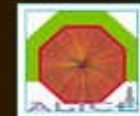
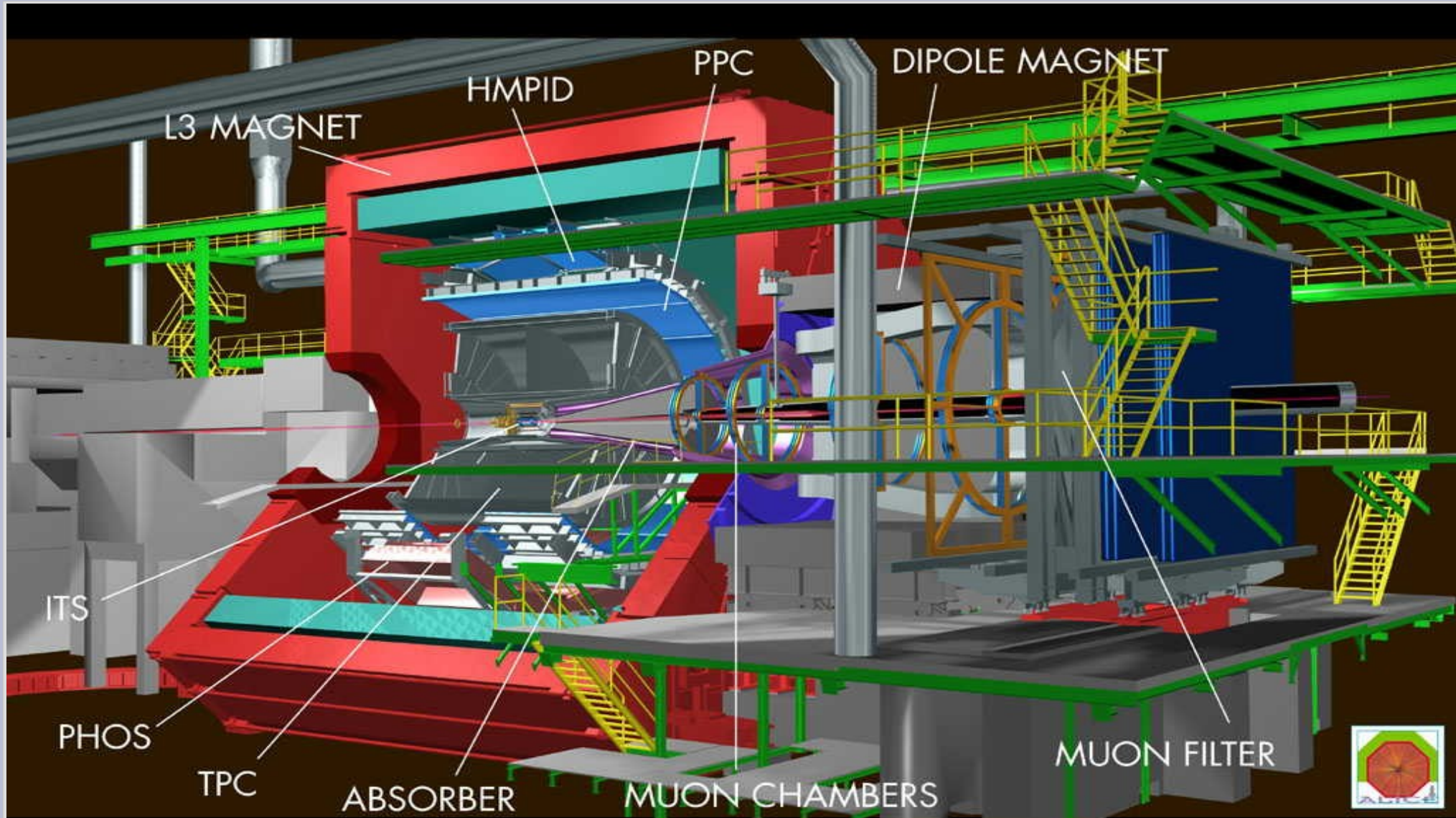




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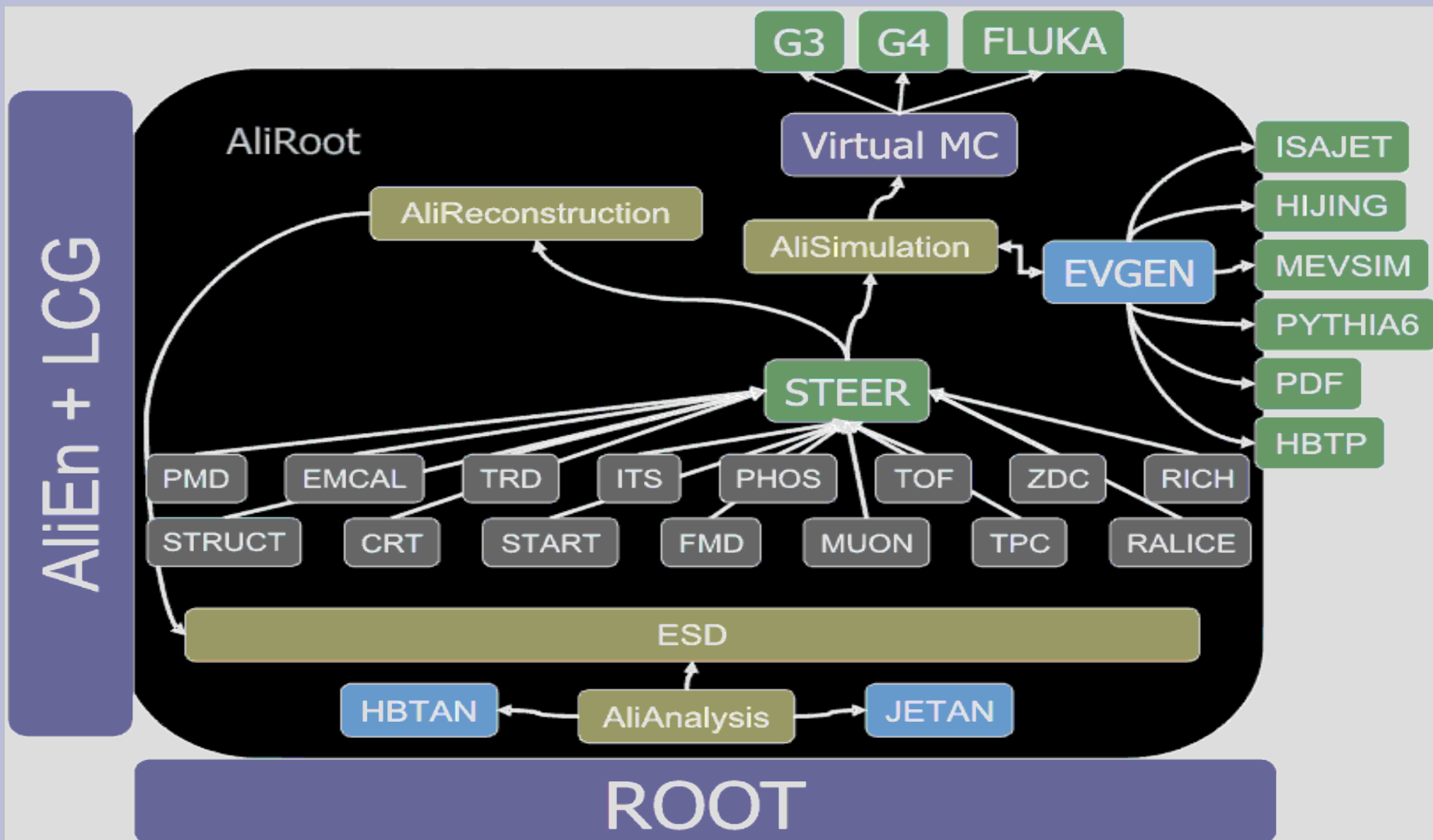
In cadrul experimentului ALICE ISS e implicat in urmatoarele activitati:

- ALICE Offline : proiectarea si dezvoltarea infrastructurii de calcul, simulare si analiza de date (ROOT & AliROOT)
(Andrei si Mihaela Gheata)
- ALICE Physics Working Group 4 (PWG4) : Grupul de studii de fizica a jeturilor si a fenomenelor la P_T mare
(Andrea Danu, Daniel Felea, Ciprian Mitu, Adrian Sevcenco)
- ALICE GRID : participarea la efortul computational comun al experimentului ; contributia cu putere de calcul si capacitate de stocare catre ALICE
(Sorin Zgura, Ionel Stan, Adrian Sevcenco, Mihai Niculescu)



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ALICE offline





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ALICE offline

- Contributii continue incepand cu 2000 (A.&M. Gheata)
- Principalele directii: dezvoltarea de software de interes general ALICE, intretinerea acestuia si suportul continuu pentru utilizatori
- Principalele contributii pana in prezent
 - Software folosit in descrierea si modelarea geometrica a ALICE precum si a parametrilor de aliniere (erori de pozitionare)
 - Software folosit in simulare, reconstructie si event display
 - Dezvoltarea si suportul framework-ului de analiza de date folosit in ALICE



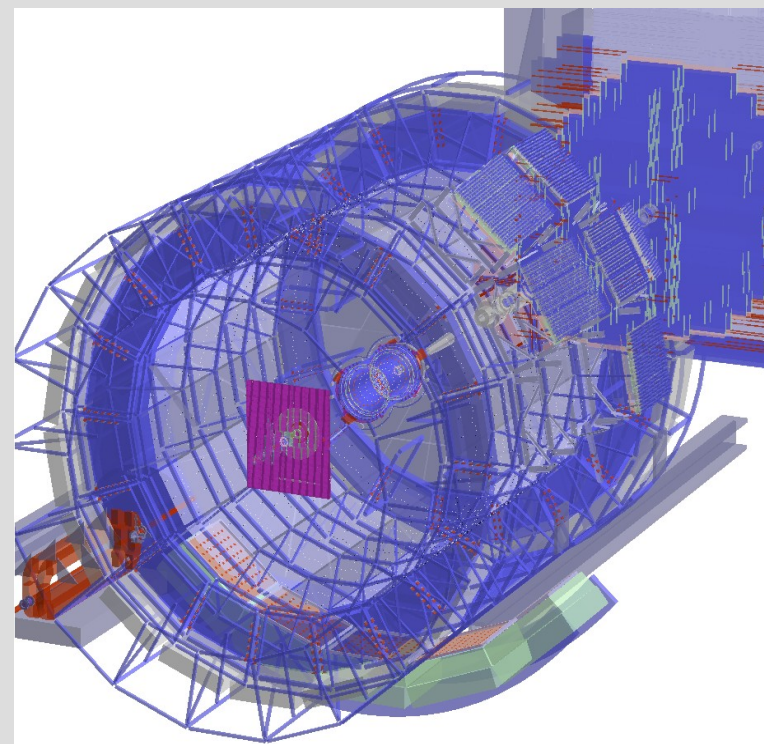
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ALICE offline

Modelarea geometrica a ALICE

<http://aliceinfo.cern.ch/Offline/Activities/Geometry/>

- Dezvoltarea unui modelator geometric folosit in:
 - Descrierea si validarea geometriei offline a experimentului
 - Framework-ul de alignment
 - Simularea transportului
 - particulelor
 - Event display
 - Tracking si reconstructia
 - particulelor





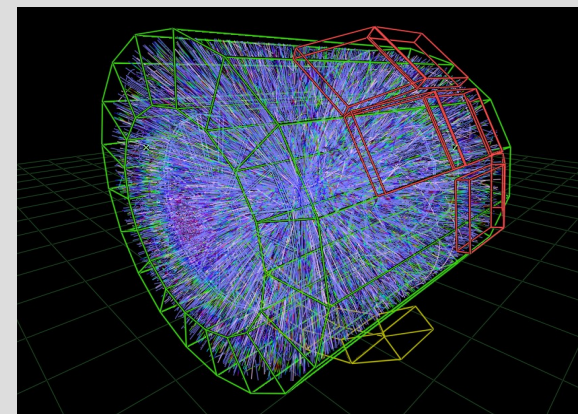
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ALICE offline

Simularea si reconstructia de evenimente in ALICE

<http://aliceinfo.cern.ch/Offline/Activities/Simulation/ParticleTransport.html>

- Dezvoltarea de interfete pentru utilizarea geometriei in corelatie cu modele Monte Carlo de transport de particule
 - GEANT3, GEANT4 si FLUKA
 - A permis in premiera simularea globala a unui experiment tip collider la asemenea scala, cu FLUKA
- Implementarea algoritmilor de propagare in material a particulelor, folositi pentru optimizarea parametrilor traselor reconstruite





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ALICE offline

Suport pentru framework-ul de alignment

<http://aliceinfo.cern.ch/Offline/Activities/Alignment.html>

- Implementarea posibilitatii de a reprezenta direct constantele de alignament (erorile de pozitionare ale detectorilor) in geometrie
- Posibilitatea de a folosi direct in simulare si reconstructie aceste erori



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ALICE offline

Dezvoltarea framework-ului general de analiza

<http://aliceinfo.cern.ch/Offline/Activities/Analysis/AnalysisFramework/index.html>

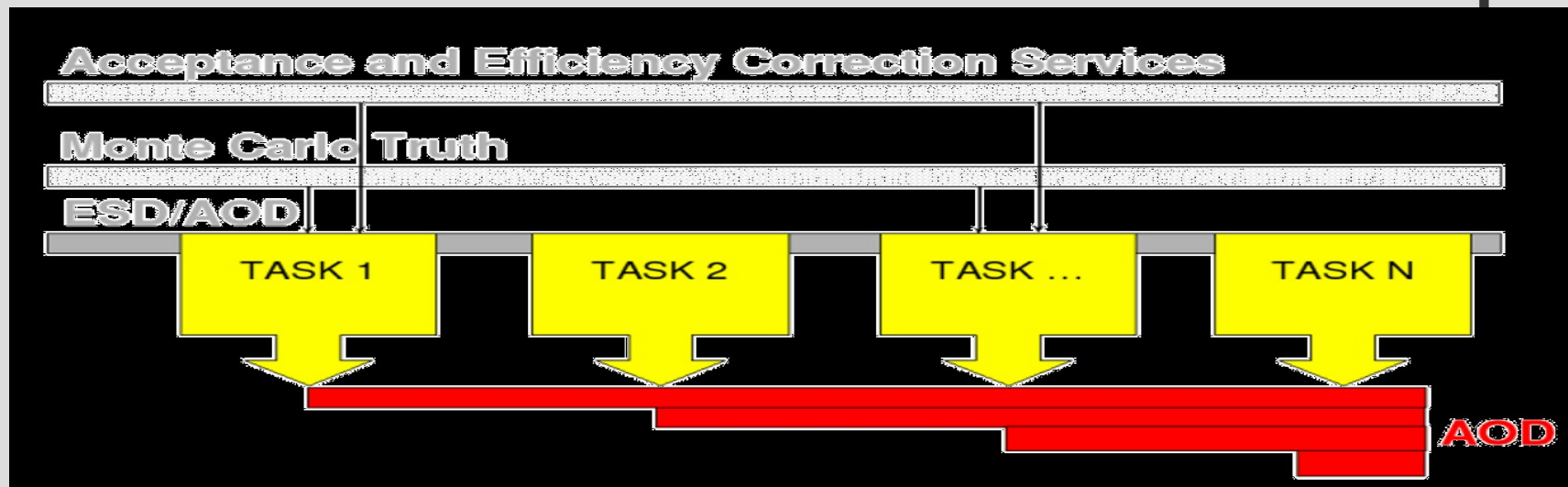
- Furnizeaza modalitati generale pentru optimizarea analizei de date in ALICE
- Foloseste tehnologiile adoptate de ALICE pentru procesare paralela (GRID, PROOF)
- Permite folosirea optima a resurselor de calcul (acces in paralel la date a mai multor analize diferite) si accesul transparent la date
- Suport constant oferit utilizatorilor ALICE in paralel cu dezvoltarea in continuare a framework-ului



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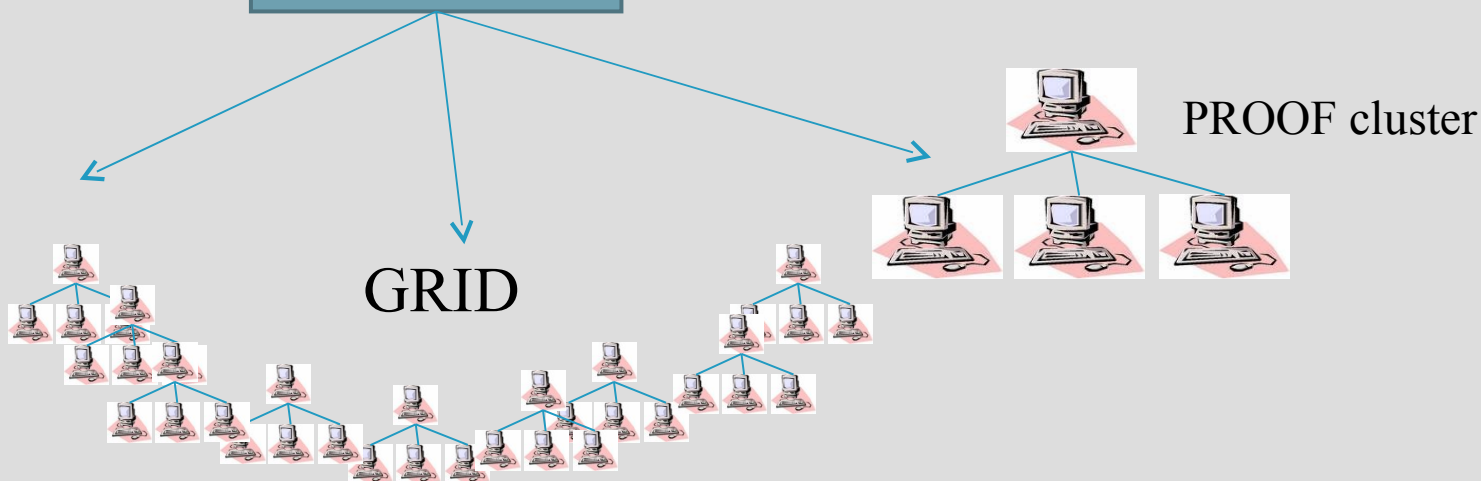
ALICE offline

Analiza secventiala folosind resurse in paralel



Analysis Train

Single Client

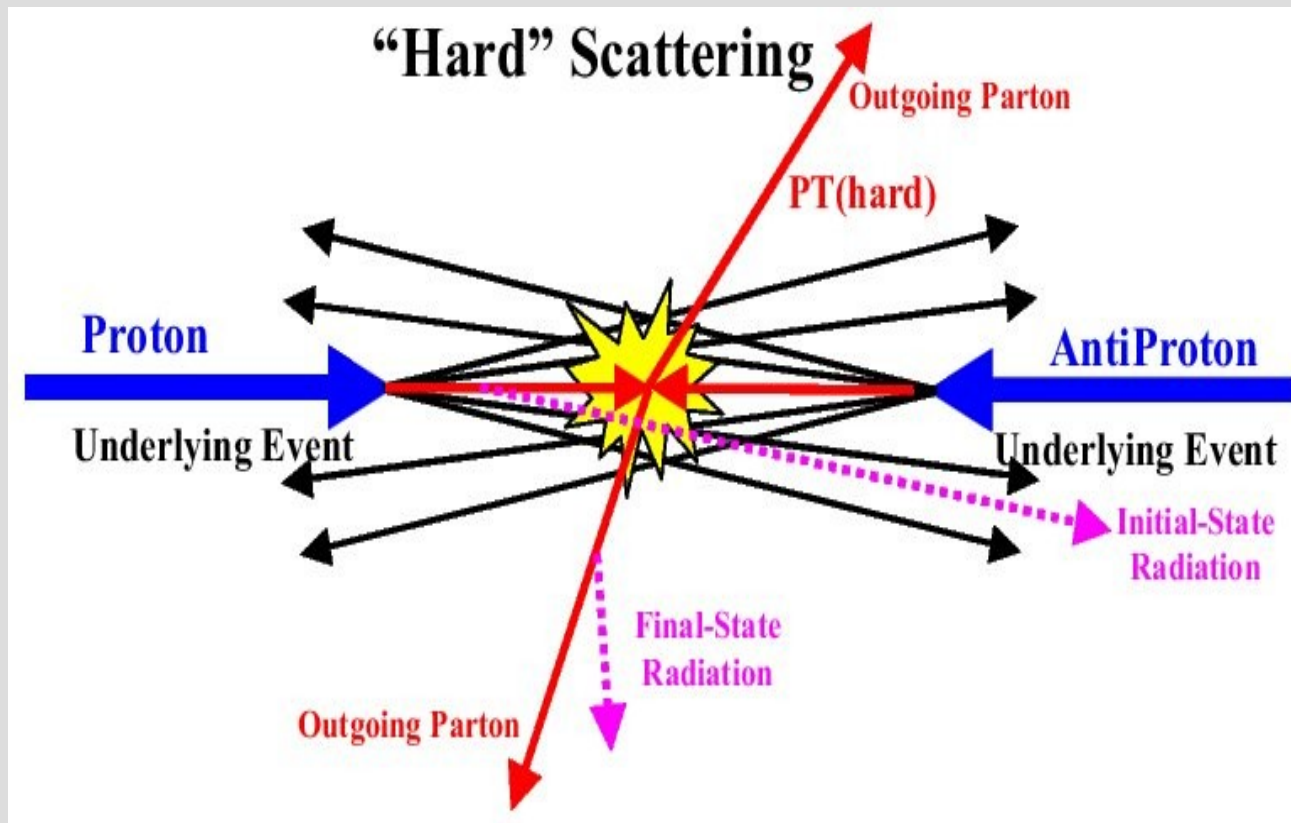




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ALICE PWG4

Jeturile sunt definite in QCD ca fiind cascade de emisii consecutive partonice initiate de partonii primari dintr-o imprastiere tare initiala.

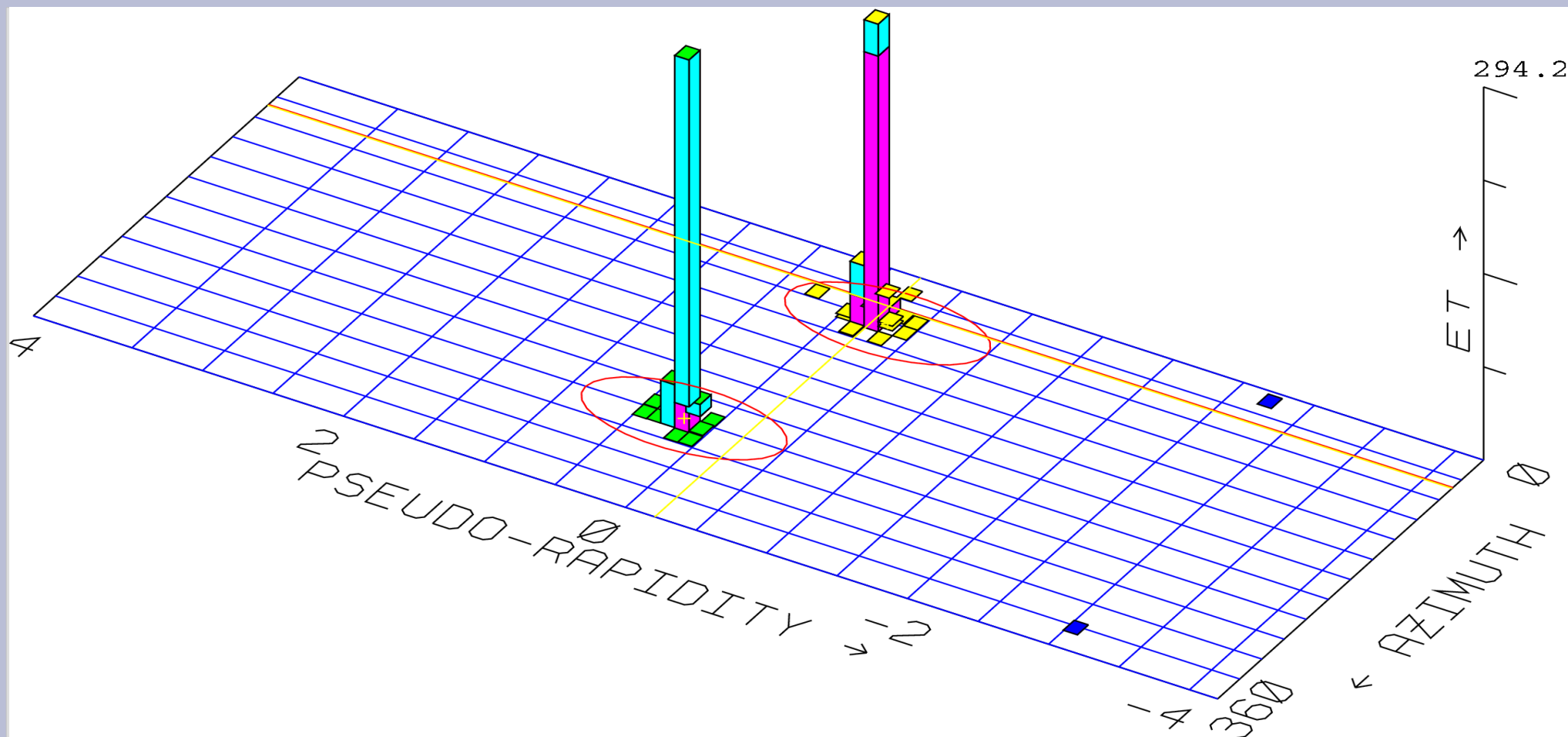


- Jeturile observate ne ofera o perspectiva a interactiilor tari de baza ale quarcilor si gluonilor, interactii ce se produc la distante foarte mici



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ALICE PWG4



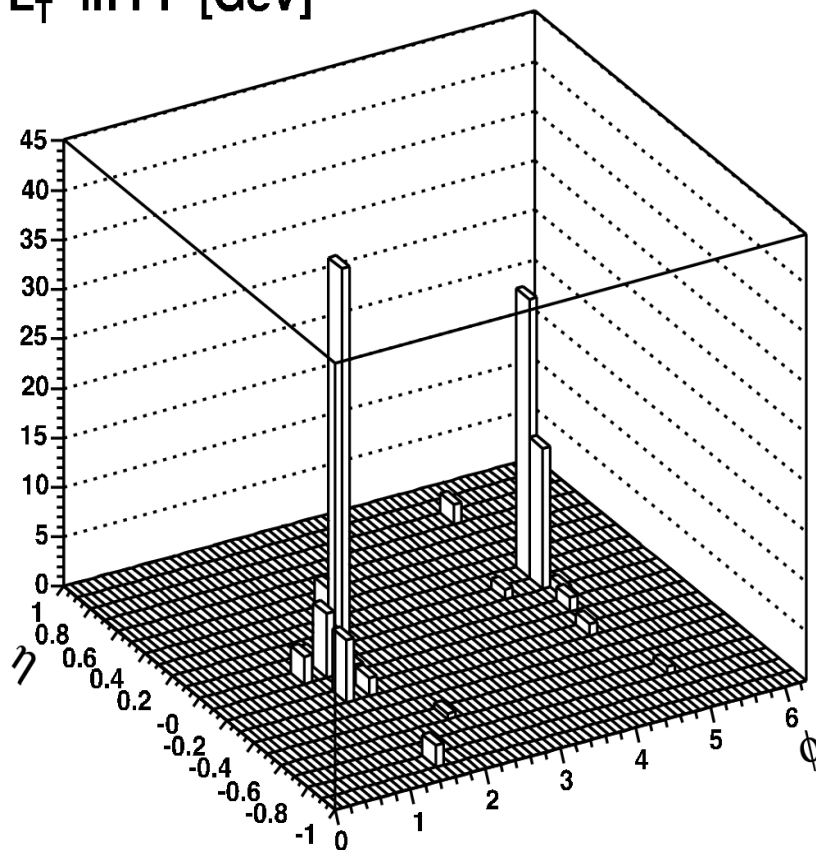
- Experimental, jeturile sunt definite ca un exces de energie transversa peste fondul evenimentului de baza intr-un con de raza R_C in planul $\eta - \phi$. (R_C defineste marimea geometrica a jetului)



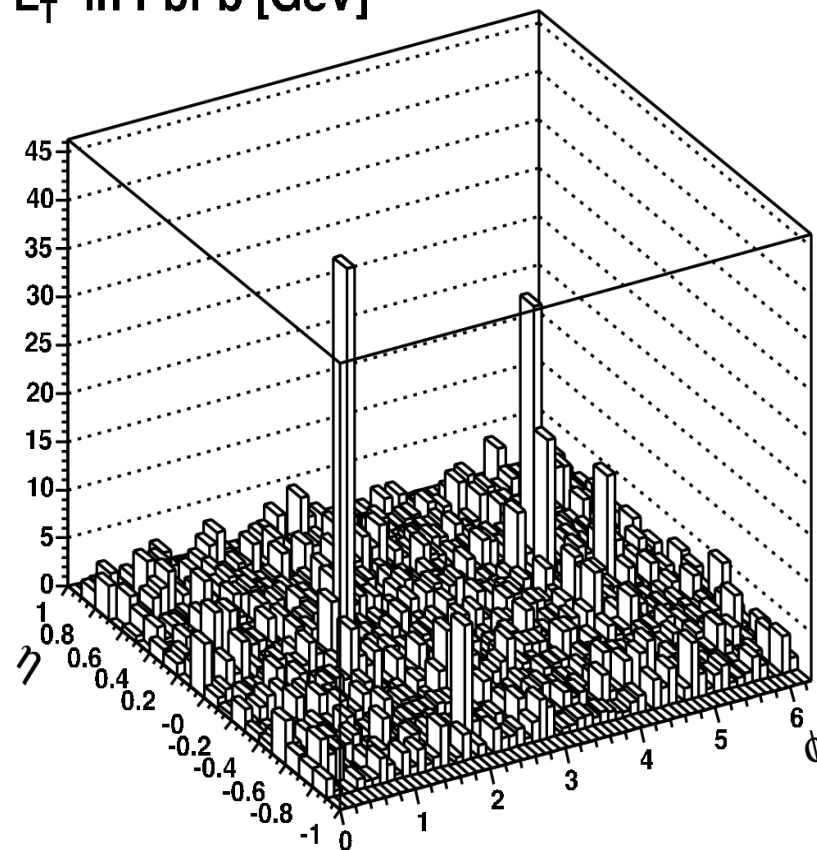
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ALICE PWG4

E_T^{ch} in PP [GeV]



E_T^{ch} in PbPb [GeV]

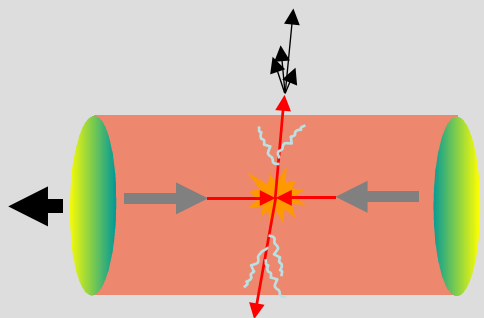


- Diferenta de fond intre un jet intr-o ciocnire pp si o ciocnire PbPb



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ALICE PWG4



▣ Interactiile nucleu-nucleu de mare energie permit investigarea atat a fenomenelor de fragmentare partonica din vacuum cit si a celor din mediumul QCD, anume Plasma de cuarci si Gluoni si de a studia proprietatile acestui mediu prin studiul modificarii structurii si parametrilor jeturilor.

*Sonda ideala: $t_{\text{formare}} \sim 1/Q \ll 1 \text{ fm}/c$
Istoria interactiei cu mediu imprimata
in structura jetului...*

• Partonii cu P_T mare produsii in interactiile tari in faza initiala a ciocnirii sint supusi la multiple interactii in regiunea ciocnirii inainte de hadronizare

- In particular ei pierd energie prin radiatie gluonica indusa de mediu, iar acesta asa numita “stingere a jetului” e presupusa a se comporta mult diferit in materia nucleara rece fata de QGP.
- Aceasta e motivatia principala pentru studierea atat a jeturilor cit si a spectrului de particule cu p_T mare si corelatilor intre particule in ciocnirile de ioni grei.

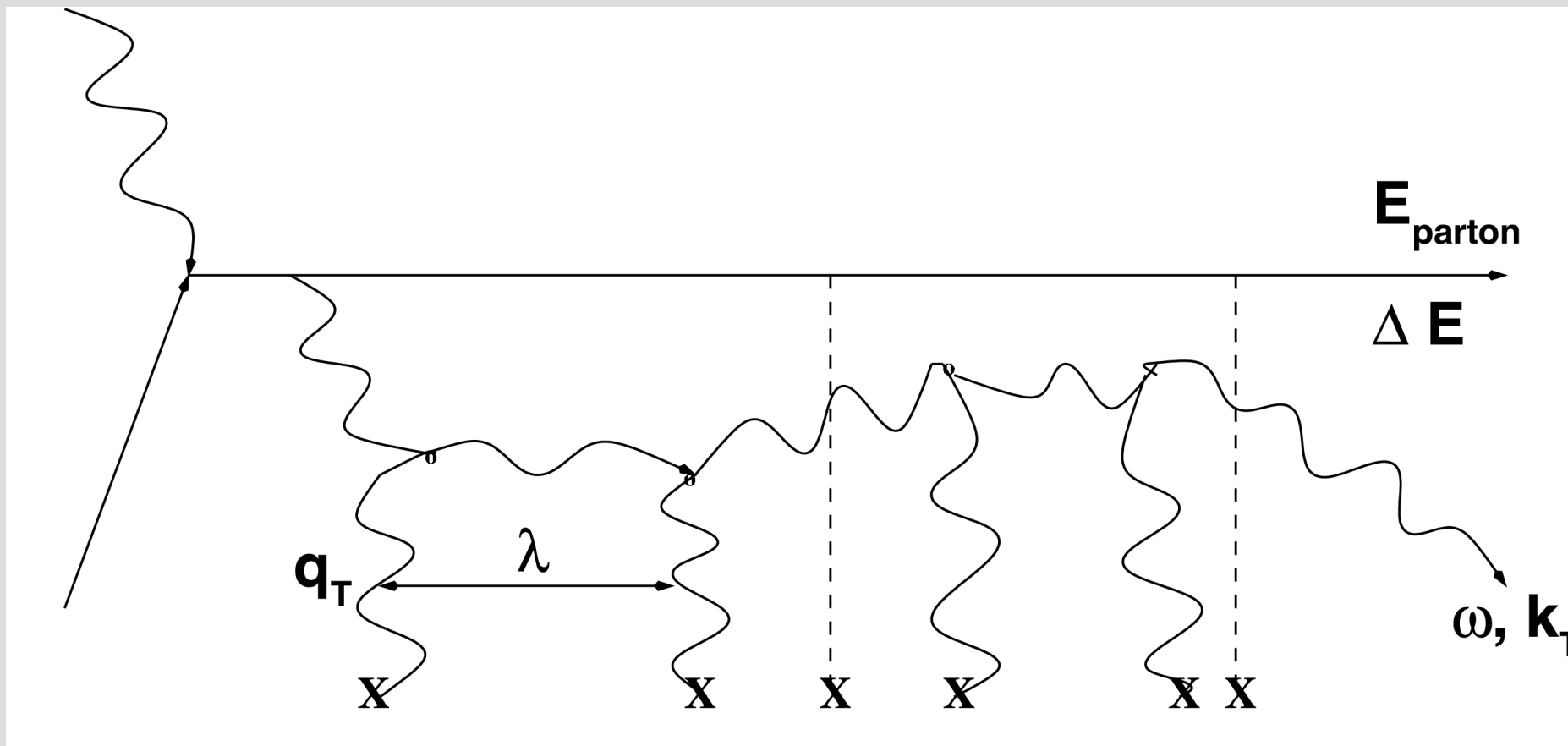


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ALICE PWG4

• In termeni generali:

$$\text{Jet}(E) \rightarrow \text{Jet}(E-\Delta E) + \text{soft gluons } (\Delta E)$$





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ALICE PWG4

Sistemele de detectori ALICE utilizati in identificarea de jeturi si γ

- **ITS+TPC+(TOF, TRD)**

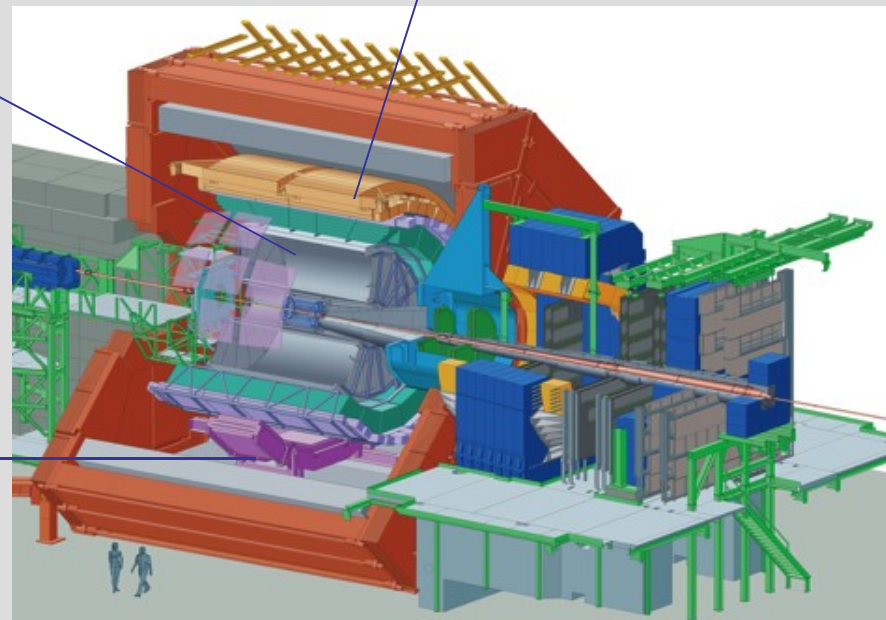
- Particule incarcate cu $|\eta| < 0.9$
- Rezolutie in impuls excelenta de pina la 100 GeV/c ($\Delta p/p < 6\%$)
- Rezolutie in tracking 100 MeV/c
- PID excelent

- **PHOS**

- Spectrometru electromagnetic de mare rezolutier (PbWO₄ crystals)
- γ -Trigger
- $|\eta| < 0.12$
- $220^\circ < \phi < 320^\circ$
- Rezolutie in energie : $\Delta E_\gamma/E_\gamma = 3\%/\sqrt{E_\gamma}$
- Rezolutie in pozitie : $\Delta x/x = 23\%/\sqrt{E_\gamma}$

- **EMCal**

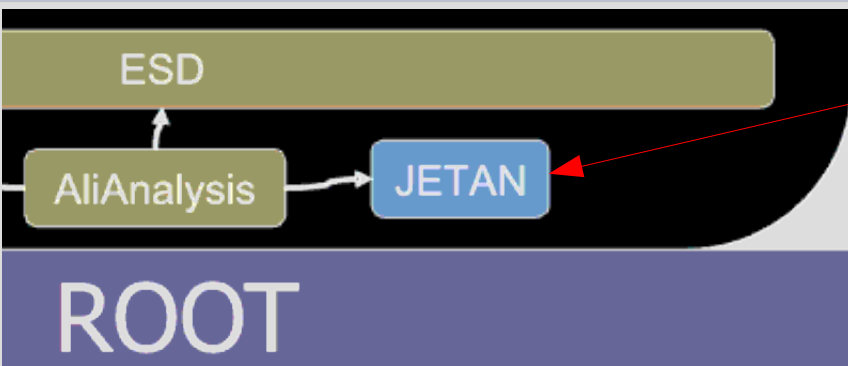
- Energia de la particulele neutre
- Pb-scintillator, 13k towers
- $\Delta\phi = 107^\circ, |\eta| < 0.7$
- *Rezolutie in energie $\sim 10\%/\sqrt{E_\gamma}$*
- Capabilitati de declansare (Trigger)



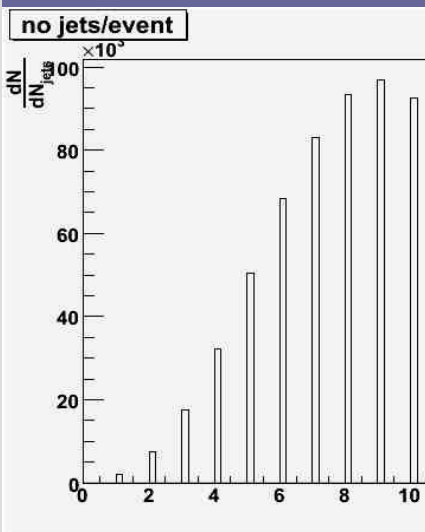


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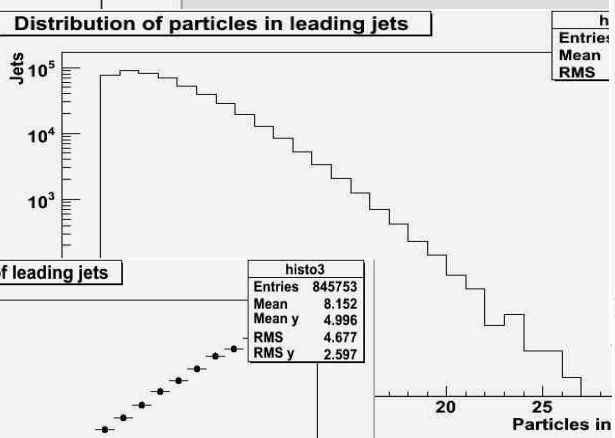
ALICE PWG4



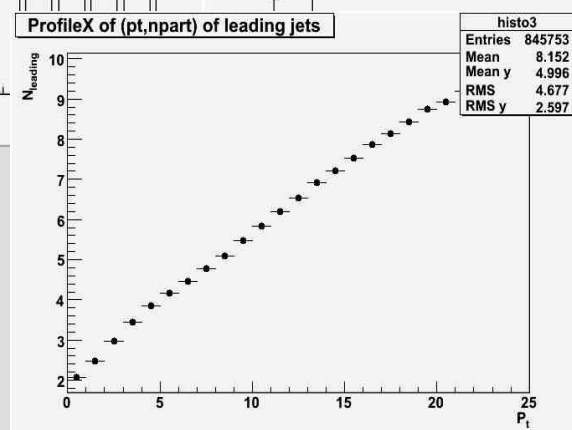
- AliCdfJetFinder - Phys. Rev. D 65, 092002 (2002) CDF collaboration
- Algoritim iterativ de tip con cu centrul median
- Codul e prezent in svn trunk in \$ALICE_ROOT/JETAN
- Rezultate preliminare prezentate in cadrul PWG4



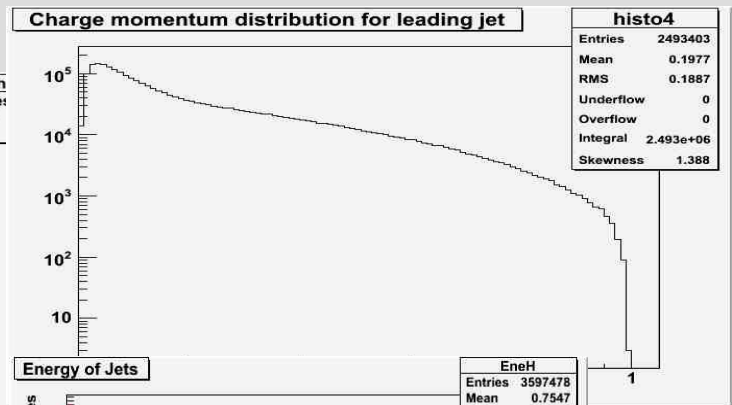
histo1	
Entries	857520
Mean	9.39
RMS	3.395



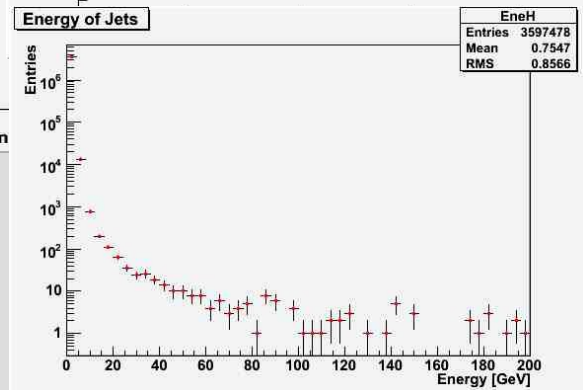
h	
Entries	
Mean	
RMS	



histo3	
Entries	845763
Mean	8.152
Mean y	4.996
RMS	4.677
RMS y	2.597



histo4	
Entries	2493403
Mean	0.1977
RMS	0.1887
Underflow	0
Overflow	0
Integral	2.493e+06
Skewness	1.388



EneH	
Entries	3597478
Mean	0.7547
RMS	0.8566



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ISS GRID:: Alien

...The beginning...





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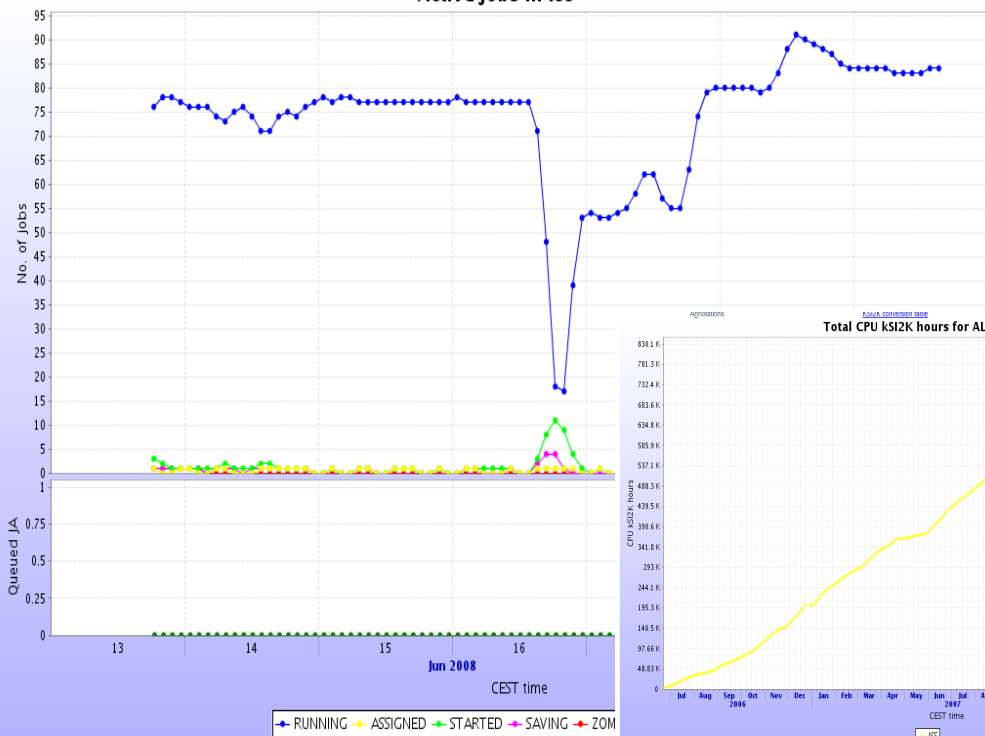
- Serviciile sunt monitorizate si intretinute de 2 administratori

What is this about?

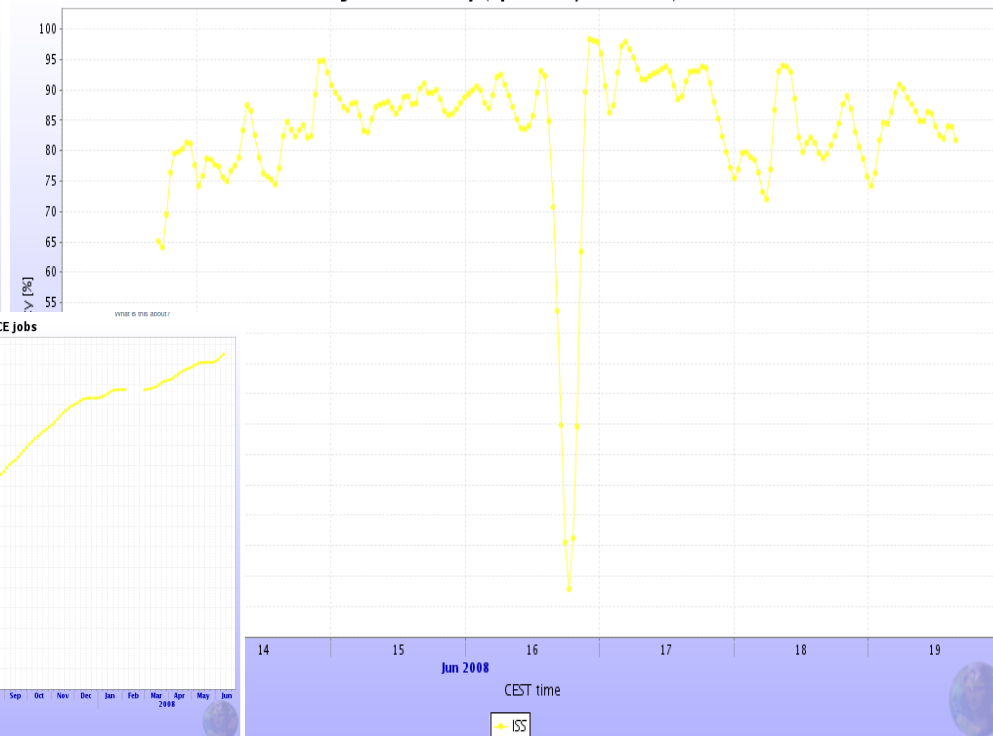
AliEn services

Service	VOBox		AliEn services					
	Address	AliEn version	Monitoring script	CE	SE	PackMan	Monitor	FTD
31. ISS	alien.spacescience.ro	v2-15.8						-

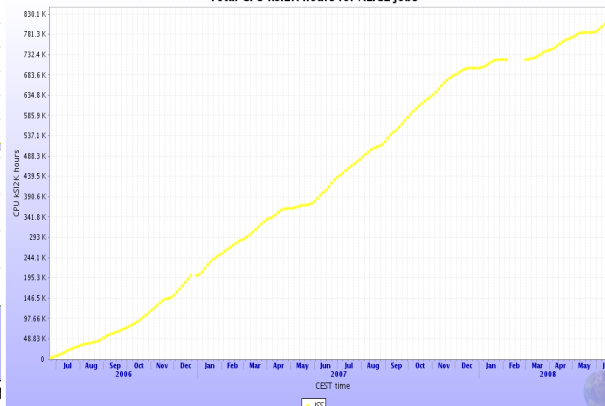
Active jobs in ISS



Jobs efficiency (cpu si2k / wall si2k)



Total CPU KSI2K hours for ALICE jobs



◆ RUNNING
 ◆ ASSIGNED
 ◆ STARTED
 ◆ SAVING
 ◆ ZOM

ISS



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- Datacenter-ul aflat in pregatire va intra in utilizare in 1-2 luni; sistemul de racire este instalat, urmeaza sa se finalizeze racordarea la retea electrica
- Urmeaza suplimentarea clusterului existent cu 17 noi servere (34 WNs) fiecare worker node avind 8 core-uri cu 2 GiB/core
- Urmeaza ca in urma a unor investitii de pina la 200 kEUR pe domeniul GRID sa se consolideze infrastructura de networking si de management/monitorizare