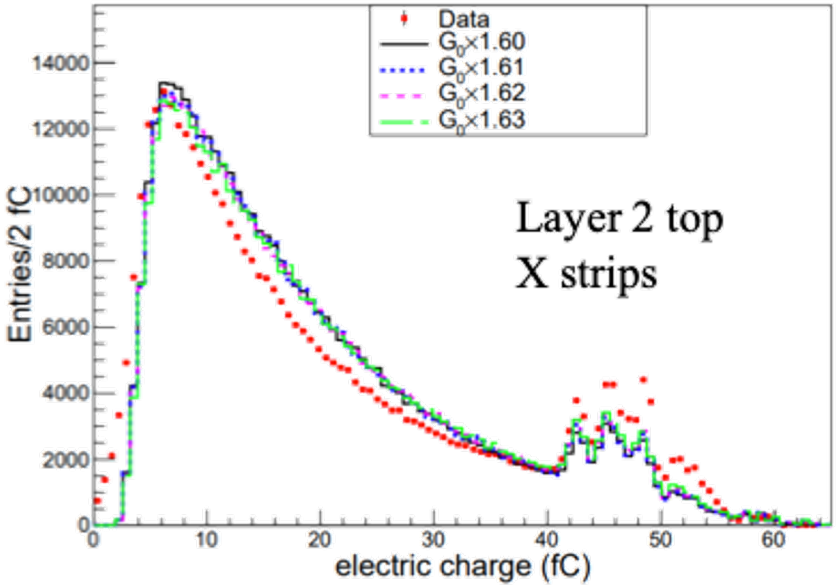
I colleghi cinesi nel frattempo hanno pubblicato la prima parte del lavoro

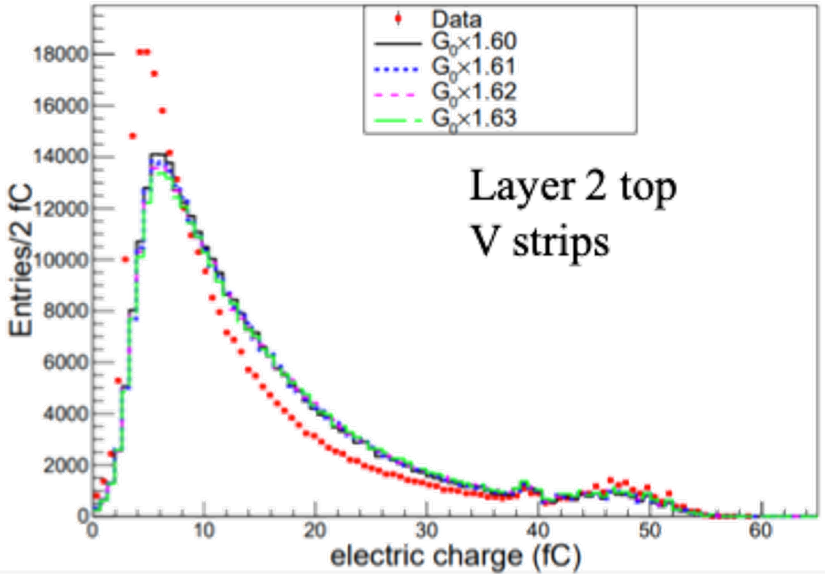
- Implementata la risposta dell'elettronica TIGER (rami T ed E , soglie, saturazione)
- Ottimizzazione con dati da cosmici
- Studi di correzioni temporali
- Micro-settori (iniziato)

Charge of strips simulated with different G_0 (top parts)









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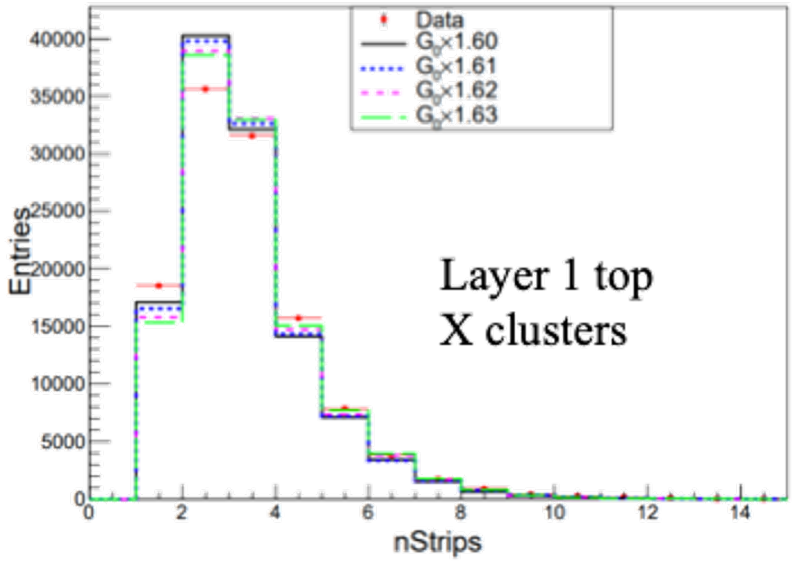
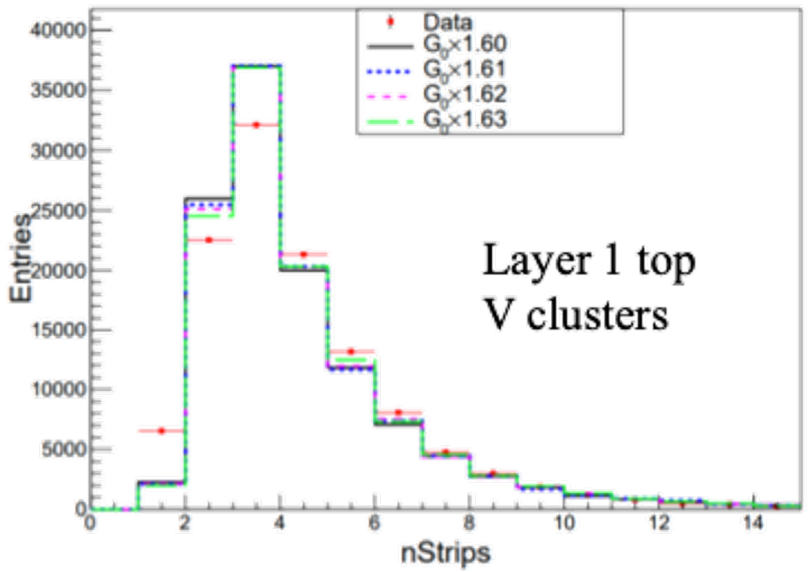
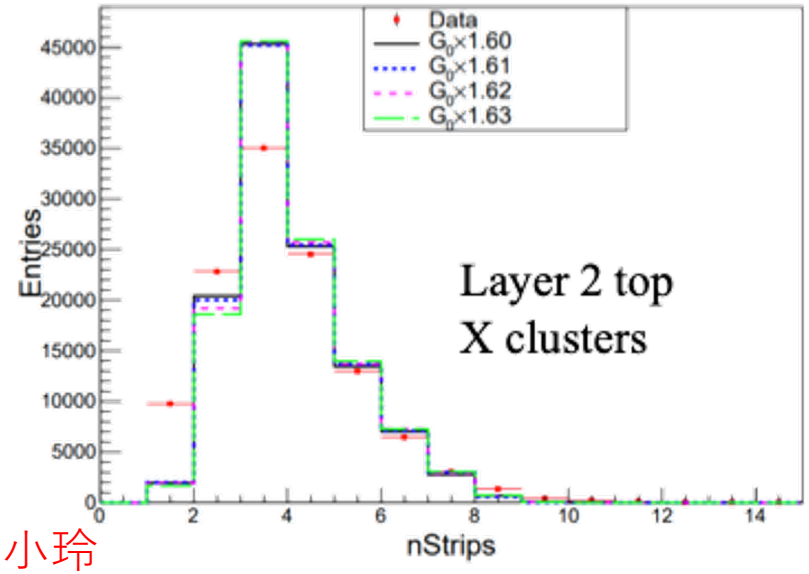
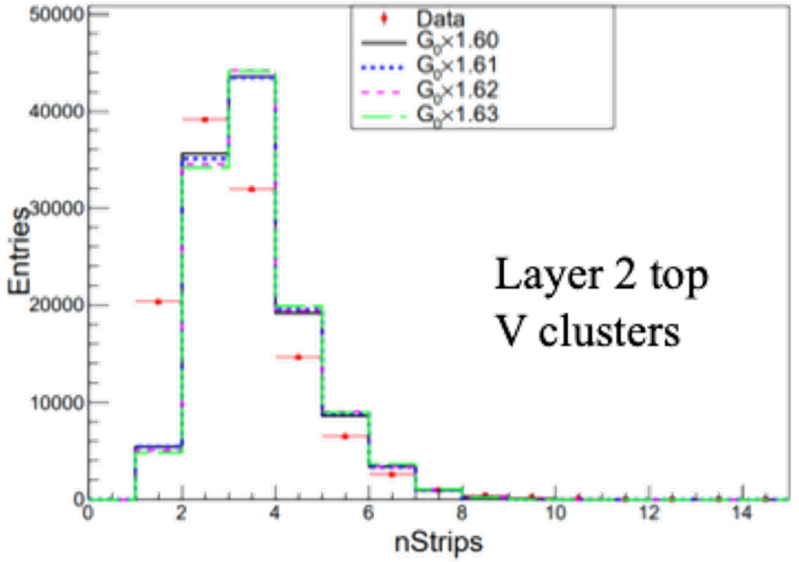
Cluster size (top parts)









- Buon accordo per L1
- Probabilmente L2 ha bisogno di parametri diversi

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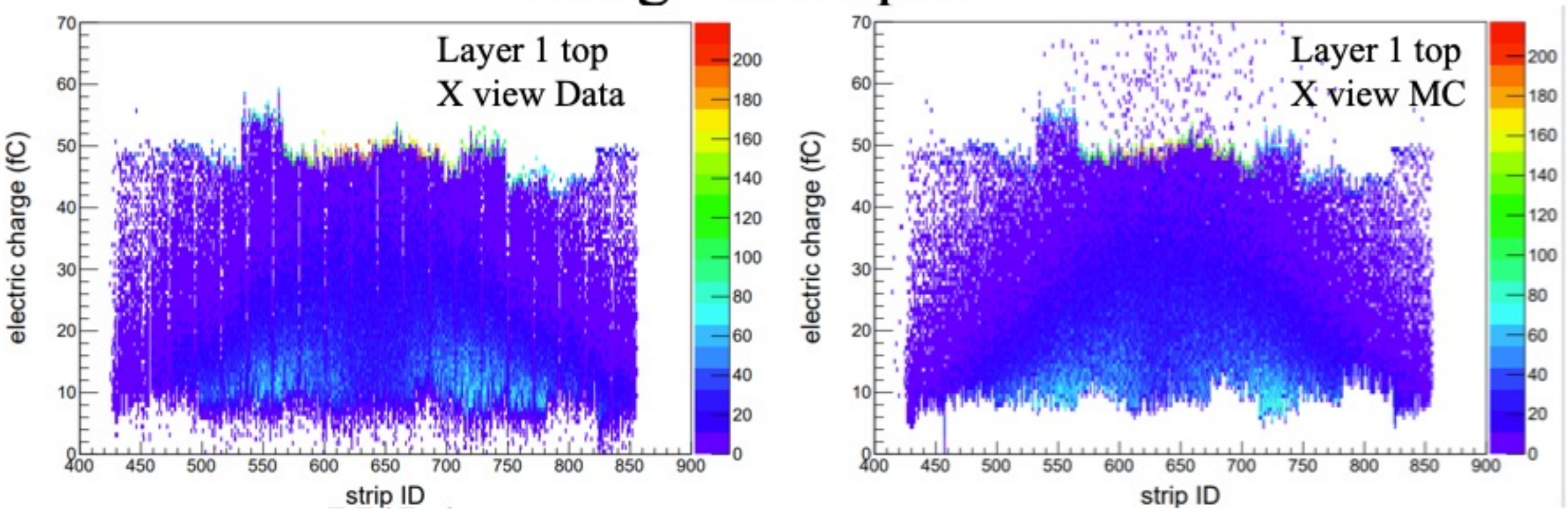
Charge vs stripID



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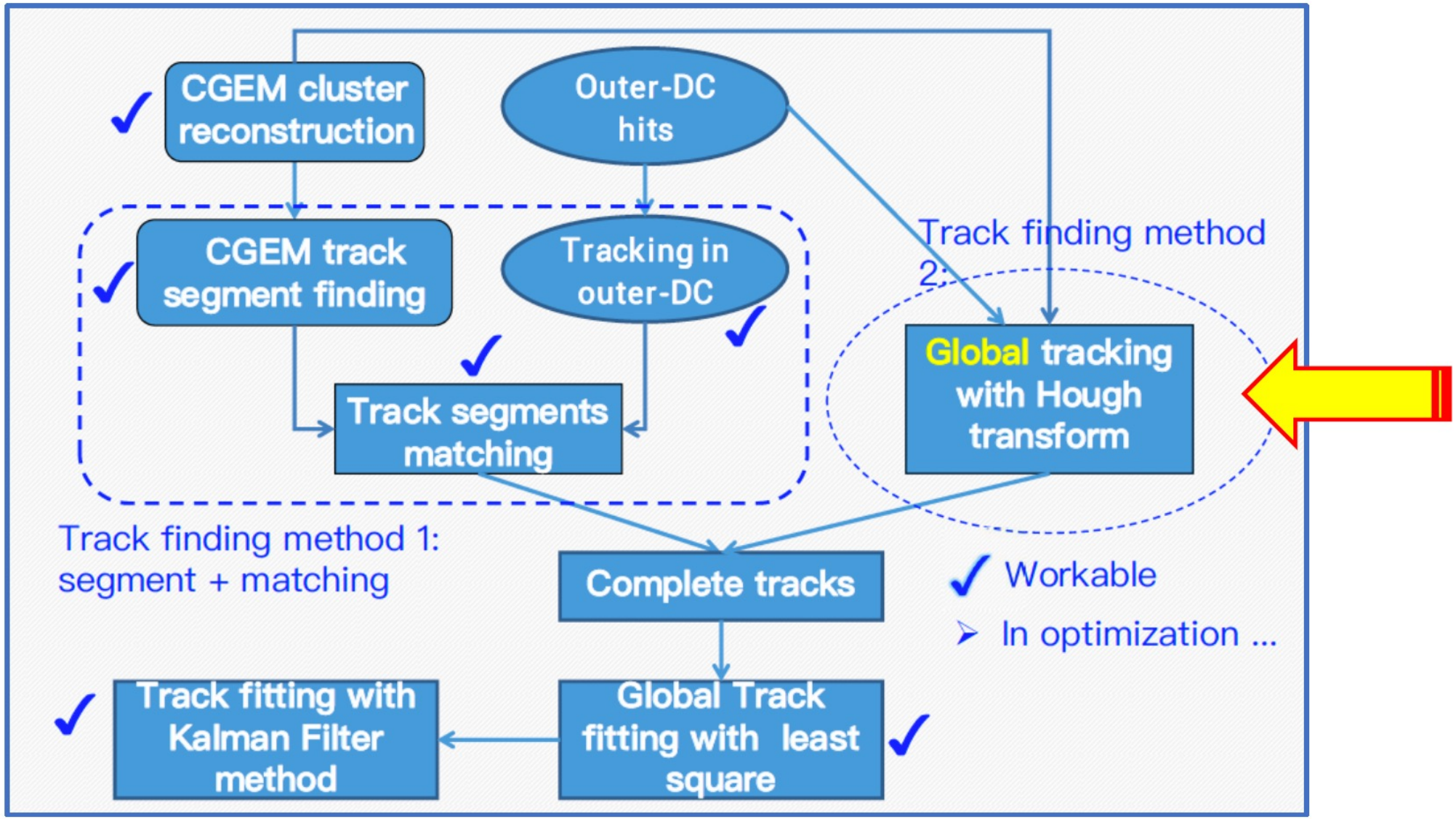
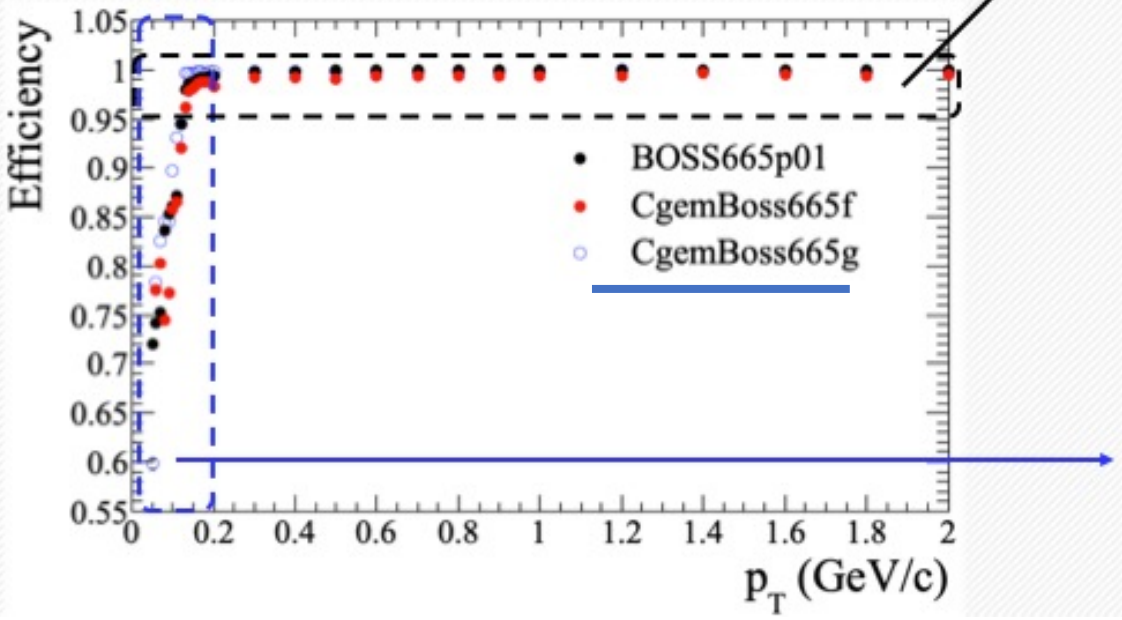
Tracciamento

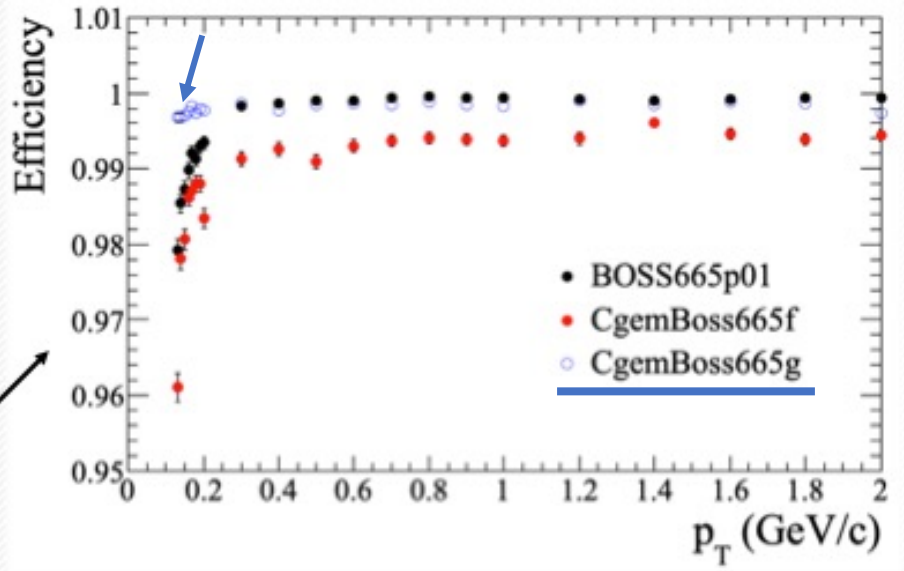


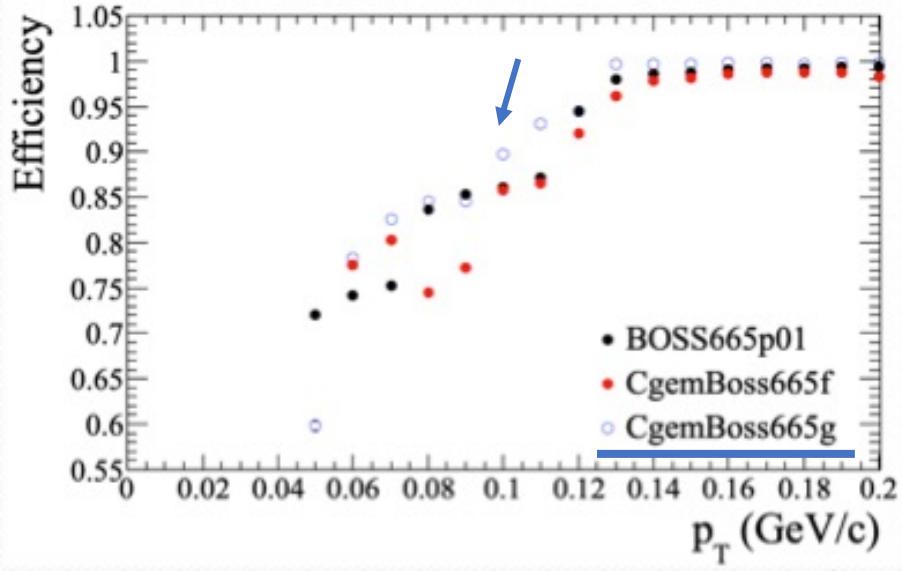
Muoni: Efficienza

Tracking efficiency for single μ^-

- Good track: $|dr|<1.0cm$, $|dz|<10cm$, $|\cos\theta|<0.93$, correct charge
- Tracking efficiency for single track events: $\varepsilon = N_{good}/N_{gen}$ where N_{good} is the number of events with one or more good tracks reconstructed, N_{gen} is the number of events generated/simulated

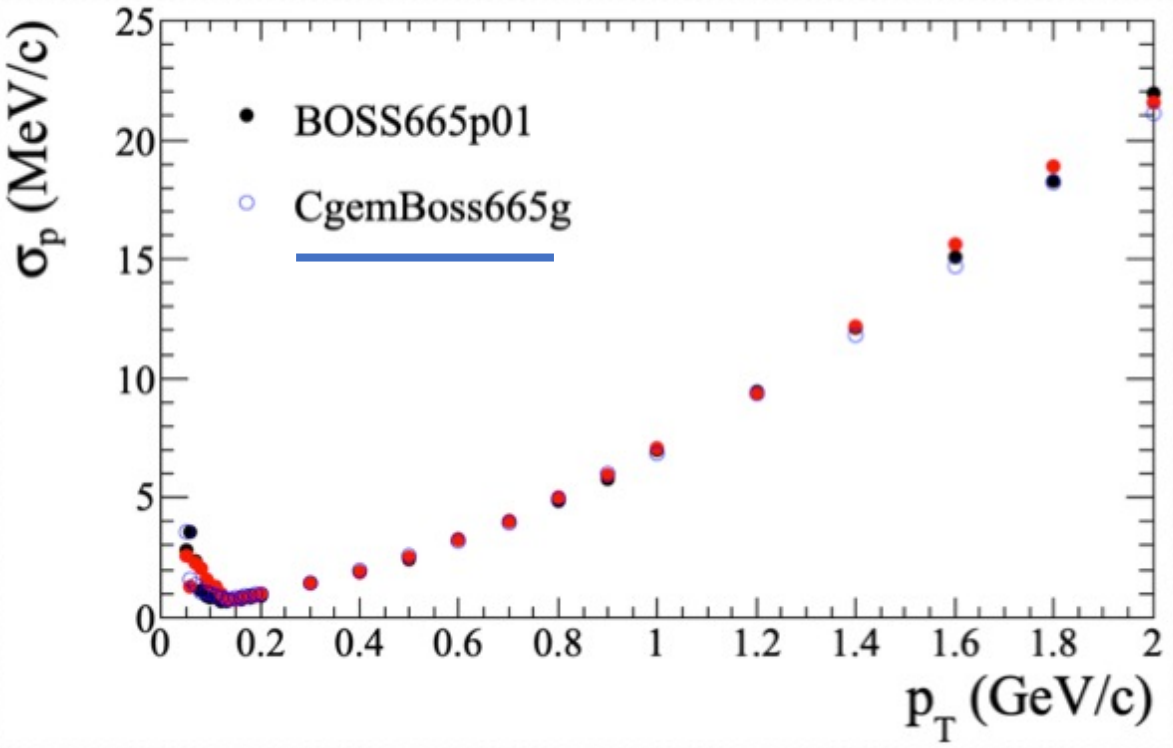


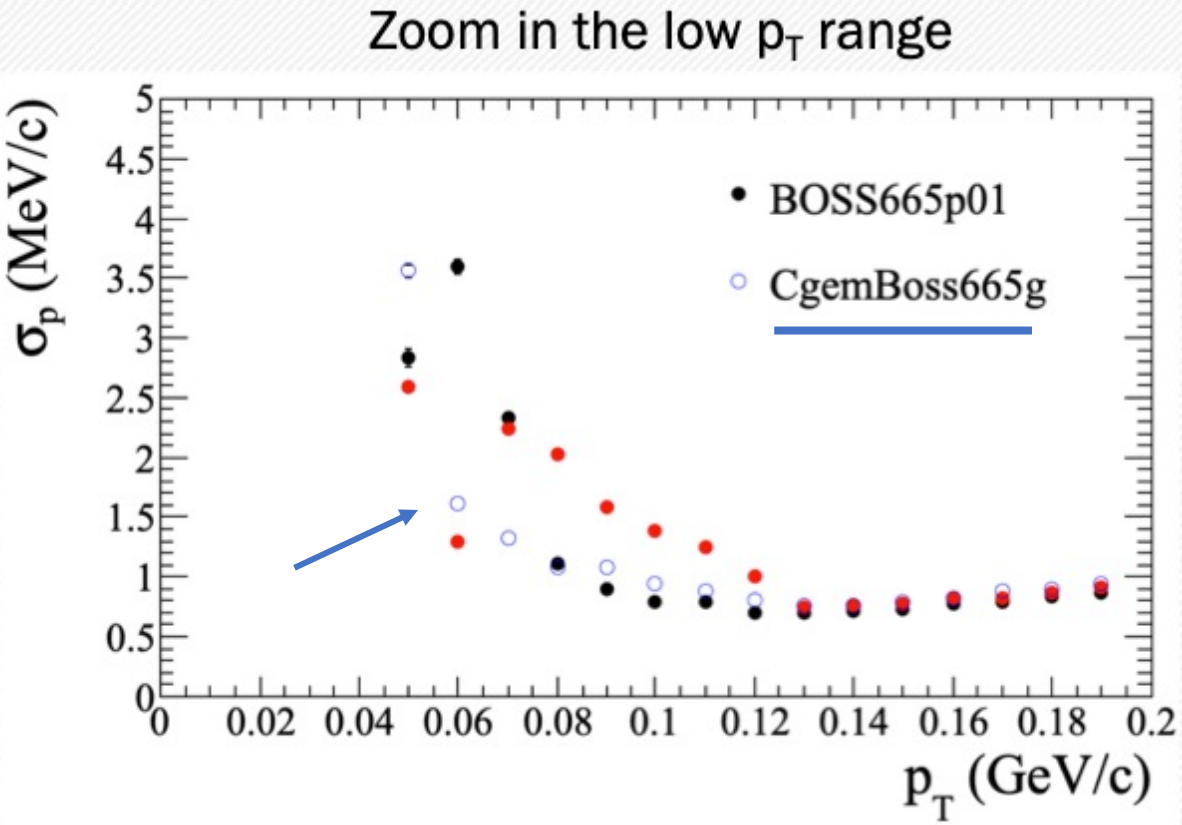




Liangliang

Muoni: Risoluzione in momento



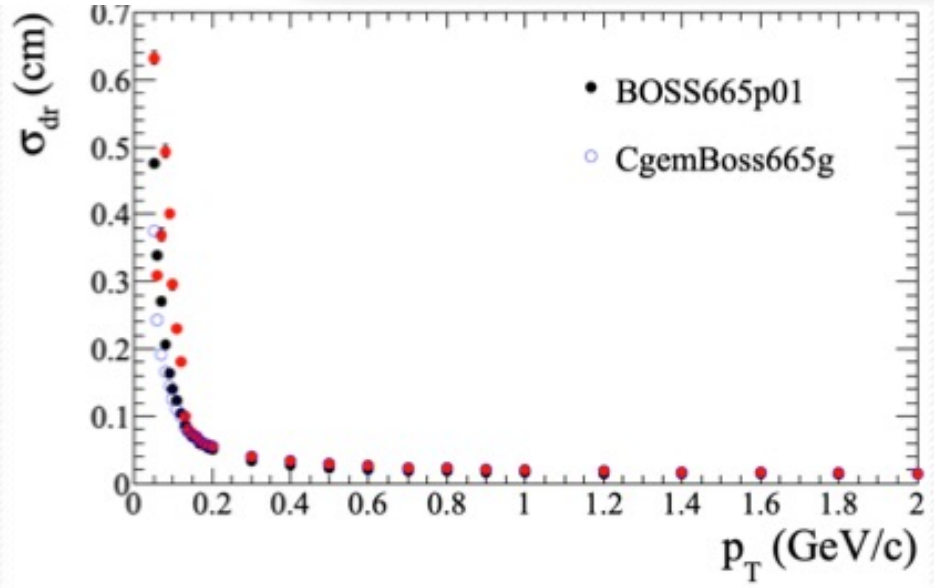


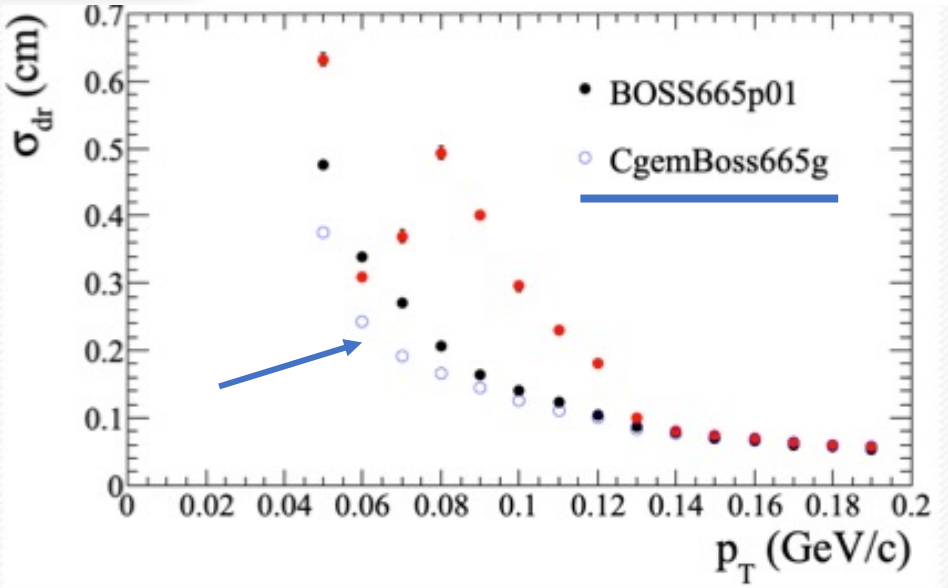
Liangliang

Risultati CGEM+ODC paragonabili a MDC

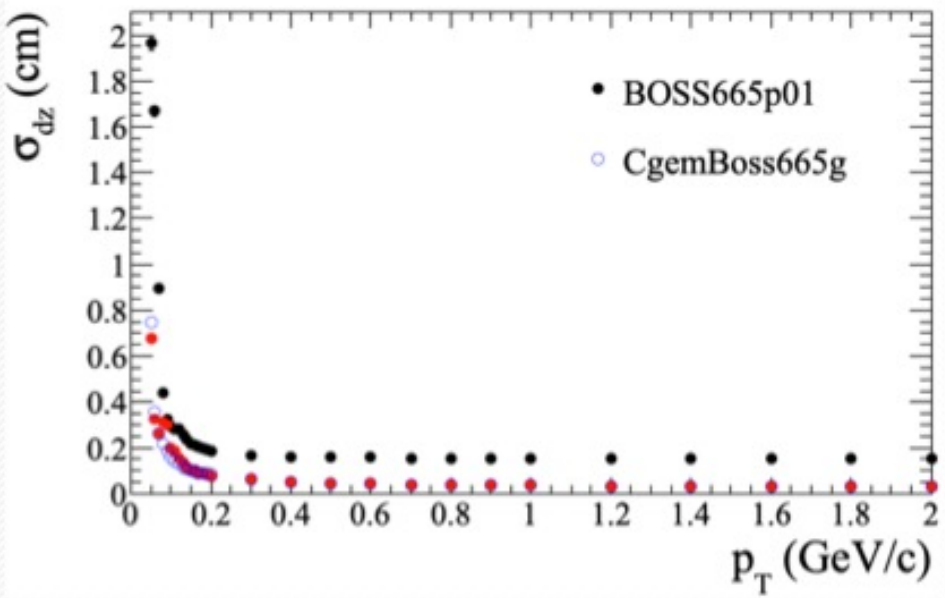
Muoni: Risoluzione in vertice

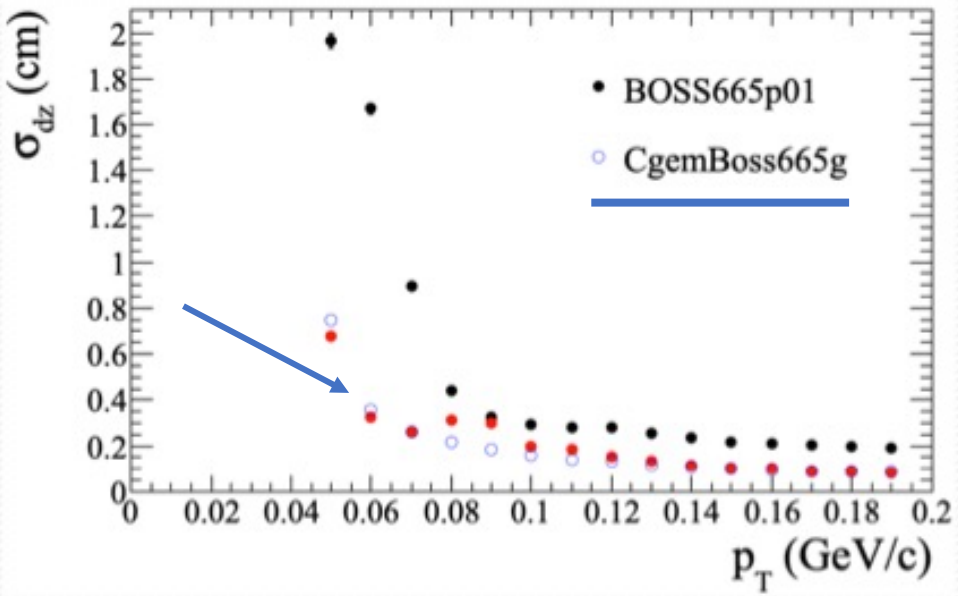
R





Z

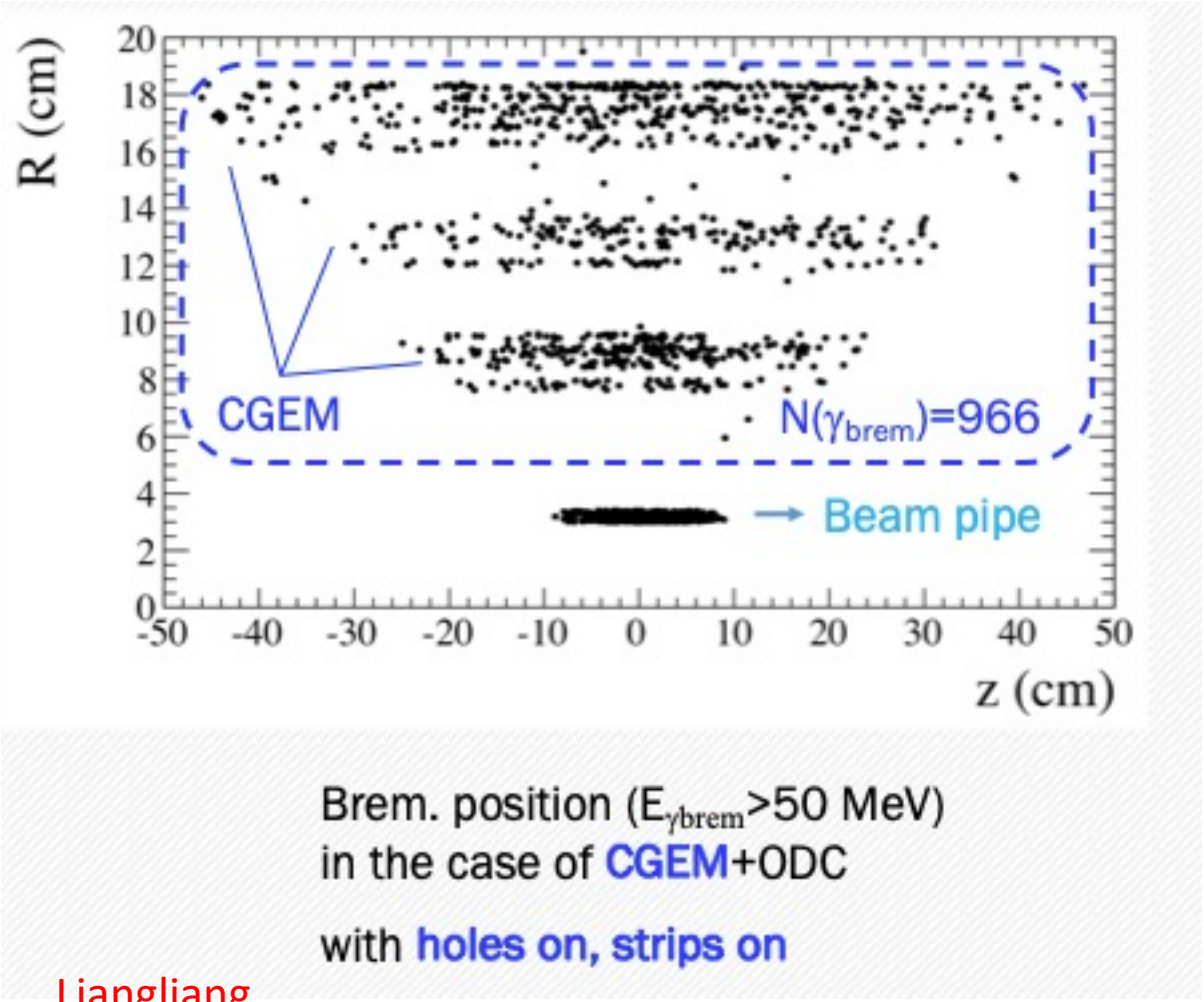




Liangliang

Effetti del materiale

10k elettroni p_t=1GeV/c

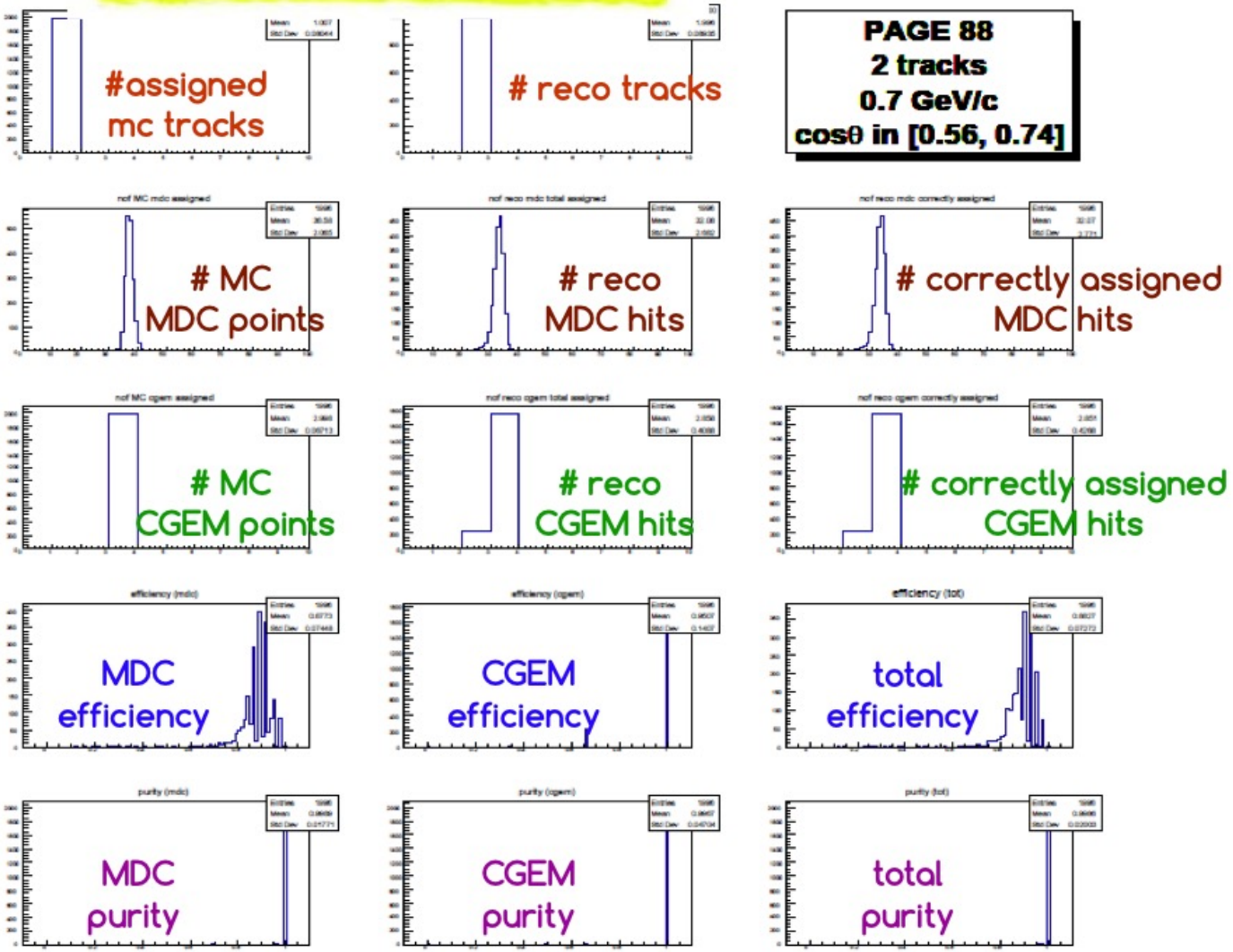


Liangliang

- Più bremsstrahlung?
- Possibili effetti sul tracciamento degli elettroni?
- Da studiare!

QA Automatica per il Tracciamento

Very preliminary results

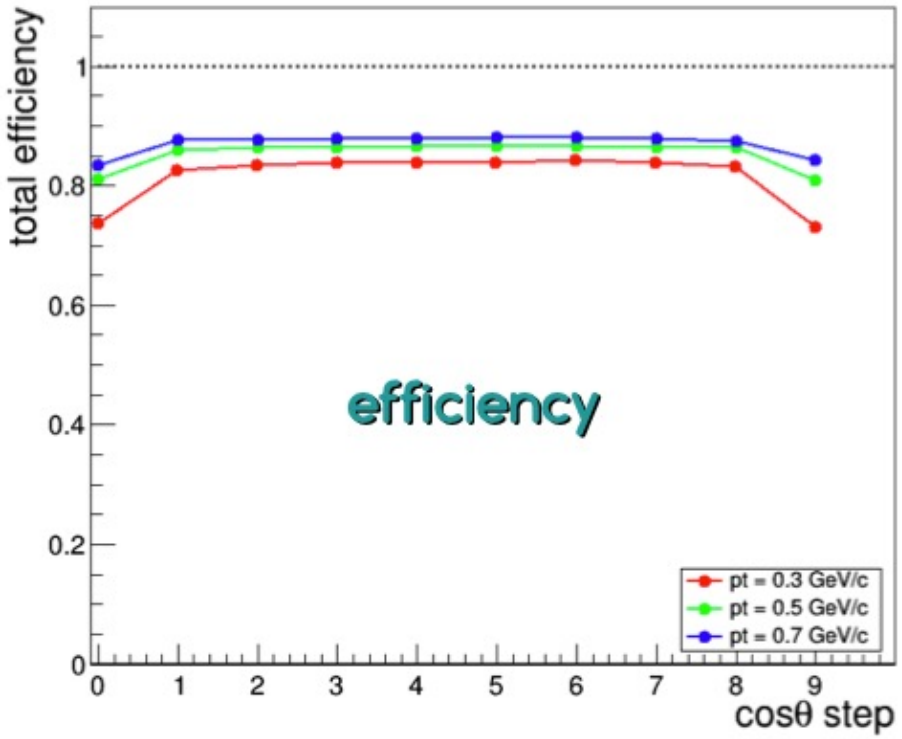


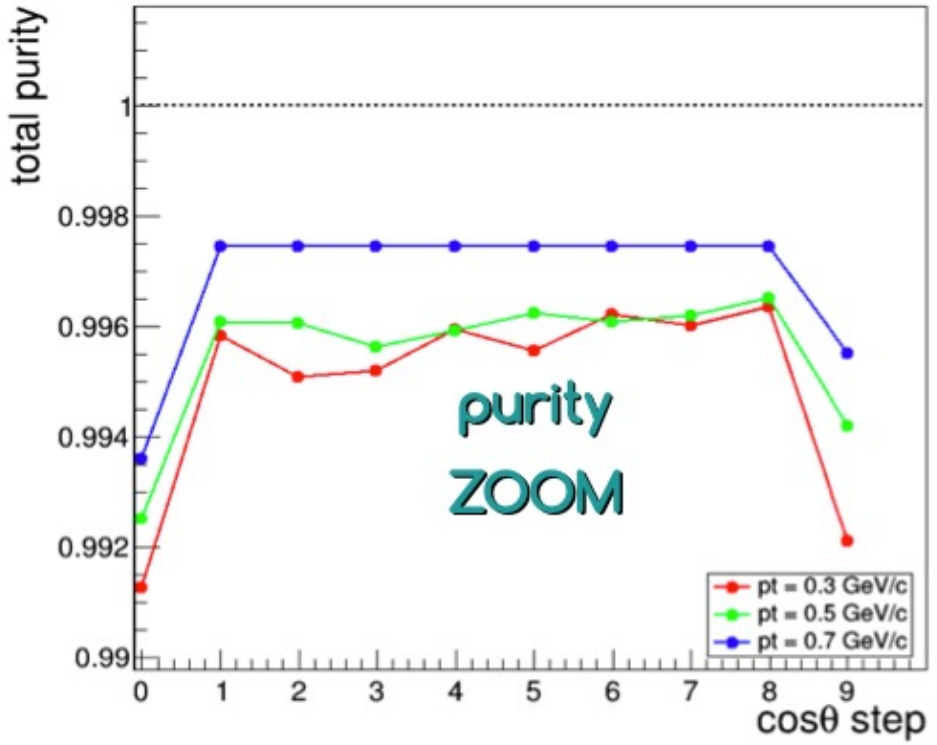
Lia

Set di plot per verificare le performance in maniera standard

Very preliminary results

- multiplicity = 4 tracks/event
- transverse momentum = 0.3, 0.5, 0.7 GeV/c
- cos(theta) in [-0.93, 0.93] in steps of 0.186

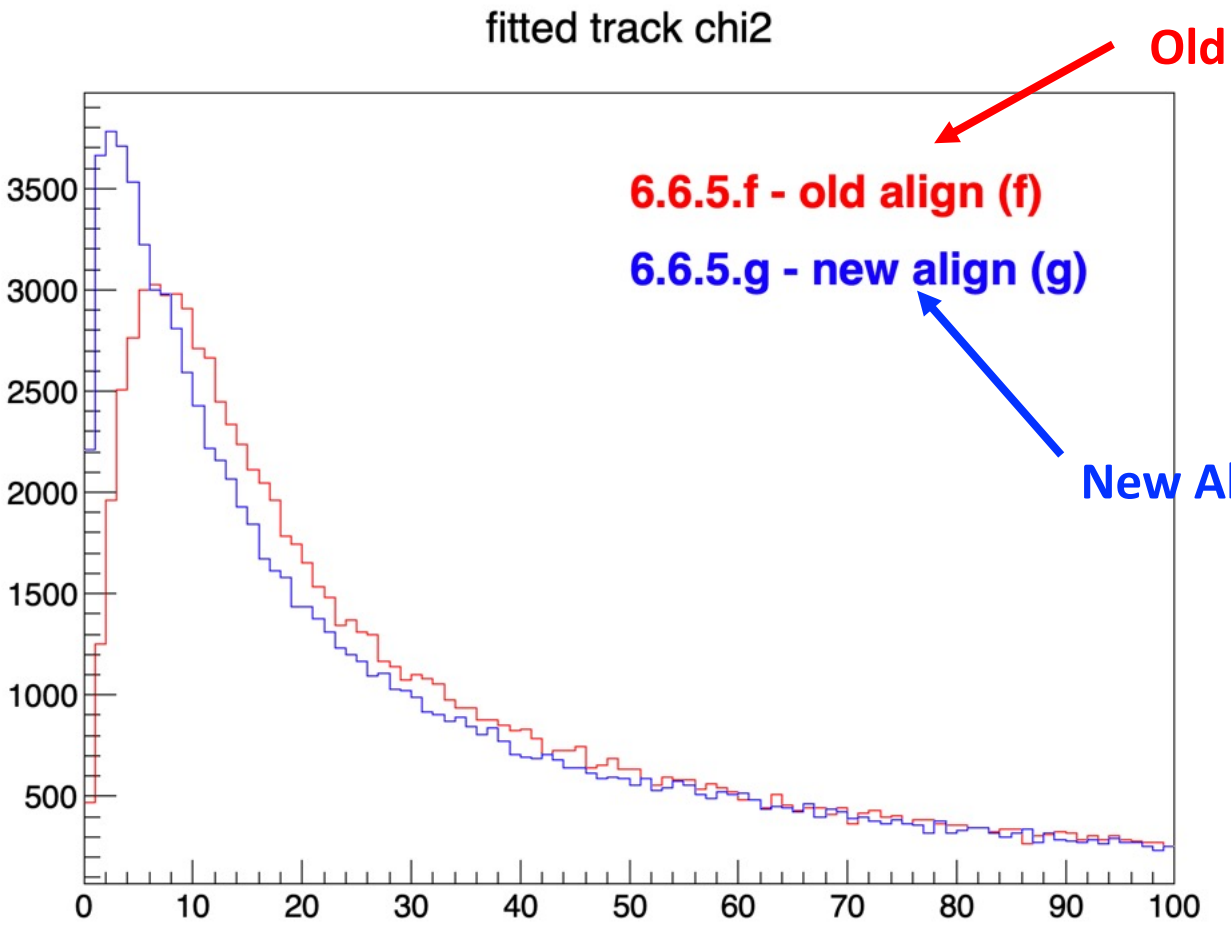




Lia

Analisi di cosmici

Il nuovo allineamento utilizzabile per l'analisi col codice più recente

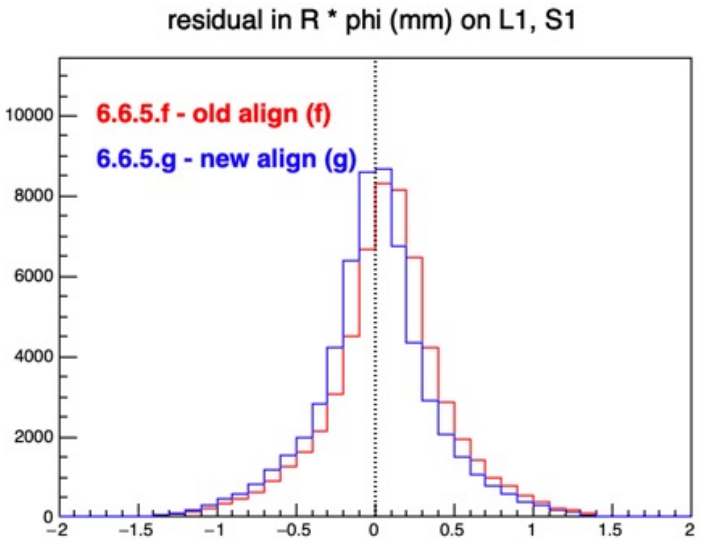


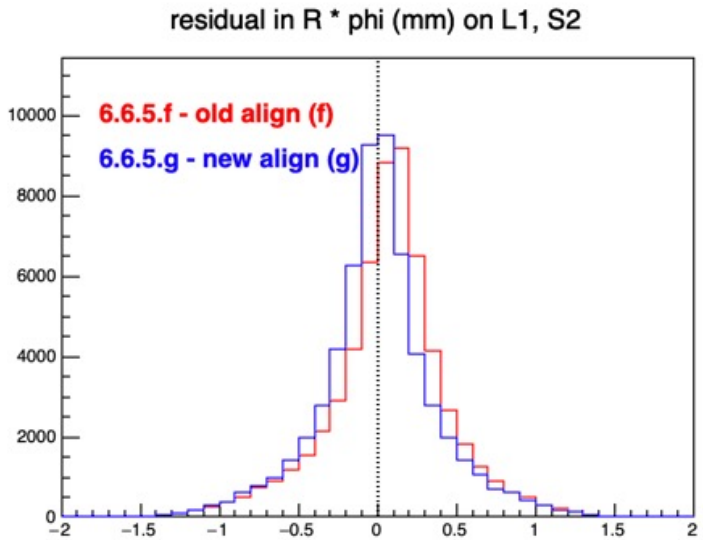
Old Alignment using CgemBoss6.6.5.f

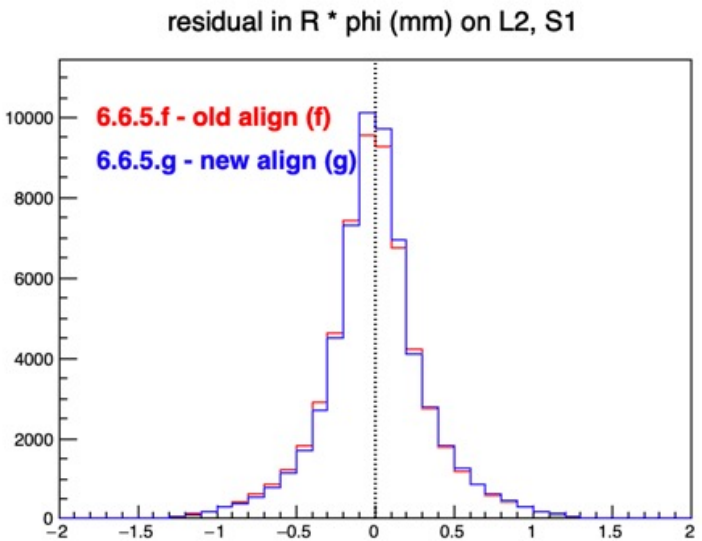
Great improvement

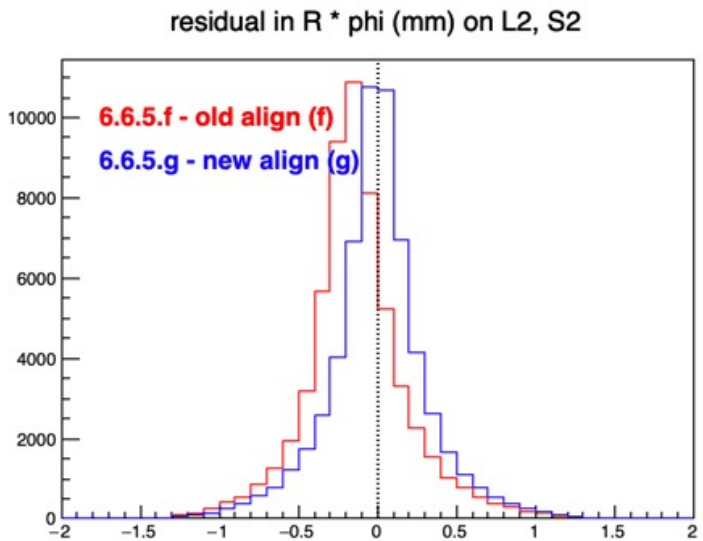
New Alignment using CgemBoss6.6.5.g

Residuals in rφ

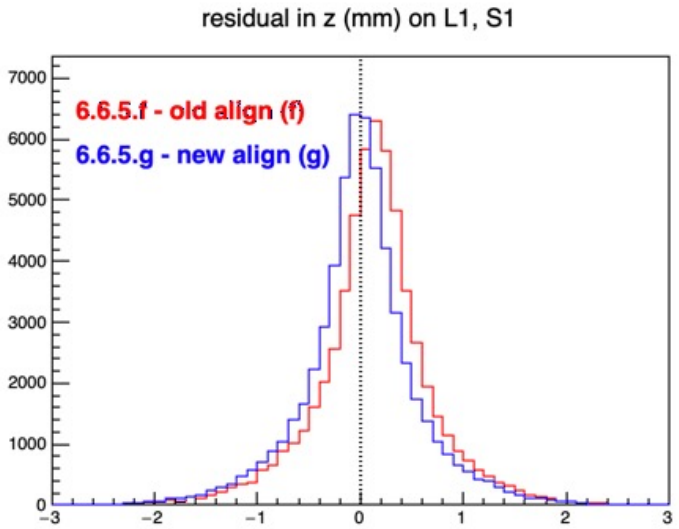


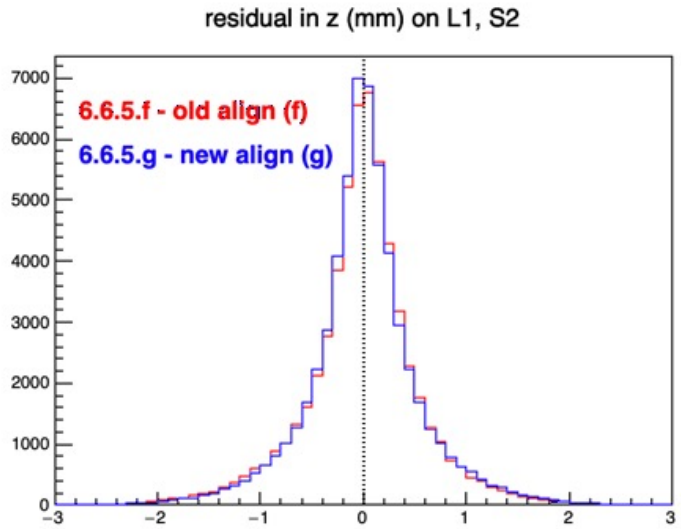


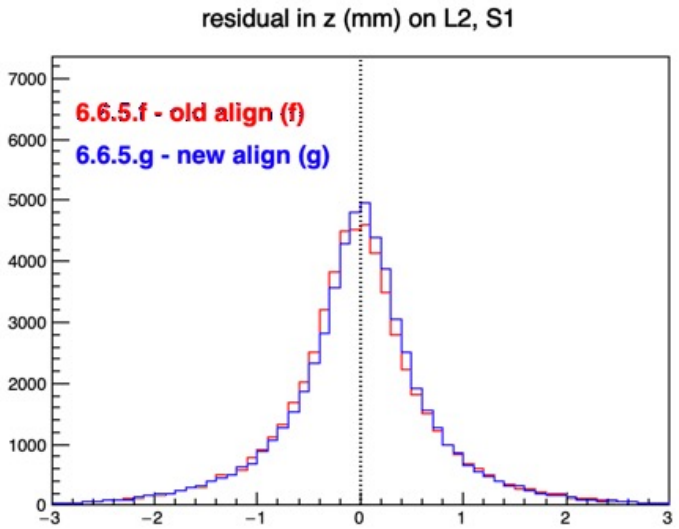


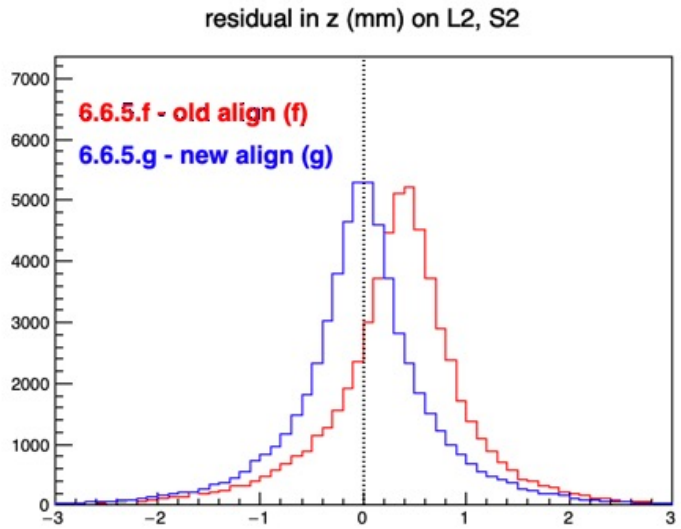


Residuals in Z





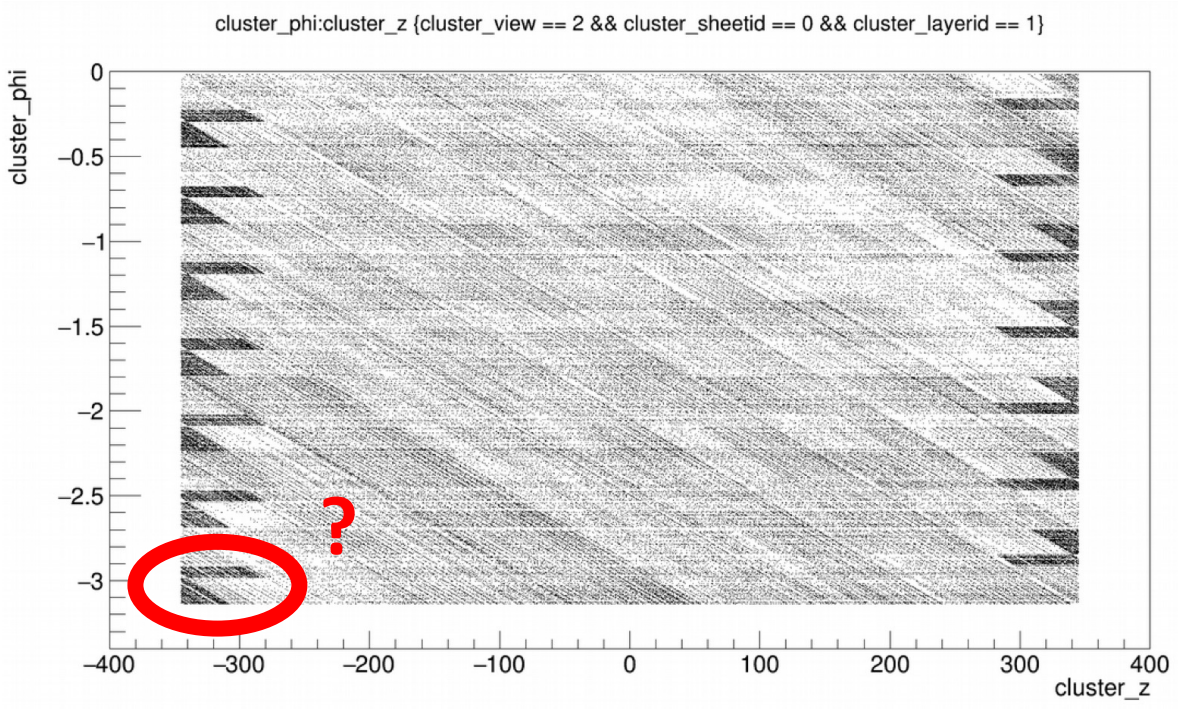


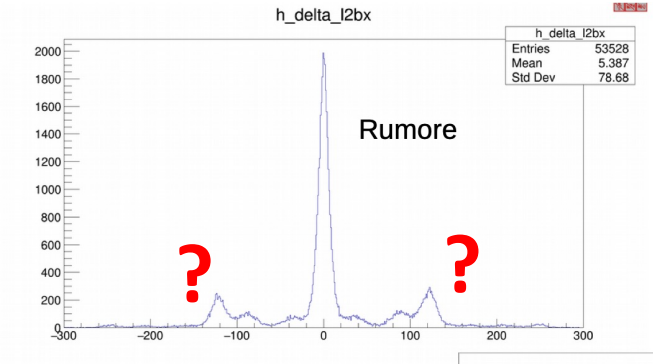


Lunga lista di questioni aperte sui cosmici

- Identificazione e rimozione del rumore (strip/cluster)
- Studi di divisione di carica tra viste diverse X/V
- Analisi della composizione dei cluster (carica, tempo)
- …

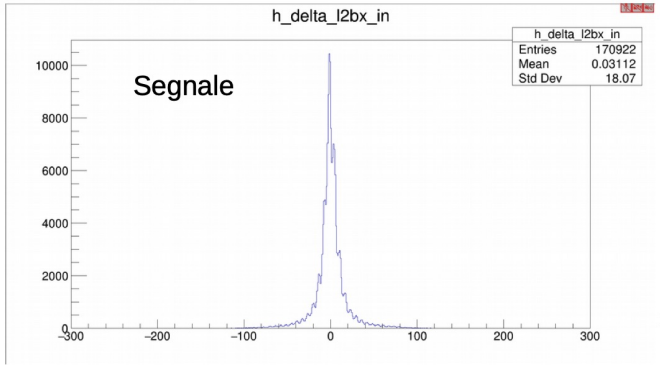
Calibrazione temporale (vedi talk di Riccardo)





Distribuzione compatibile a quella nel run 22, più marcato il picco oltre 125 ns

Segnale tutto tra -100 e 100 (dominato da come definisco strip di segnale)



Riorganizzazione Gruppo Software

Geometria:

- Richiesto nuovo manpower per i nuovi studi, supervisione di IG e LL

Digitalizzazione

- Task dei colleghi cinesi, ultimare tuning, microsettori, etc

Tracciamento:

- Finalizzare la QA (Lia)
- Studi con più particelle/benchmark (chiedere a Mainz qualche studente)

Cosmici:

- Ripresa dell'analisi (Lia)
- Calibrazione temporale (Riccardo, Will)

That's all folks!