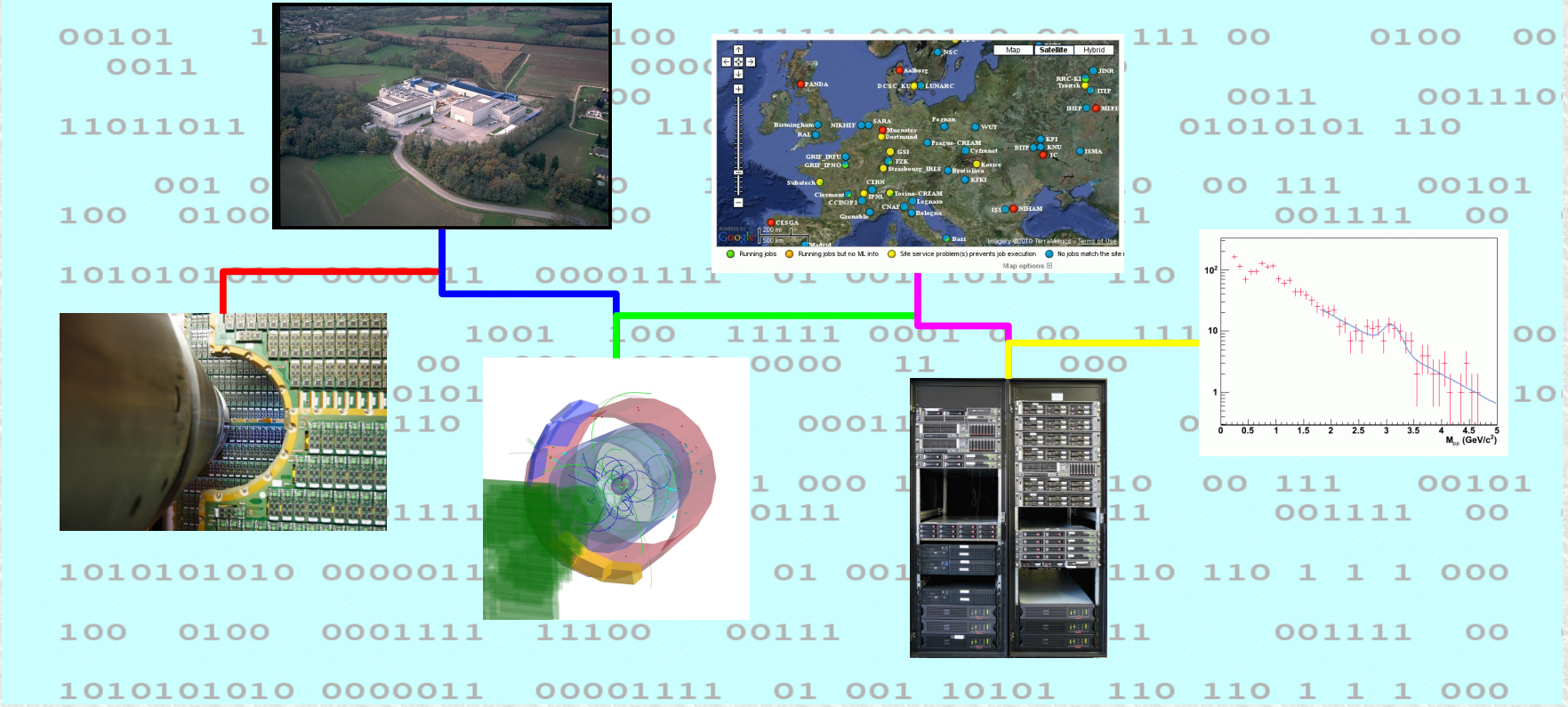
ALICE

Une expérience en physique des particules:

des données expérimentales

aux résultats scientifiques



Bogdan Vulpescu
LPC - Service Informatique, pour le groupe ALICE
Séminaire Mini AG, 01.12.2011

Le plan

- la physique: pourquoi étudier la matière nucléaire dans des collisions à très hautes énergies ?

- la technologie: comment accélérer des particules, les faire collisioner et enrégistrer les résultats des phénomènes qui se produisent ?
  Où ? C.E.R.N. = Conseil Européen pour la Recherche Nucléaire

- l'informatique: comment collecter, transporter, stocker et analyser des volumes immenses de données ?
  Où ? WLCG = Worlwide LHC Computing Grid = ~130 centres de calcul dans ~34 pays = 100 000 processeurs (+ stockage)

La Physique

1) le Modèle Standard des particules élémentaires

2) la diagramme de phase de la matière nucléaire

3) l'argument de la cosmologie (les origines de l'Univers)

Standard Model of
FUNDAMENTAL PARTICLES AND INTERACTIONS

The Standard Model summarizes the current knowledge in Particle Physics. It is the quantum theory that includes the theory of strong interactions (quantum chromodynamics or QCD) and the unified theory of weak and electromagnetic interactions (electroweak). Gravity is included on this chart because it is one of the fundamental interactions even though not part of the "Standard Model."

FERMIONS

matter constituents
spin = 1/2, 3/2, 5/2, ...

Leptons spin = 1/2

Flavor	Mass GeV/c^2	Electric charge
ν_e electron neutrino	$<1\times10^{-8}$	0
e electron	0.000511	−1
ν_μ muon neutrino	<0.0002	0
μ muon	0.106	−1
ν_τ tau neutrino	<0.02	0
τ tau	1.7771	−1

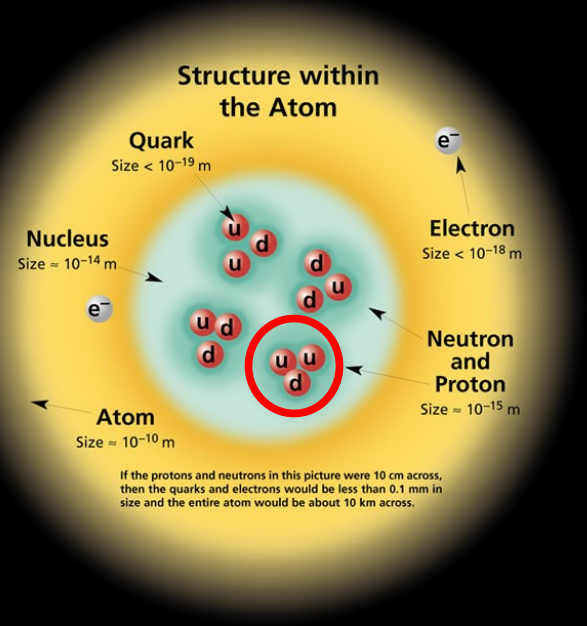
Quarks spin = 1/2

Flavor	Approx. Mass GeV/c^2	Electric charge
u up	0.003	2/3
d down	0.006	−1/3
c charm	1.3	2/3
s strange	0.1	−1/3
t top	175	2/3
b bottom	4.3	−1/3

Spin is the intrinsic angular momentum of particles. Spin is given in units of ħ, which is the quantum unit of angular momentum, where $\hbar = h/2\pi = 6.58\times10^{-25}$ GeV s $= 1.05\times10^{-34}$ J s.

Electric charges are given in units of the proton's charge. In SI units the electric charge of the proton is 1.60×10^{-19} coulombs.

The **energy** unit of particle physics is the electronvolt (eV), the energy gained by one electron in crossing a potential difference of one volt. **Masses** are given in GeV/c^2 (remember $E = mc^2$), where 1 GeV = 10^9 eV = 1.60×10^{-10} joule. The mass of the proton is 0.938 GeV/c^2 = 1.67×10^{-27} kg.



BOSONS

force carriers
spin = 0, 1, 2, ...

Unified Electroweak spin = 1

Name	Mass GeV/c^2	Electric charge
γ photon	0	0
W^-	80.4	−1
W^+	80.4	+1
Z^0	91.187	0

Strong (color) spin = 1

Name	Mass GeV/c^2	Electric charge
g gluon	0	0

Color Charge
Each quark carries one of three types of "strong charge," also called "color charge." These charges have nothing to do with the colors of visible light. There are eight possible types of color charge for gluons. Just as electrically-charged particles interact by exchanging photons, in strong interactions color-charged particles interact by exchanging gluons. Leptons, photons, and ***W*** and ***Z*** bosons have no strong interactions and hence no color charge.

Quarks Confined in Mesons and Baryons
One cannot isolate quarks and gluons; they are confined in color-neutral particles called **hadrons**. This confinement (binding) results from multiple exchanges of gluons among the color-charged constituents. As color-charged particles (quarks and gluons) move apart, the energy in the color-force field between them increases. This energy eventually is converted into additional quark-antiquark pairs (see figure below). The quarks and antiquarks then combine into hadrons; these are the particles seen to emerge. Two types of hadrons have been observed in nature: **mesons** $q\bar{q}$ and **baryons** qqq.

Residual Strong Interaction
The strong binding of color-neutral protons and neutrons to form nuclei is due to residual strong interactions between their color-charged constituents. It is similar to the residual electrical interaction that binds electrically neutral atoms to form molecules. It can also be viewed as the exchange of mesons between the hadrons.

PROPERTIES OF THE INTERACTIONS

Property \ Interaction	Gravitational	Weak (Electroweak)	Electromagnetic (Electroweak)	Strong: Fundamental	Strong: Residual
Acts on:	Mass – Energy	Flavor	Electric Charge	Color Charge	See Residual Strong Interaction Note
Particles experiencing:	All	Quarks, Leptons	Electrically charged	Quarks, Gluons	Hadrons
Particles mediating:	Graviton (not yet observed)	W^+ W^- Z^0	γ	Gluons	Mesons
Strength relative to electromag for two u quarks at: 10^{-18} m	10^{-41}	0.8	1	25	Not applicable to quarks
Strength relative to electromag for two u quarks at: 3×10^{-17} m	10^{-41}	10^{-4}	1	60	
for two protons in nucleus	10^{-36}	10^{-7}	1	Not applicable to hadrons	20

Baryons qqq and Antibaryons $\bar{q}\bar{q}\bar{q}$

Baryons are fermionic hadrons.
There are about 120 types of baryons.

Symbol	Name	Quark content	Electric charge	Mass GeV/c^2	Spin
p	proton	uud	1	0.938	1/2
$\bar{p}$	anti-proton	$\bar{u}\bar{u}\bar{d}$	−1	0.938	1/2
n	neutron	udd	0	0.940	1/2
Λ	lambda	uds	0	1.116	1/2
Ω^-	omega	sss	−1	1.672	3/2

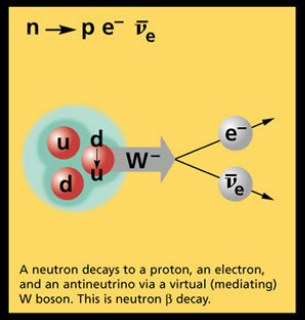
Mesons $q\bar{q}$

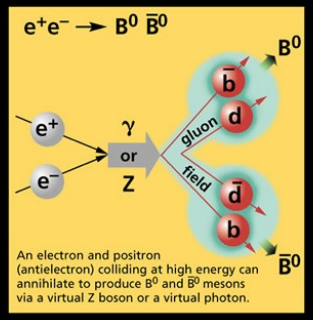
Mesons are bosonic hadrons.
There are about 140 types of mesons.

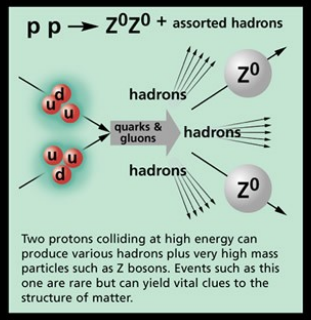
Symbol	Name	Quark content	Electric charge	Mass GeV/c^2	Spin
π^+	pion	$u\bar{d}$	+1	0.140	0
K^-	kaon	$s\bar{u}$	−1	0.494	0
ρ^+	rho	$u\bar{d}$	+1	0.770	1
B^0	B-zero	$d\bar{b}$	0	5.279	0
η_c	eta-c	$c\bar{c}$	0	2 .980	0

Matter and Antimatter
For every particle type there is a corresponding antiparticle type, denoted by a bar over the particle symbol (unless + or − charge is shown). Particle and antiparticle have identical mass and spin but opposite charges. Some electrically neutral bosons (e.g., Z^0, γ, and $\eta_c = c\bar{c}$, but not $K^0 = d\bar{s}$) are their own antiparticles.

Figures
These diagrams are an artist's conception of physical processes. They are ***not*** exact and have ***no*** meaningful scale. Green shaded areas represent the cloud of gluons or the gluon field, and red lines the quark paths.







The Particle Adventure
Visit the award-winning web feature *The Particle Adventure* at
http://ParticleAdventure.org

This chart has been made possible by the generous support of:
U.S. Department of Energy
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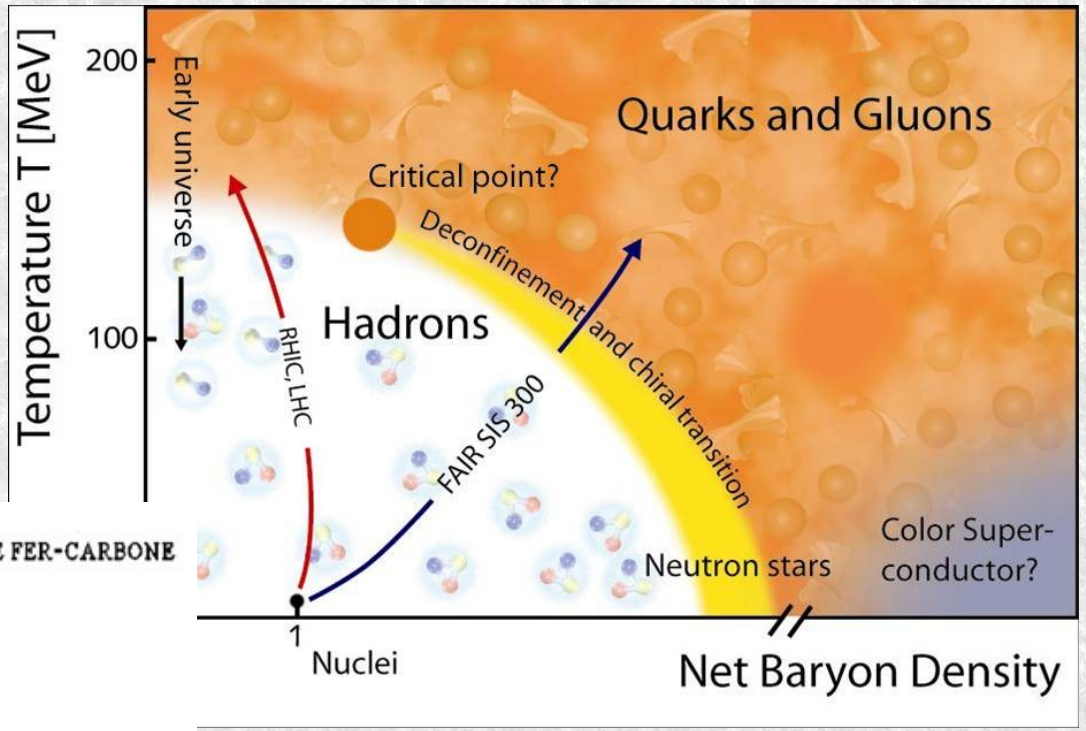
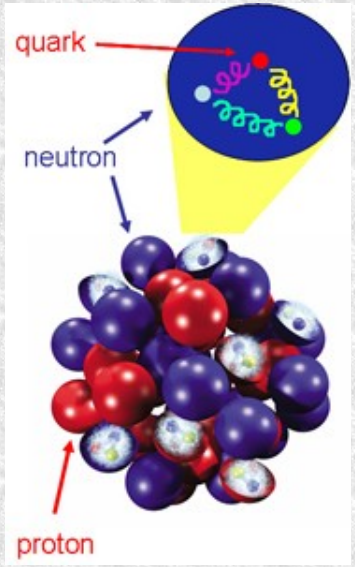
Stanford Linear Accelerator Center
American Physical Society, Division of Particles and Fields
BURLE INDUSTRIES, INC.

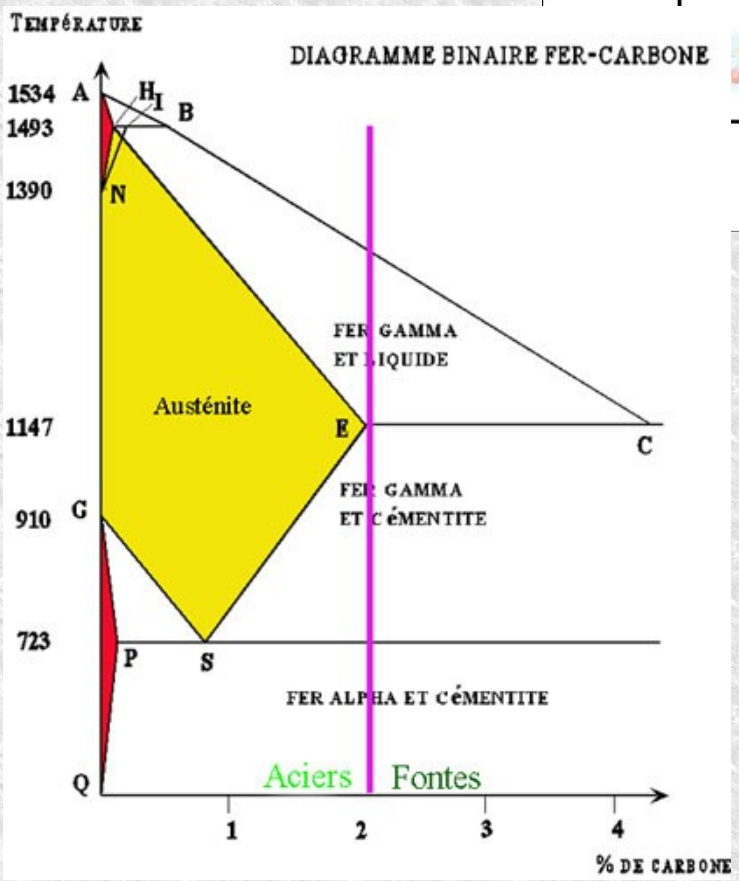
La diagramme de phase

matière nucléaire

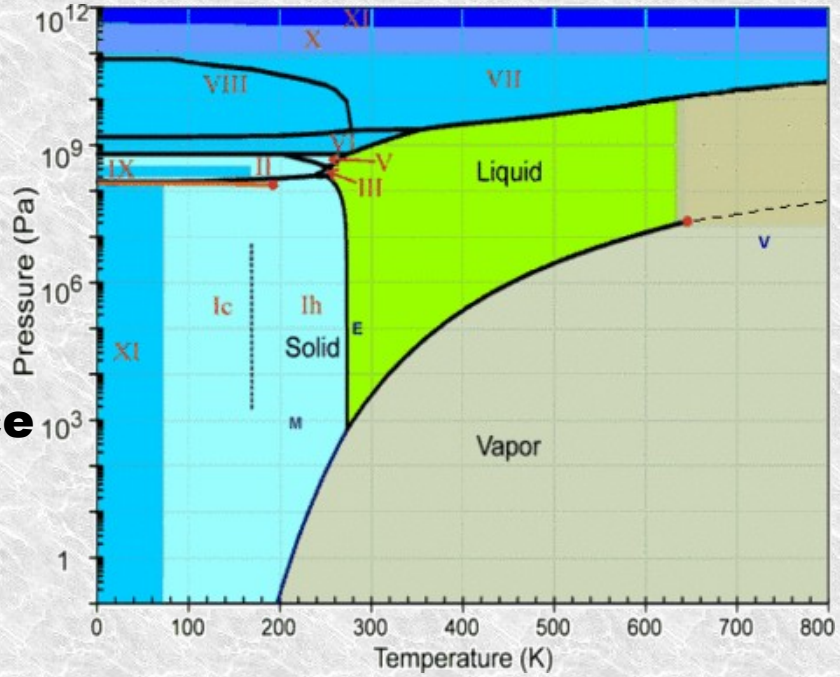


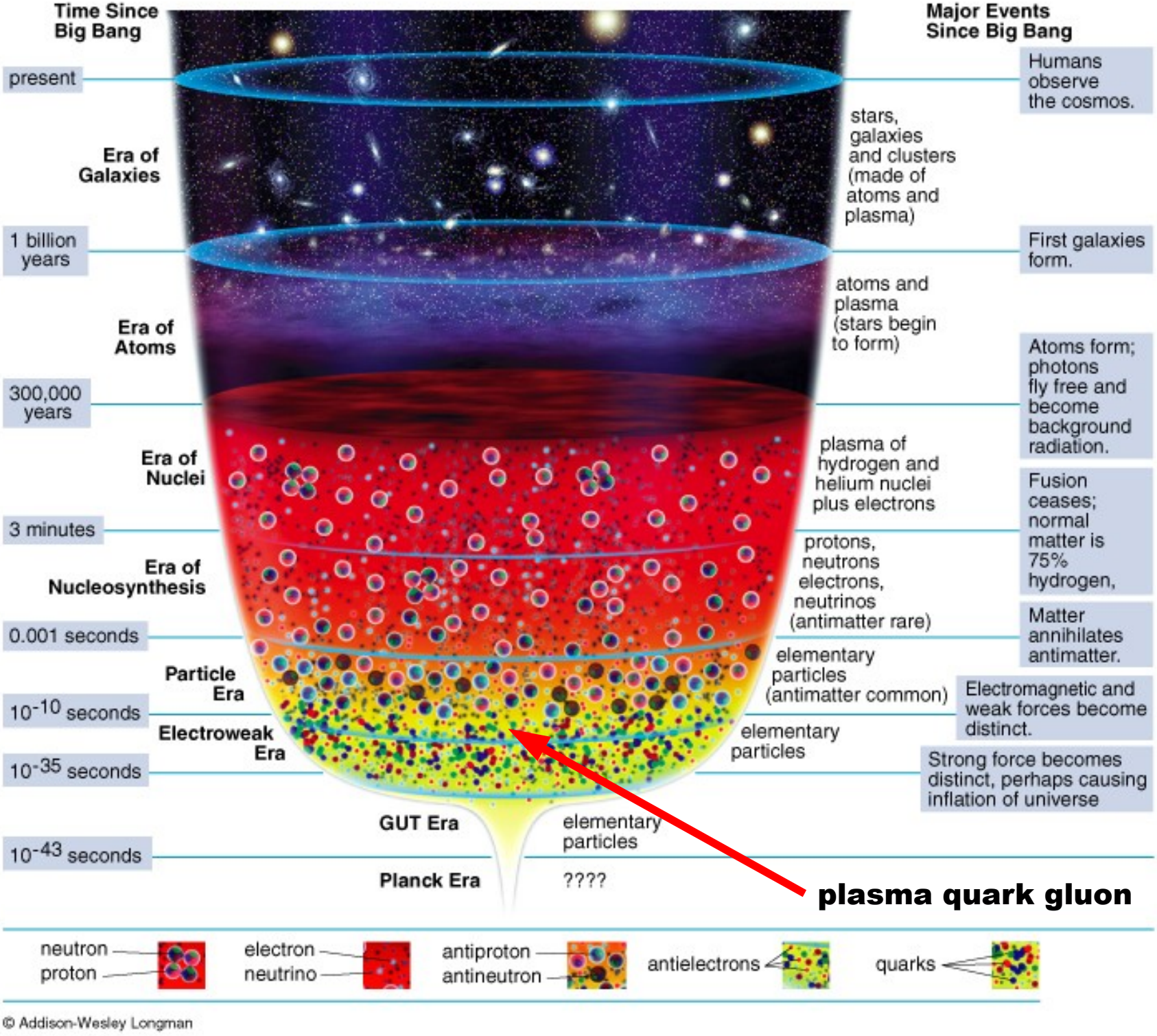


acier



glace
eau
gaz

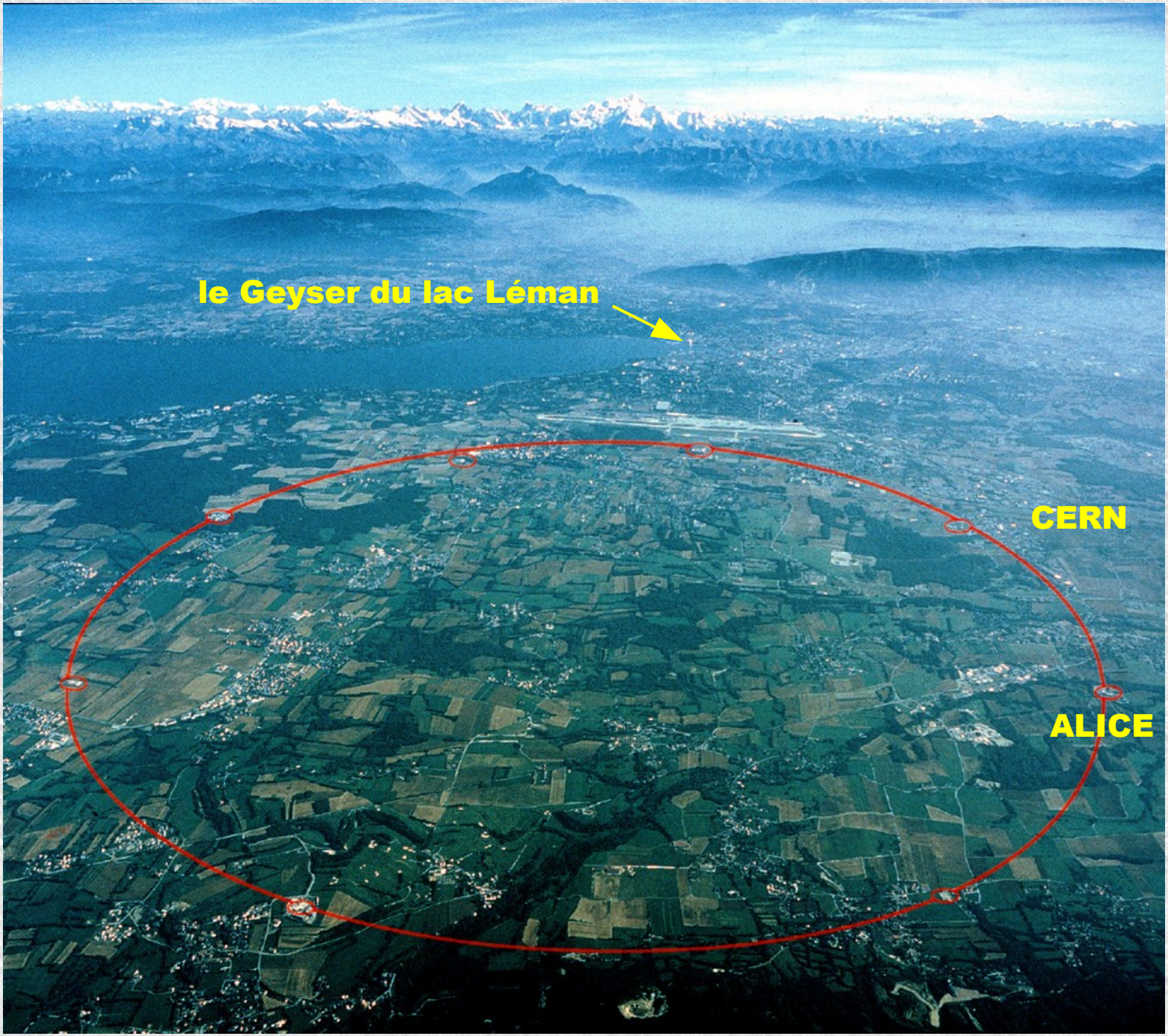




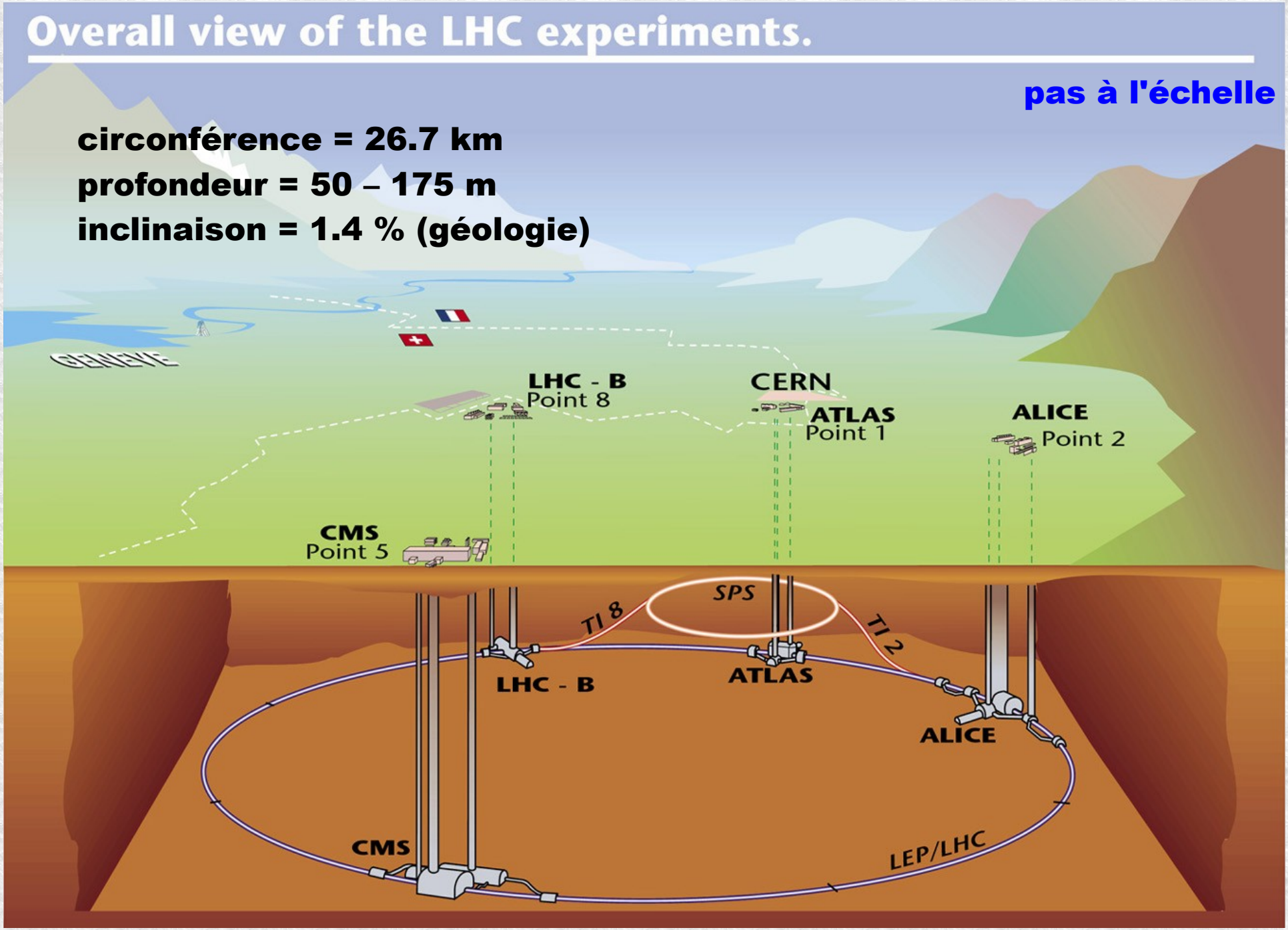
La Technologie

- le Grand Collisionneur de Hadrons LHC
- l'expérience ALICE (ions lourds, p+p)

Le LHC dans la région Genève



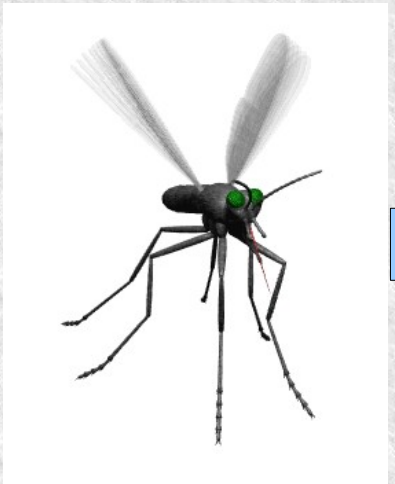
Les 4 grandes expériences au LHC



Accélérateur: l'échelle d'énergie

L'énergie approximative d'un électron frappant l'écran (CRT) d'une télévision couleur = 20000 eV = 20 keV (kilo-electron-volt)

1 eV = 1.6 10^{-19} J



m = 1mg

v = 2 km/h

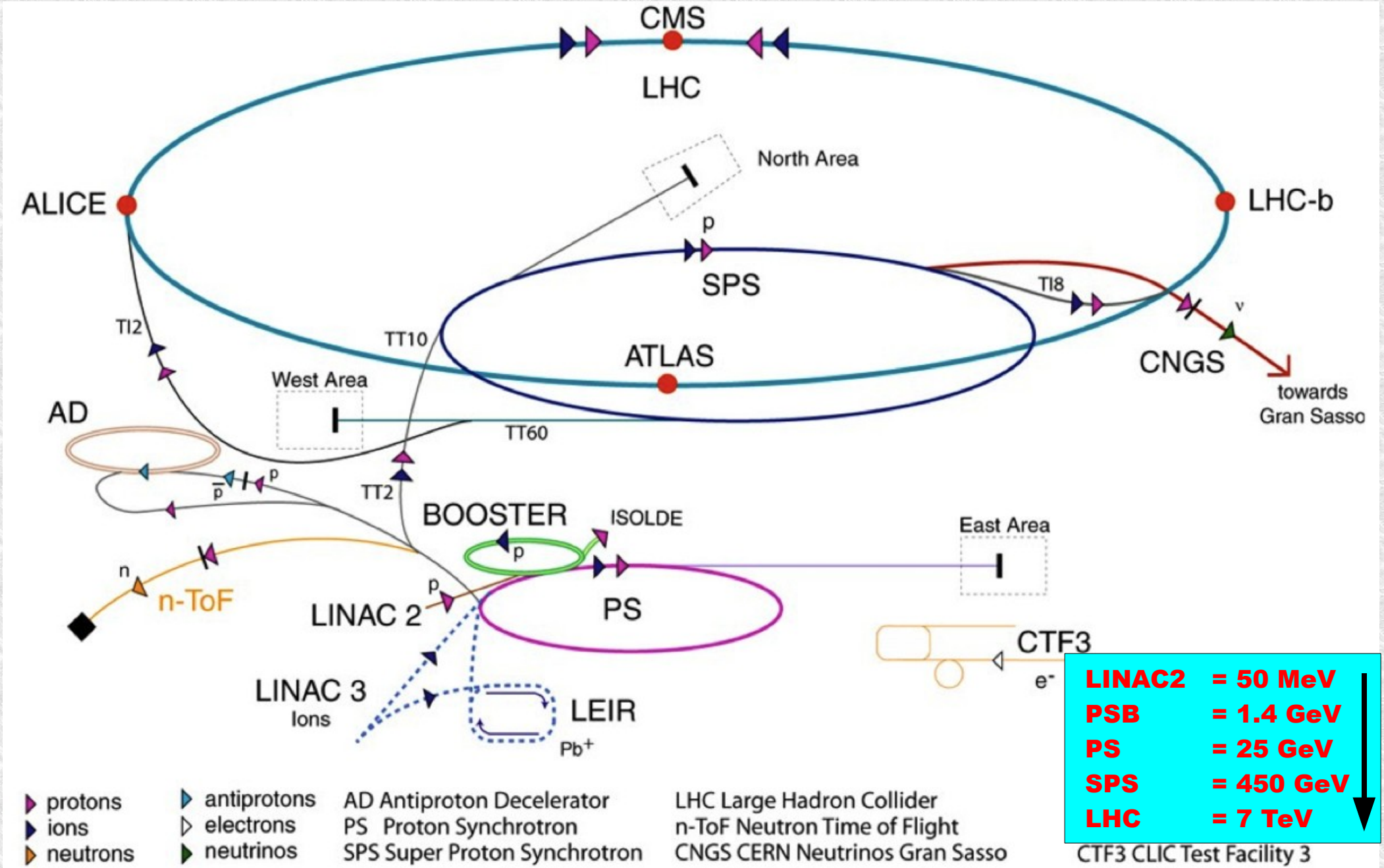
$$E_{kin} = \frac{m \cdot v^2}{2}$$

E_{kin} = 1 000 000 000 000 eV = 1TeV

(terra-electron-volt)

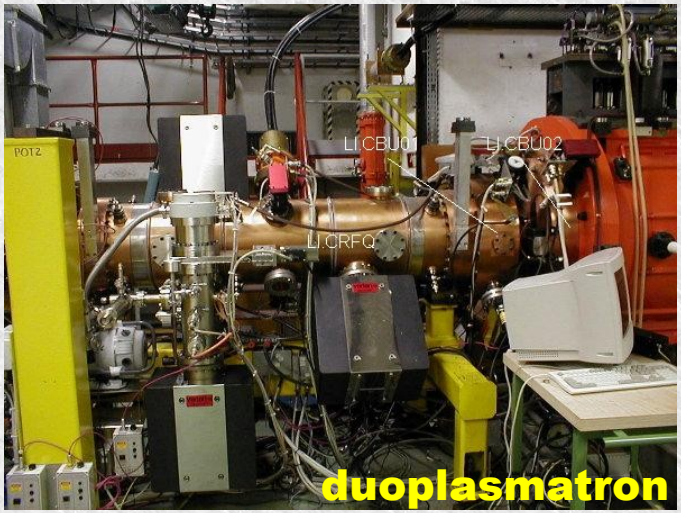
1 proton (m = 1.67 10^{-27} kg) à 15 km/s E_{kin} = 1 eV

Le complexe d'accélération (p-p)



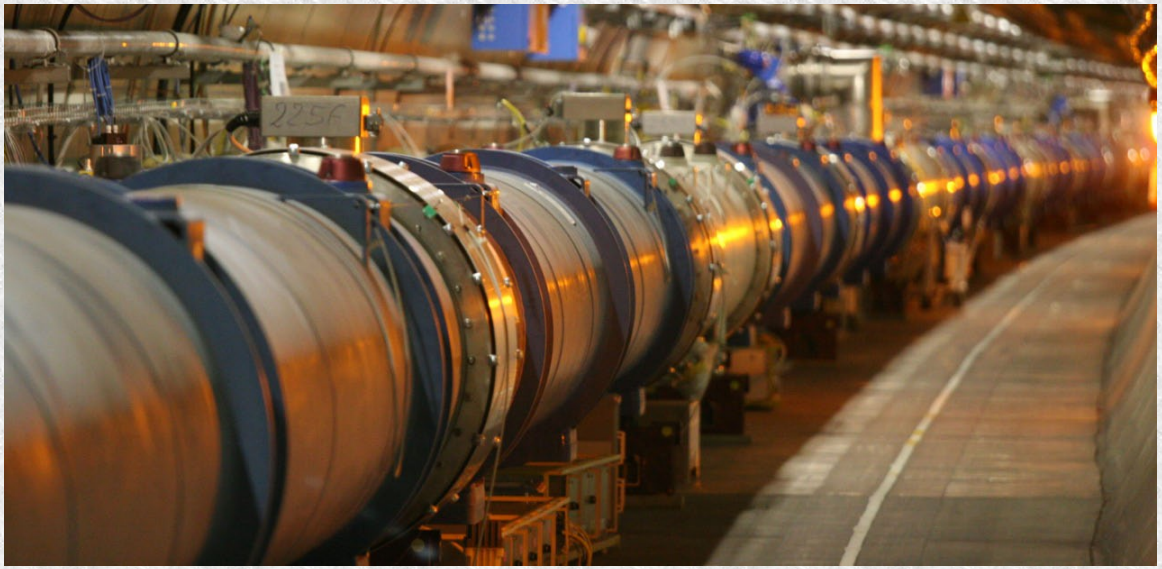
Étapes dans la formation des faisceaux

Source de protons (H^+)



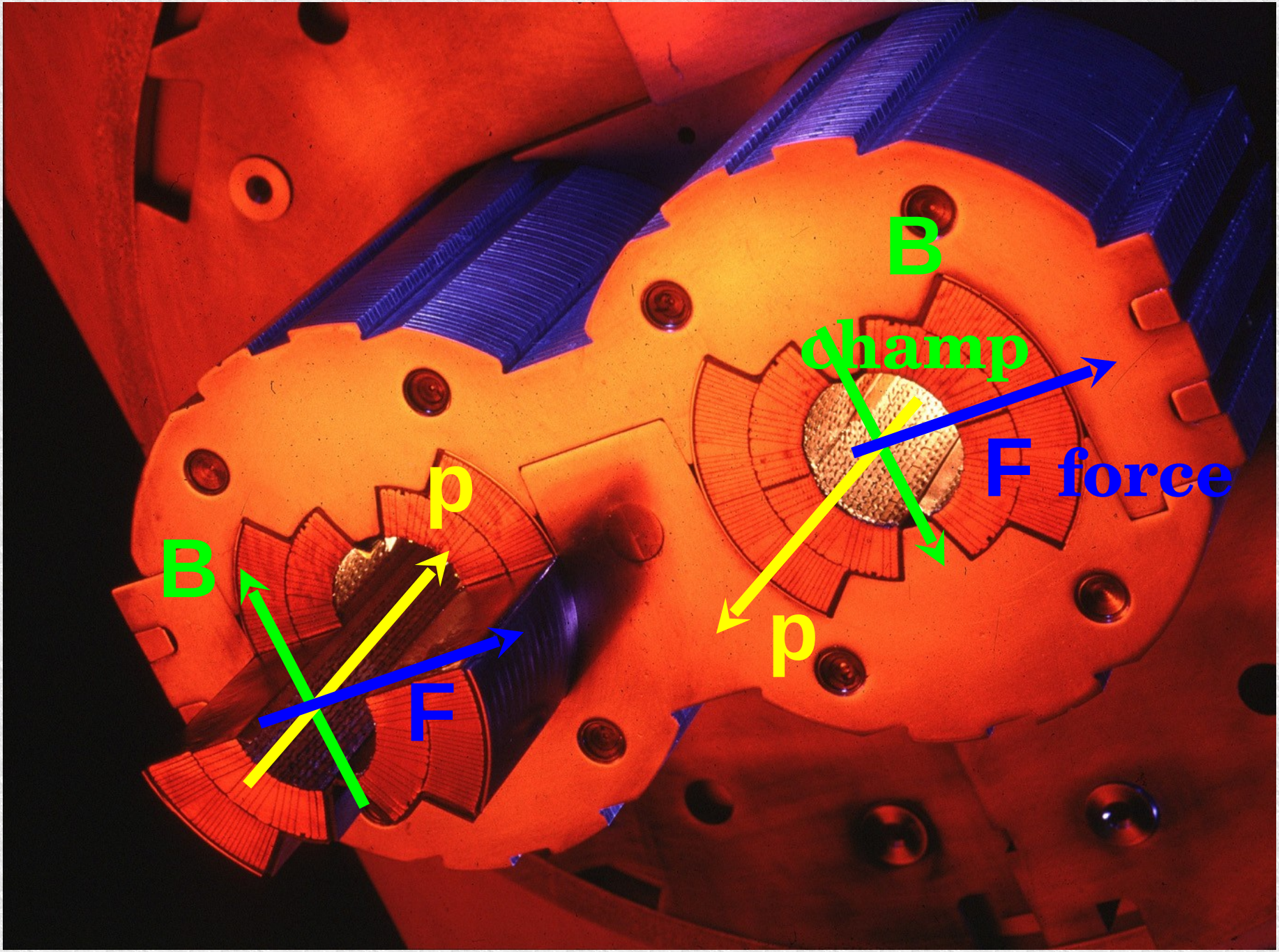
LINAC 2 – accélération

LHC – courbure (8 x 3 km)

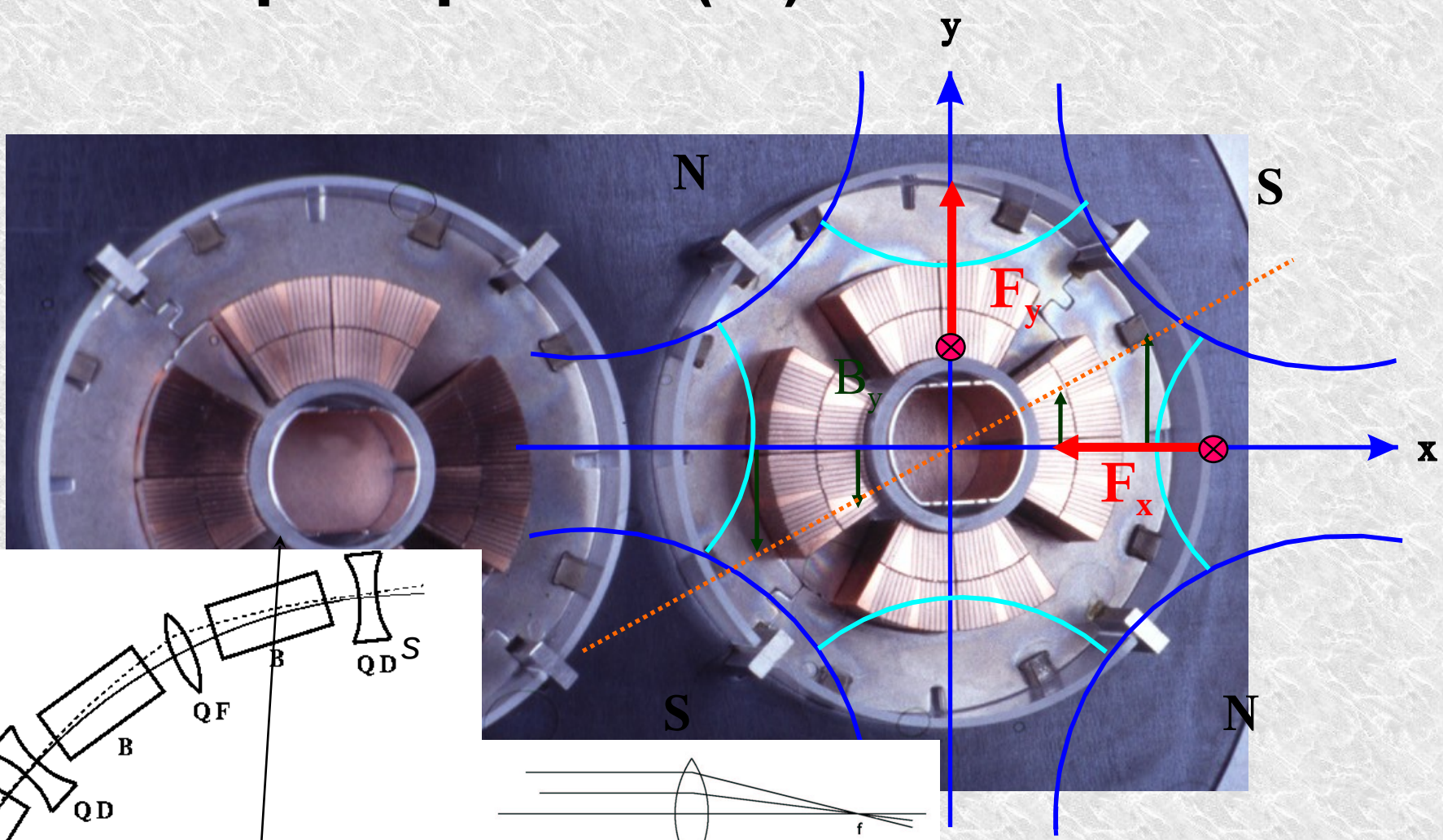


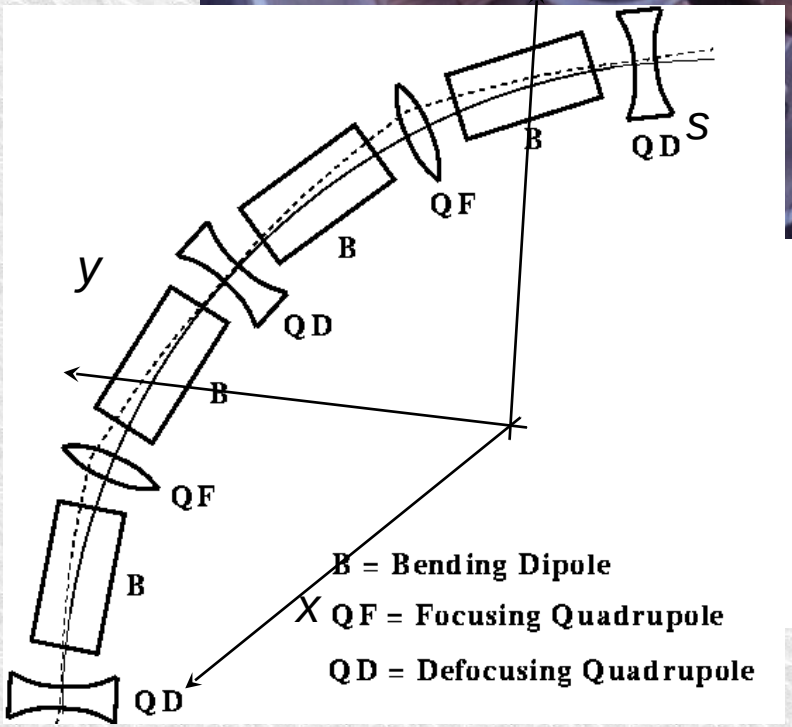
LHC – accélération RF (8)

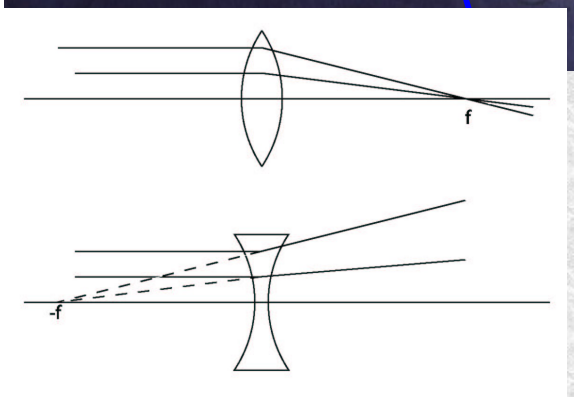
1232 dipôles de courbure



392 quadrupôles de (dé)focalisation

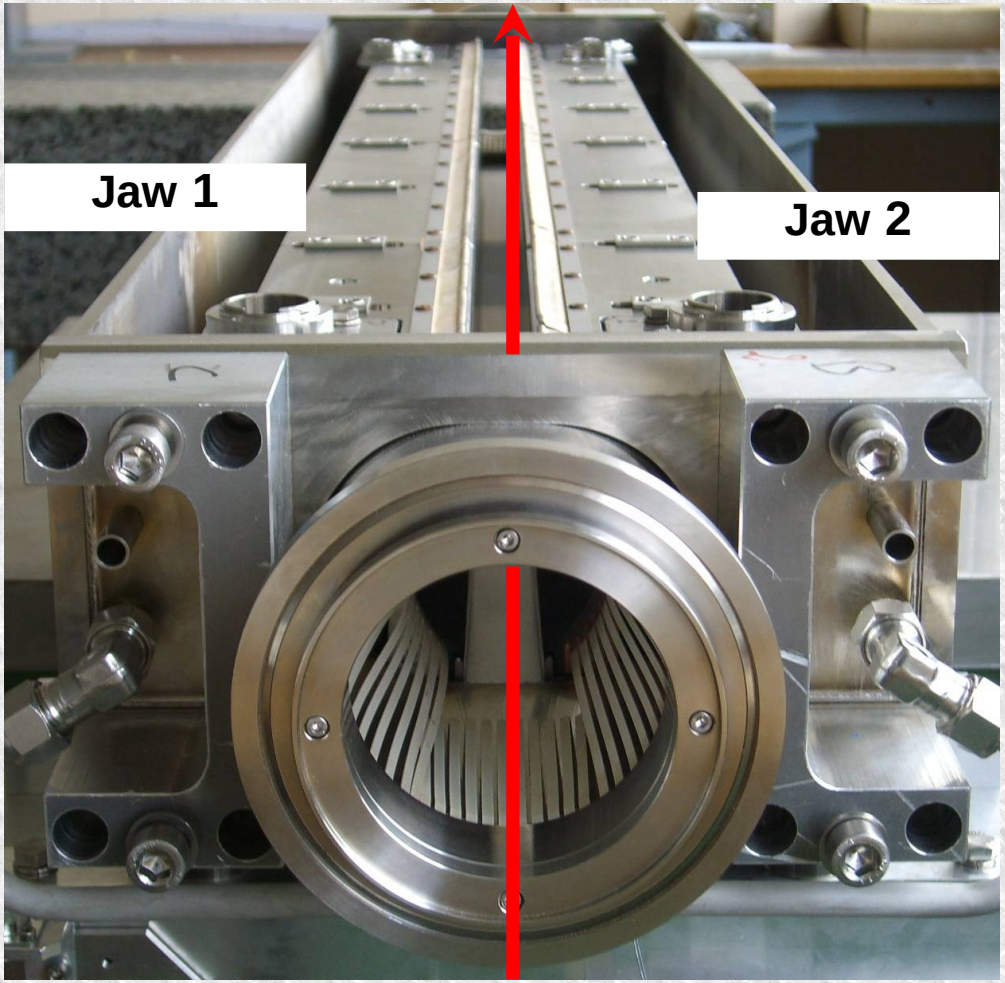






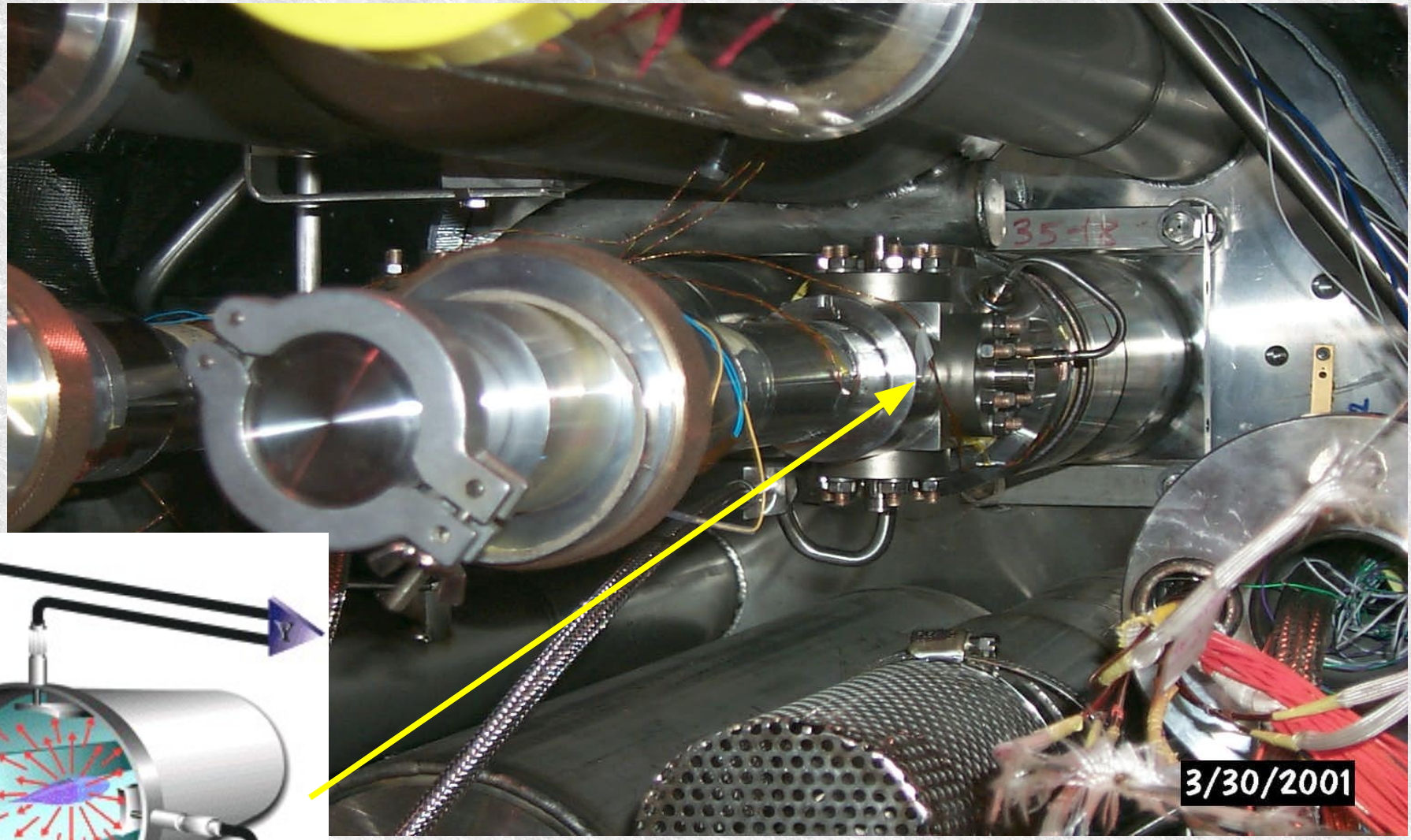
optique du faisceau (4-pôles, 6-pôles)

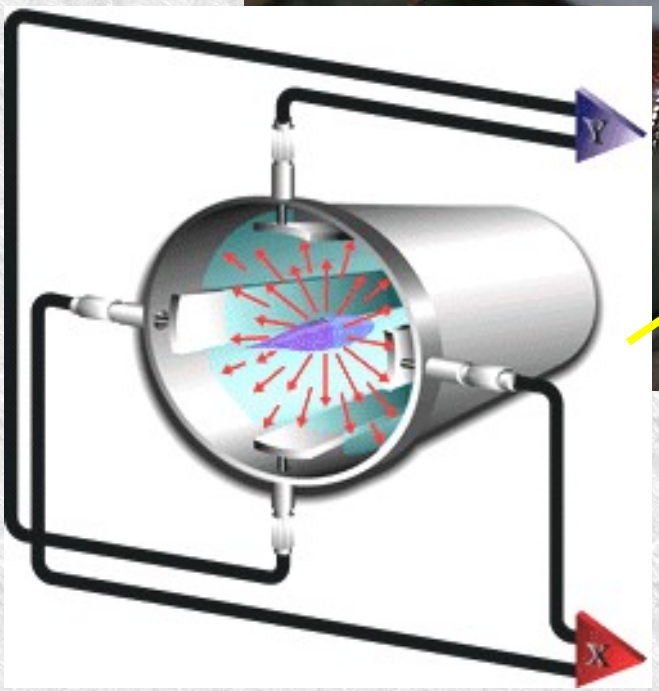
108 éléments de nettoyage du faisceau par collimateurs et absorbeurs



réduit le halo autour du faisceau

Moniteur de la position du faisceau

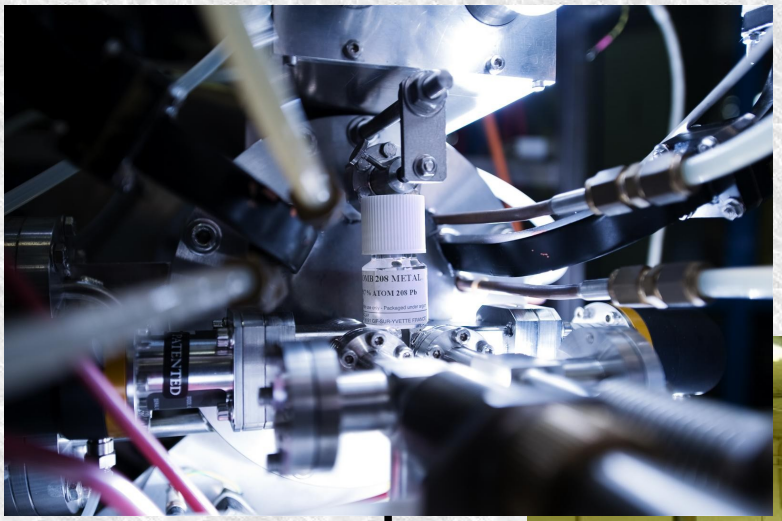




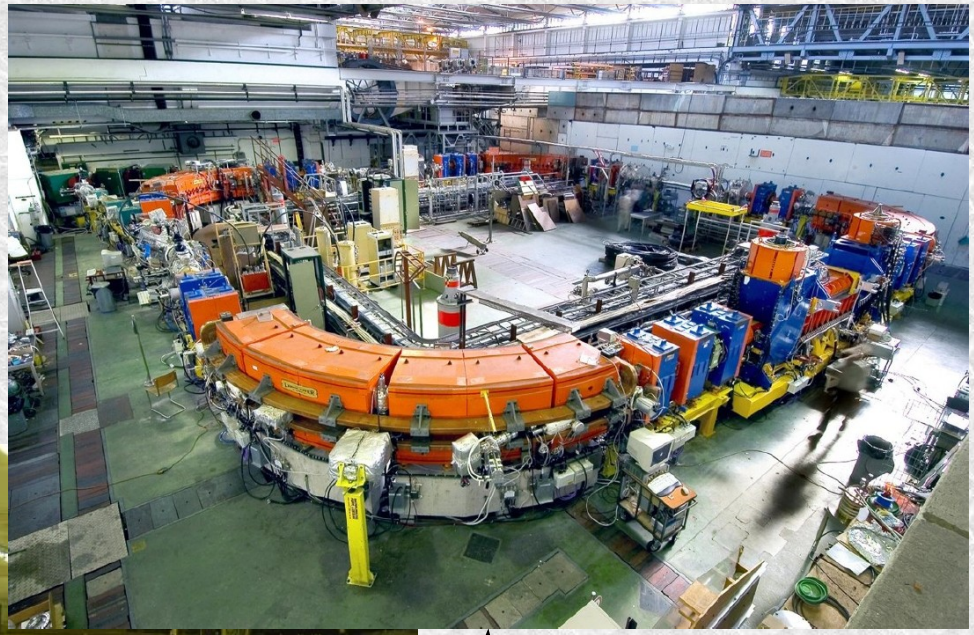
fonctionne par induction électrique

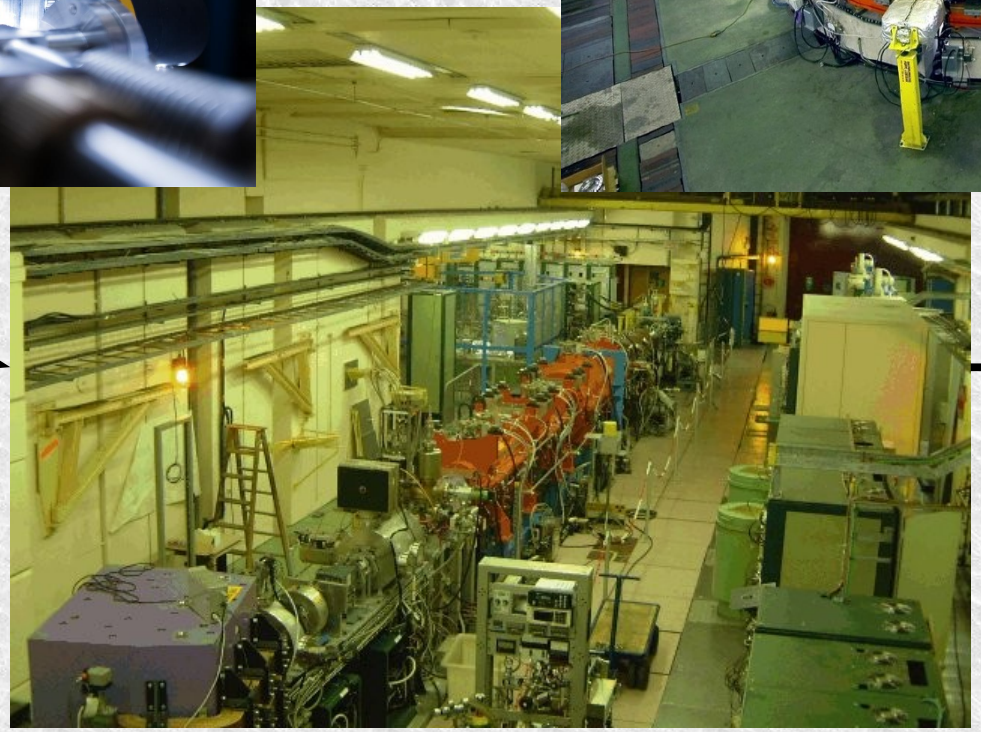
Les ions lourds (Pb=82p+126n)

Source ECR
(Electron Cyclotron Resonance)
2.4 keV/u, Pb27+



L'accumulateur d'ions LEIR





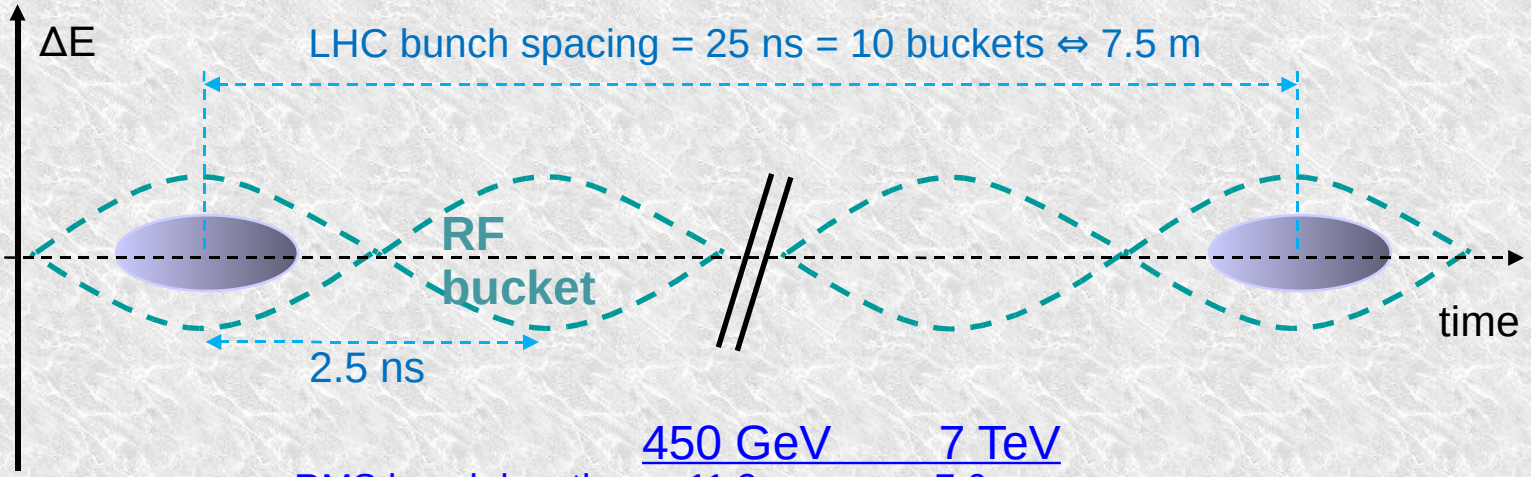
compression des paquets

accélération et augmentation de l'état de ionisation

LINAC3 4.2 MeV/u, Pb53+
(1μm feuille de carbone)

Le centre de contrôle de l'accélérateur

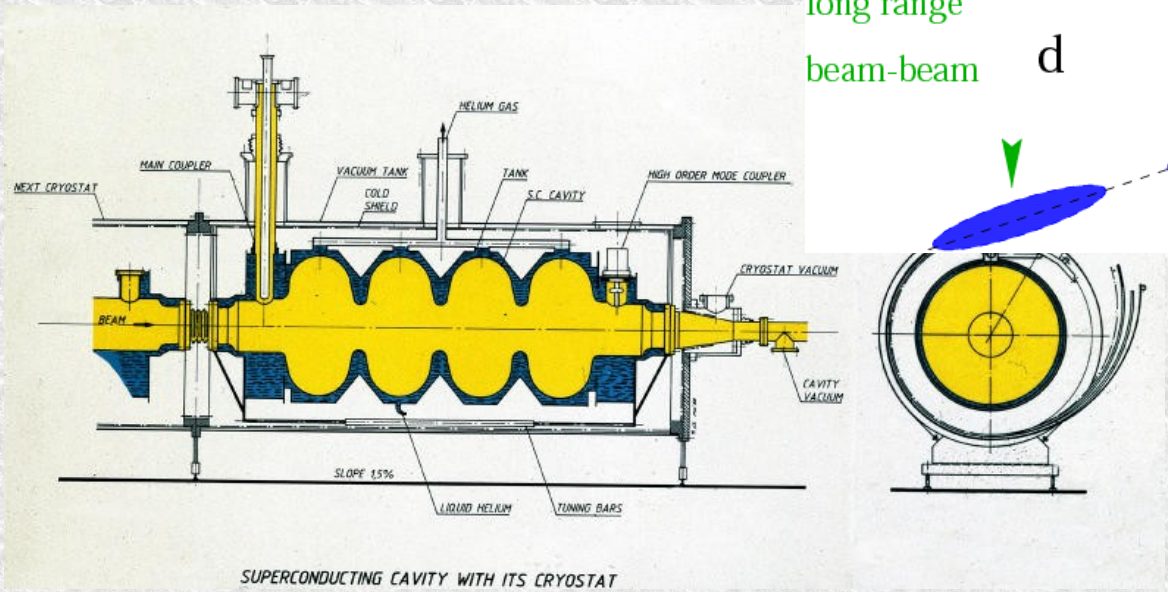
La structure du faisceau

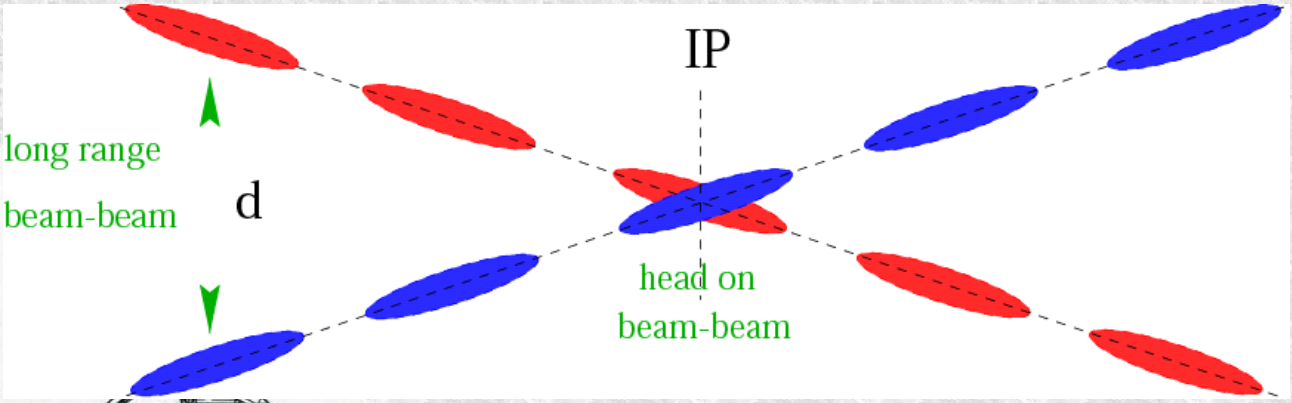


“paquets” de particules

	450 GeV	7 TeV
RMS bunch length	11.2 cm	7.6 cm
RMS energy spread	0.031%	0.011%

cavité radiofrequence





région (point) d'interaction

Collisions pour ALICE au Point2

Caractéristique	Valeur
Circonférence	26 659 m
Température d'exploitation des dipôles	1,9 K (-271.3°C)
Nombre d'aimants	9593
Nombre de dipôles principaux	1232
Nombre de quadripôles principaux	392
Nombre de cavités radiofréquence	8 par faisceau
Énergie nominale, mode protons	7 TeV
Énergie nominale, mode ions	2,76 TeV/u (*)
Champ magnétique dipolaire maximal	8.33 T
Distance min. entre les paquets	~7 m
Luminosité nominale	10^{34} cm^{-2} s^{-1}
Nombre de paquets par faisceau de protons	2808
Protons par paquet (au départ)	1,1 x 10^{11}
Nombre de tours par seconde	11 245
Nombre de collisions par seconde	600 millions

ALICE

$$L = 5 \cdot 10^{30}\, cm^{-2} s^{-1}$$

200 000 coll./s
(avec "pile-up")

$$L = 10^{29}\, cm^{-2} s^{-1}$$

(sans "pile-up", 4 kHz)

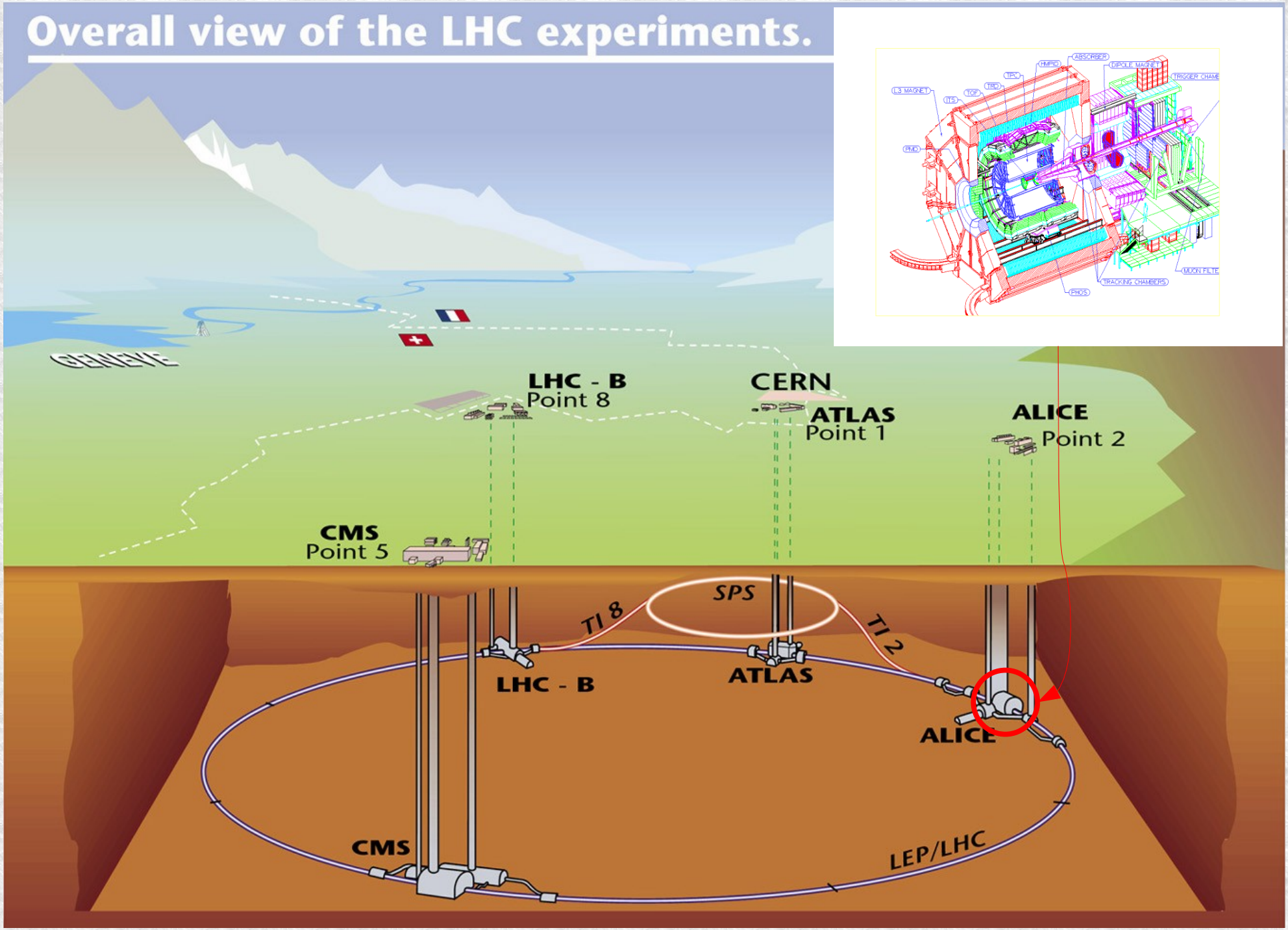
section efficace:

$$\sigma_{inel} = 60\, mb$$

$$1\, mb = 10^{-24}\, cm^{2}$$

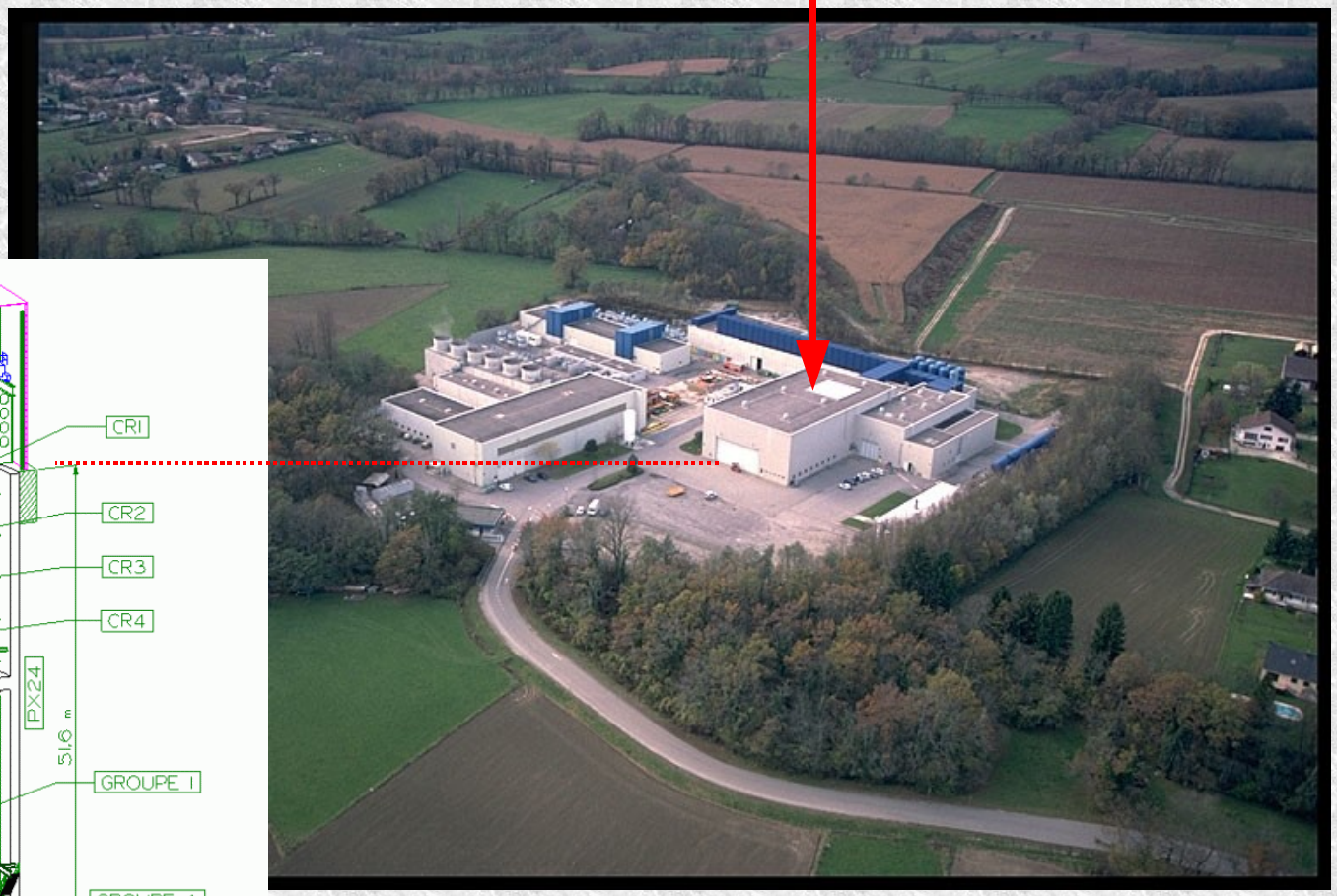
Calculateur de luminosité: http://lpc.web.cern.ch/lpc/lumi.html

L'expérience ALICE

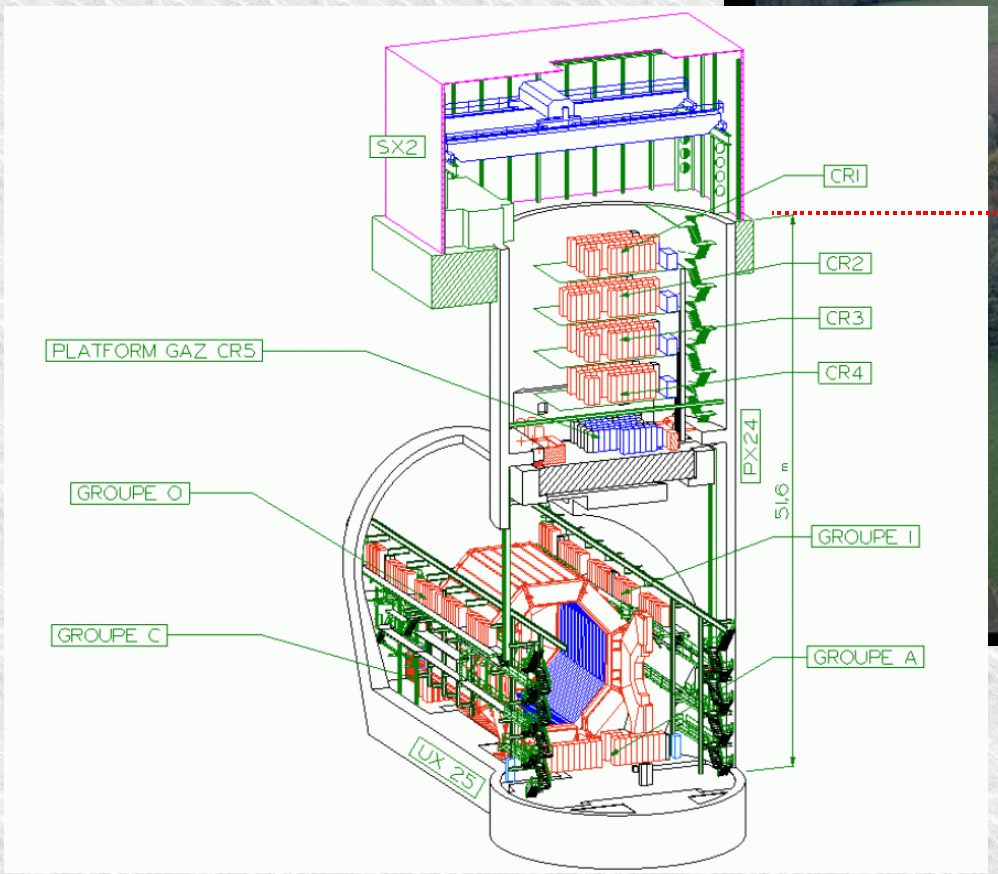


Le site ALICE au Point2 (Saint-Genis-Pouilly, FR)

ici

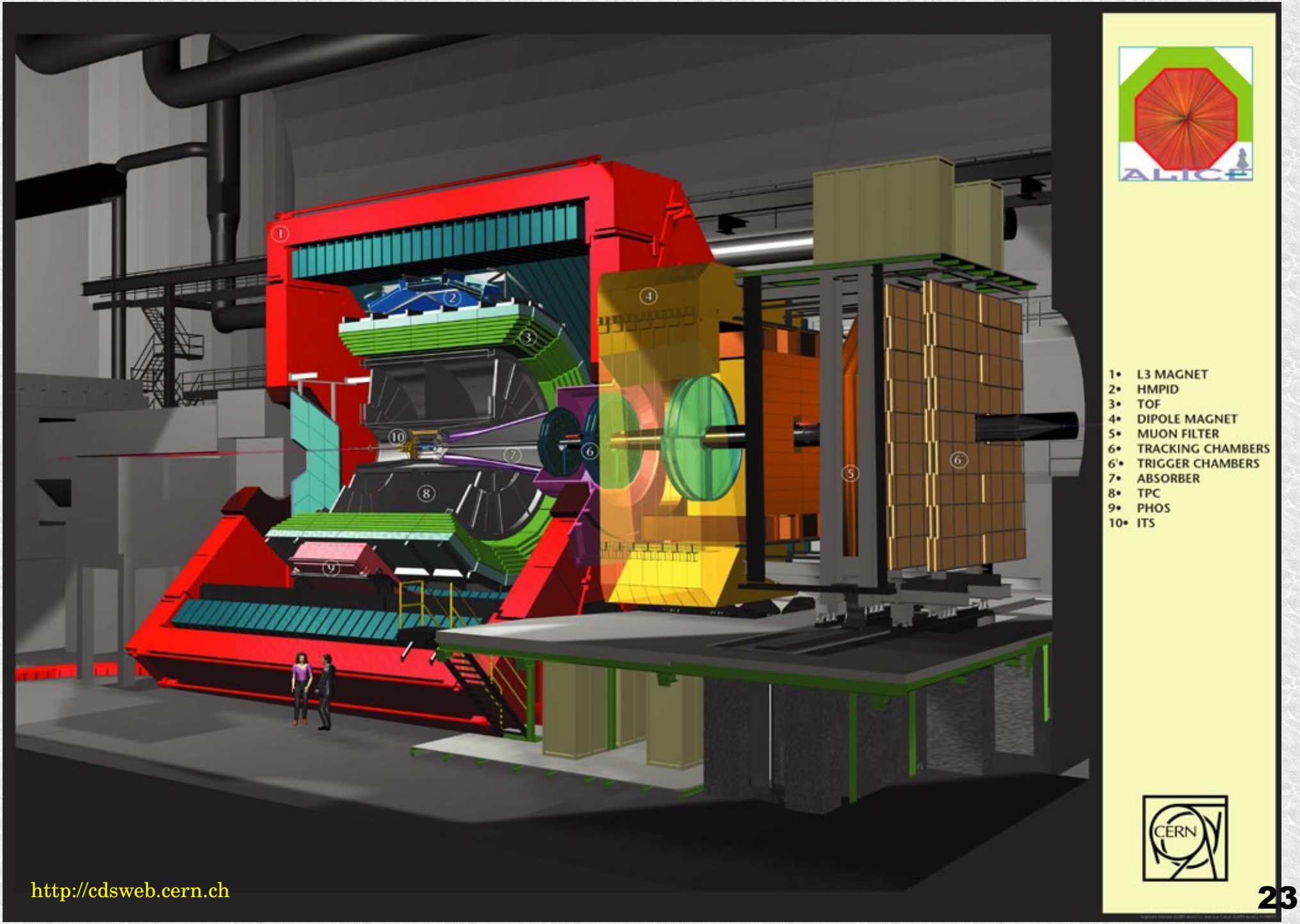


51.6 m sous la terre



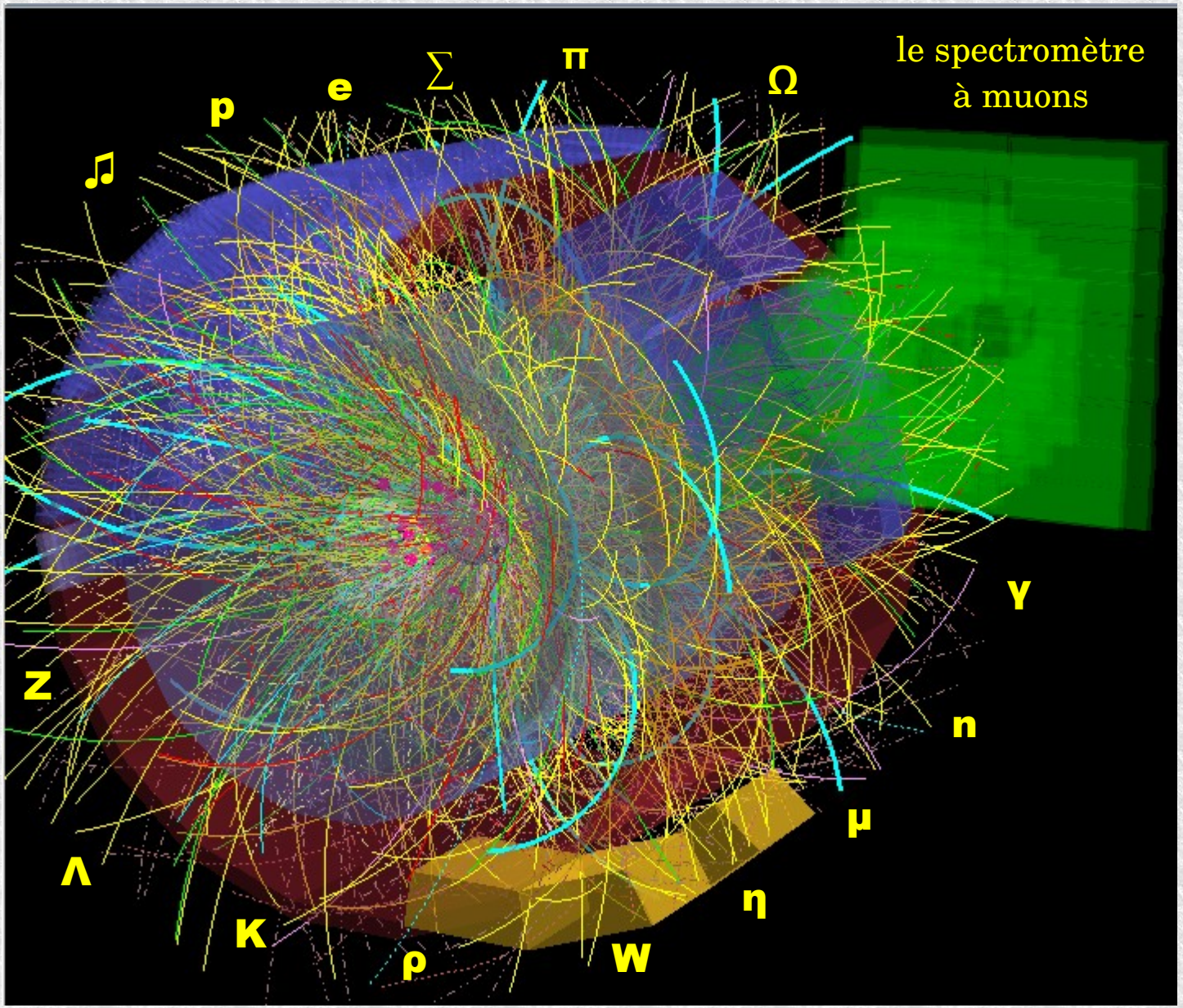
http://cdsweb.cern.ch

Les détecteurs de l'expérience ALICE



http://cdsweb.cern.ch

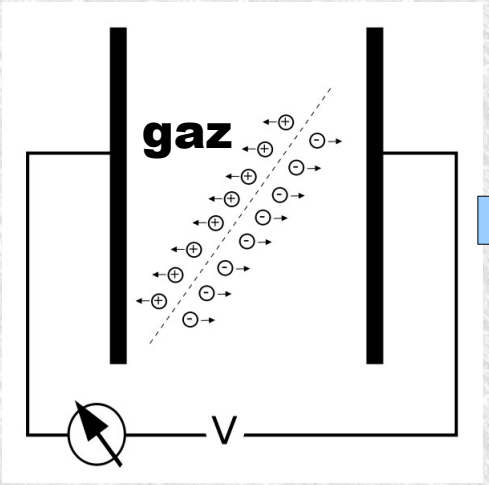
Attention, ça collisionne!



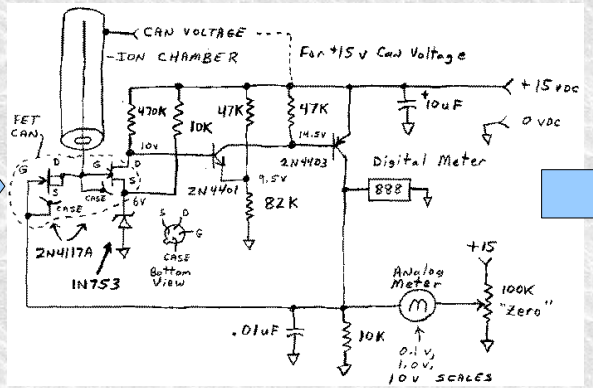
Pb-Pb novembre 2011

Le détecteur de particules

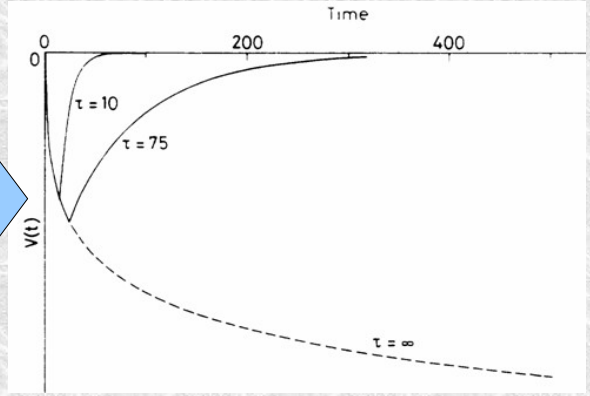
particule ionisante...



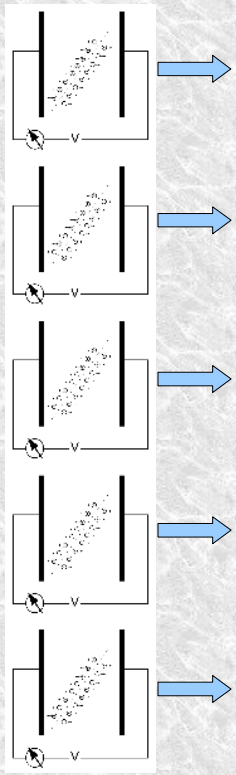
charge électrique...



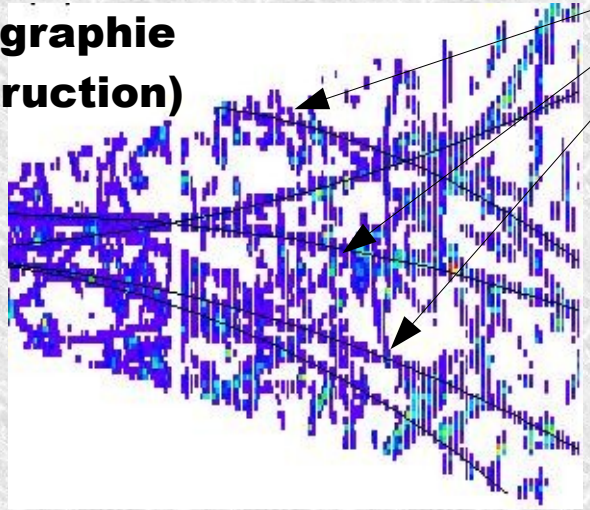
signal (analogique)



segmentation géométrique et multiplication des voies électroniques



trajectographie (reconstruction)

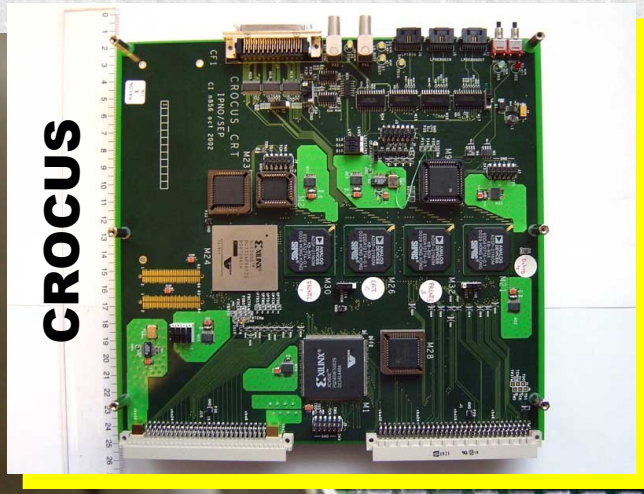


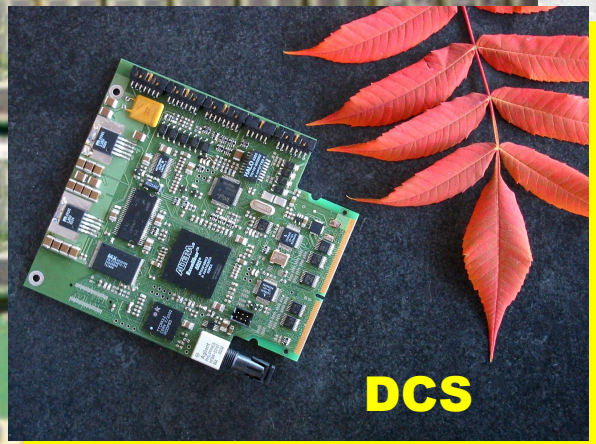
trajectoires de particules

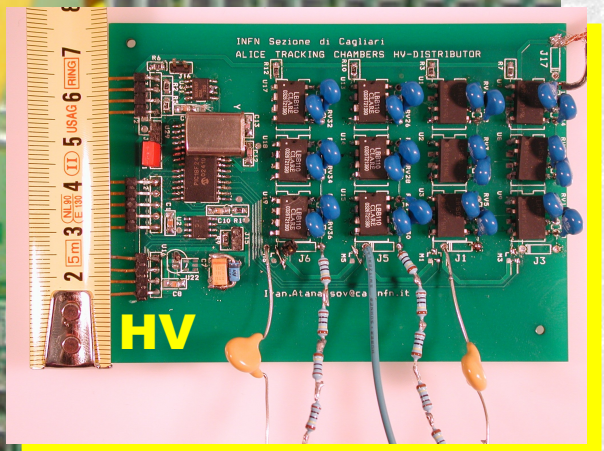
ALICE/TPC
“Time Projection Chamber”
temps = coordonnée

http://fr.wikipedia.org
http:/www.techlib.com
PHENIX

Le spectromètre à muons



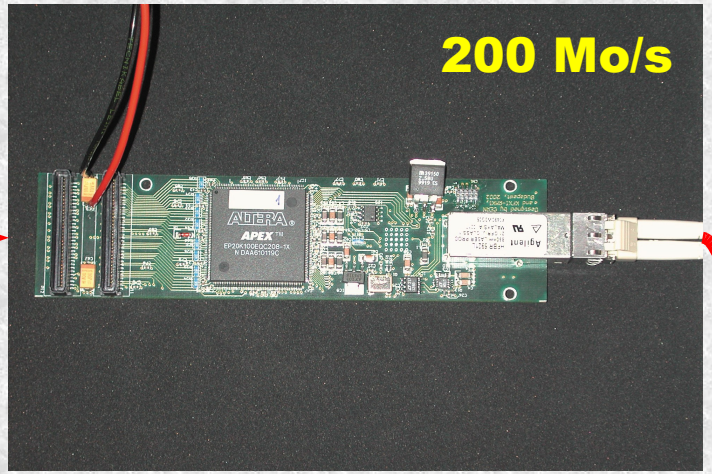




http://cdsweb.cern.ch

Le chemin des données

détecteur FERO



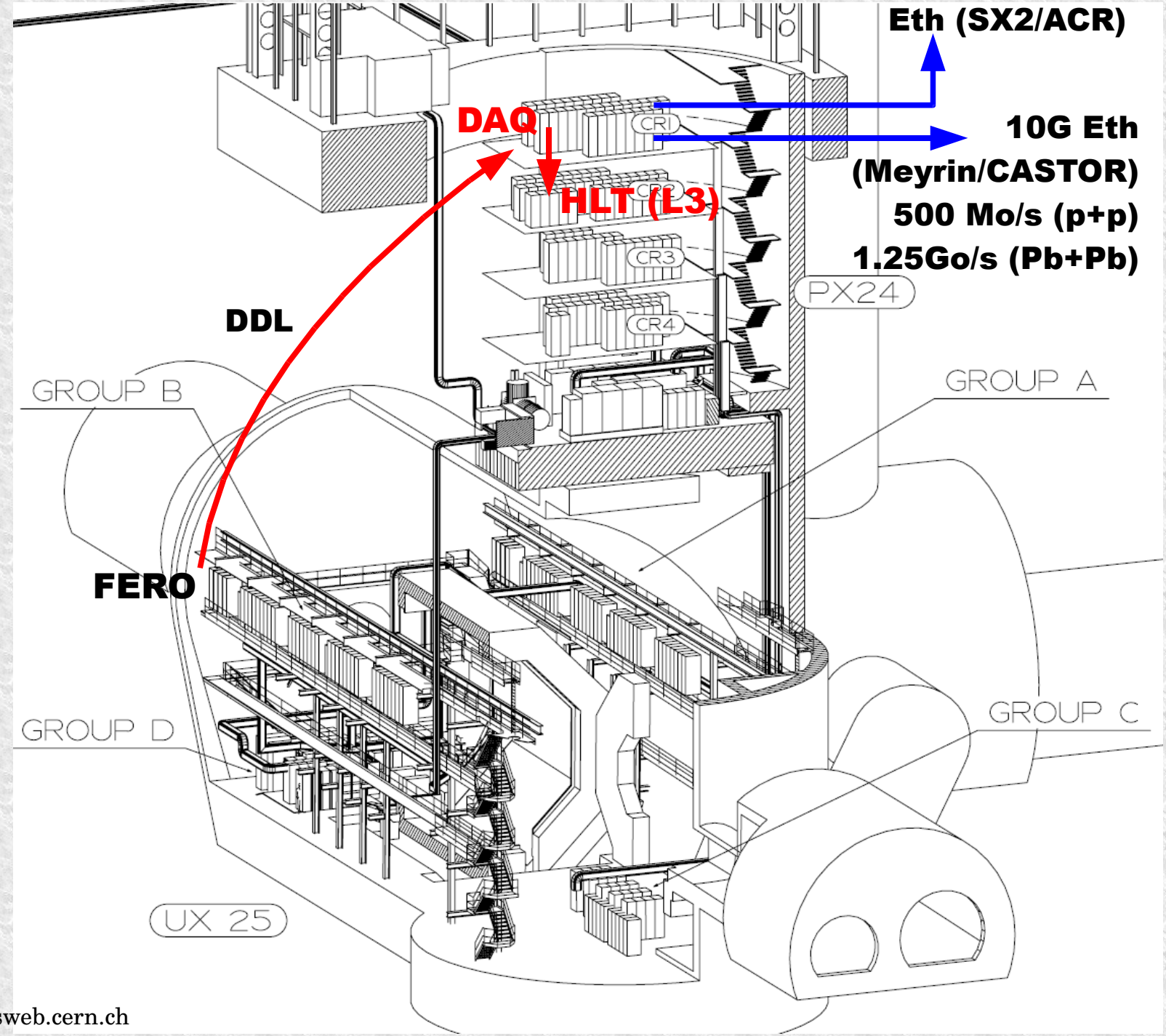
paire de fibres optiques

DDL – Detector Data Link

adaptateur PCI (D-RORC)

stockage temporaire

Le système d'acquisition de données

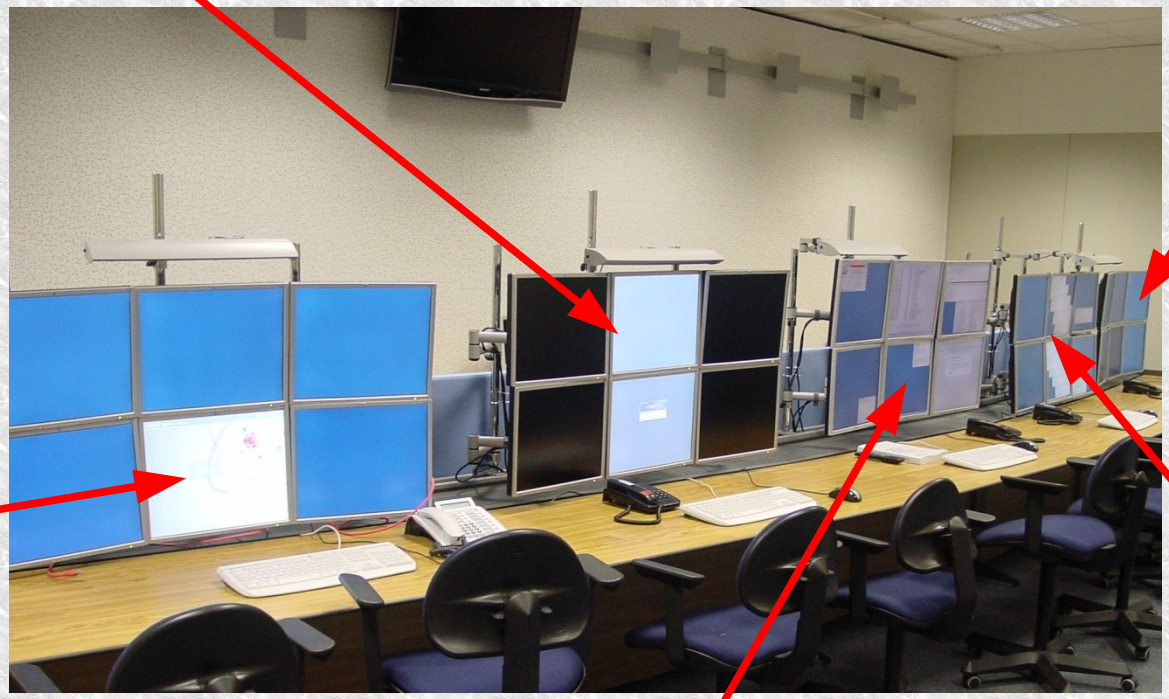


http://cdsweb.cern.ch

La salle de contrôle avec les postes de travail
ACR = ALICE Control Room

DAQ
acquisition des données

HLT
déclenchement de haut niveau

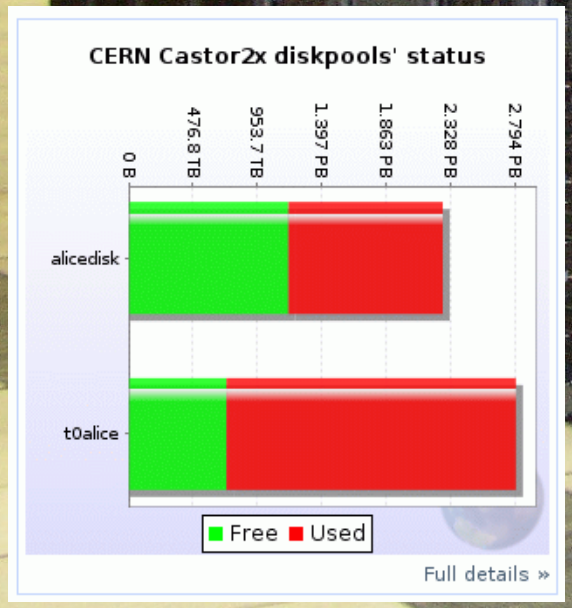


TRG
déclenchement

DCS
système contrôle du détecteur

ECS
système contrôle de l'expérience

Le stockage sur disque pour accès rapide



CASTOR = CERN Advanced Storage Manager

http://cdsweb.cern.ch

Le stockage permanent sur bande magnetique

disque vers bande: 100 Mo/s (p+p)

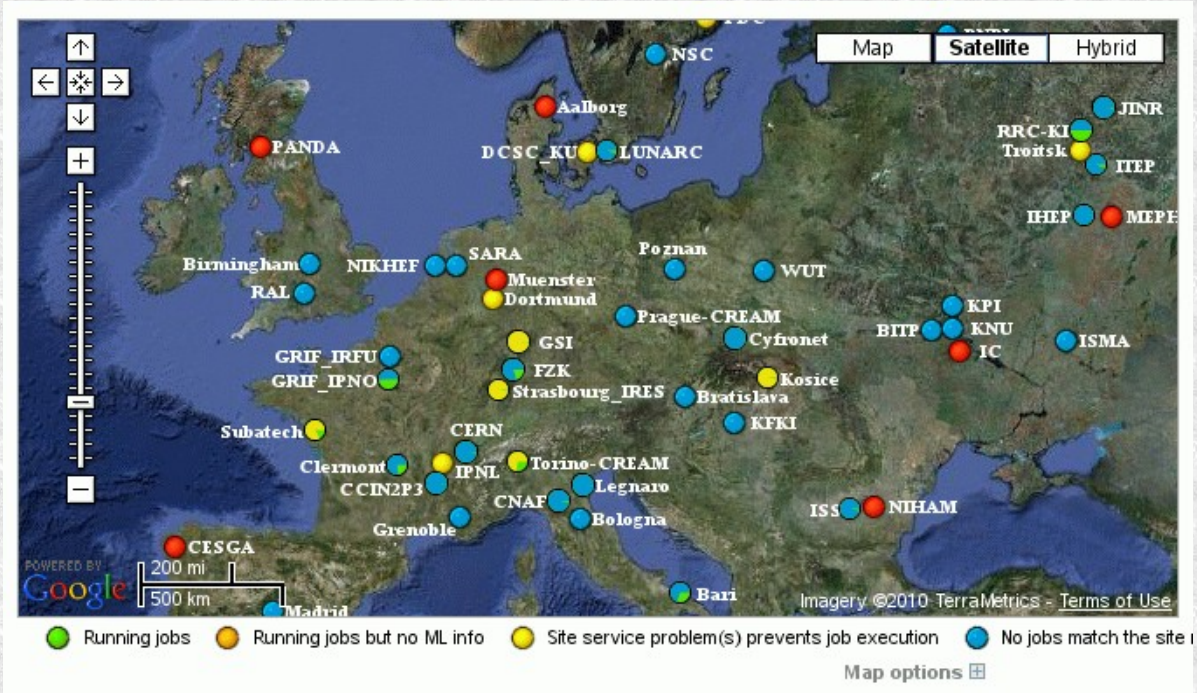
http://cdsweb.cern.ch

Le “chef d'orchestre” AliEn sur la grille de calcul

- **transfert Point2**
- **stockage, répliques**
- **catalogue (base de données)**
- **reconstruction automatique**

Le services centraux “AliEn”

L'interface web vers le service de monitorage “MonALISA”



la grille de calcul – structure étagée

Tier0/1/2/3 Tier (angl.) = étage, couche, strate

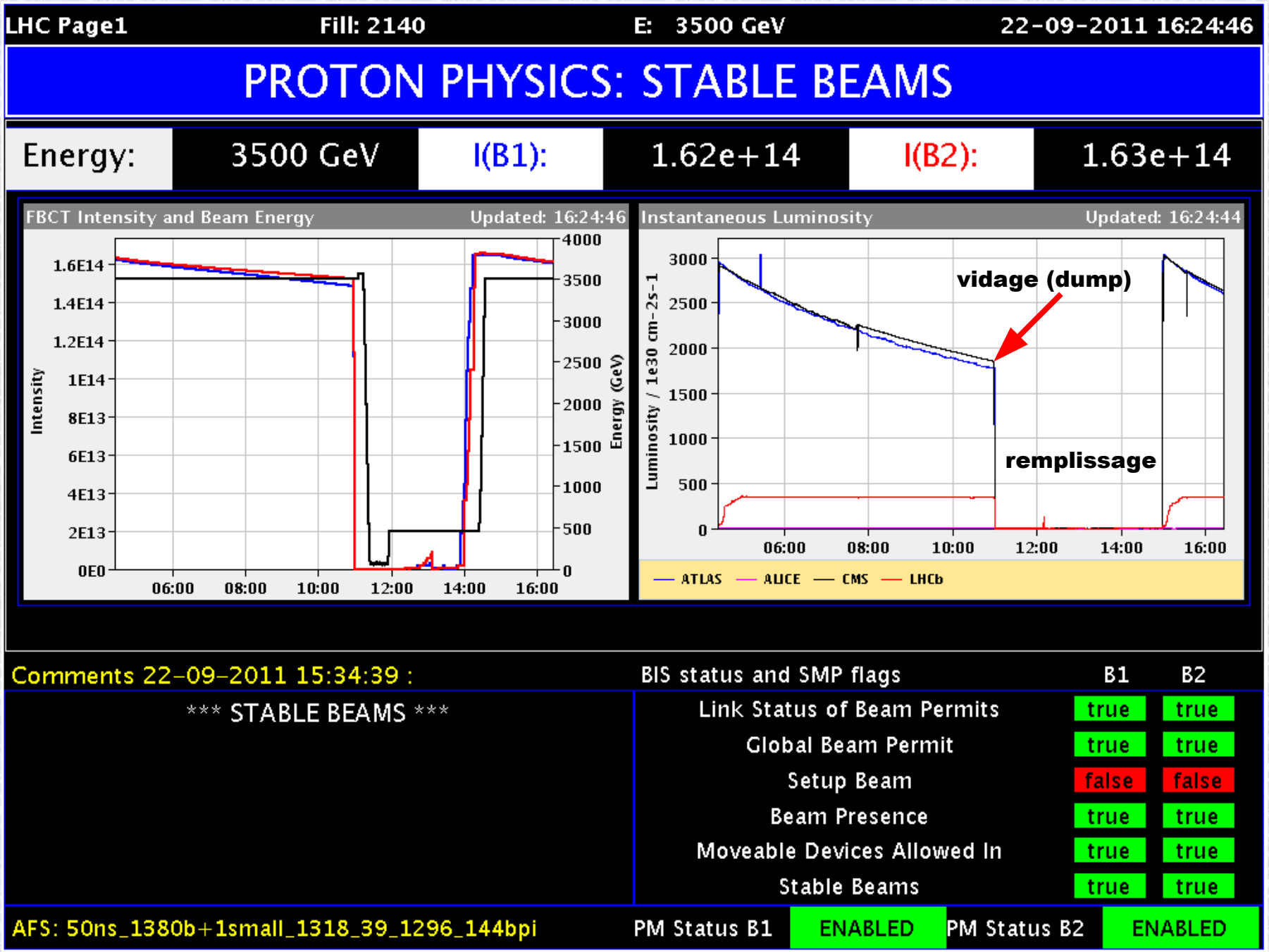
Le Tier2 du LPC
centre régional de la grille de calcul

Le déroulement d'une “session de travail”

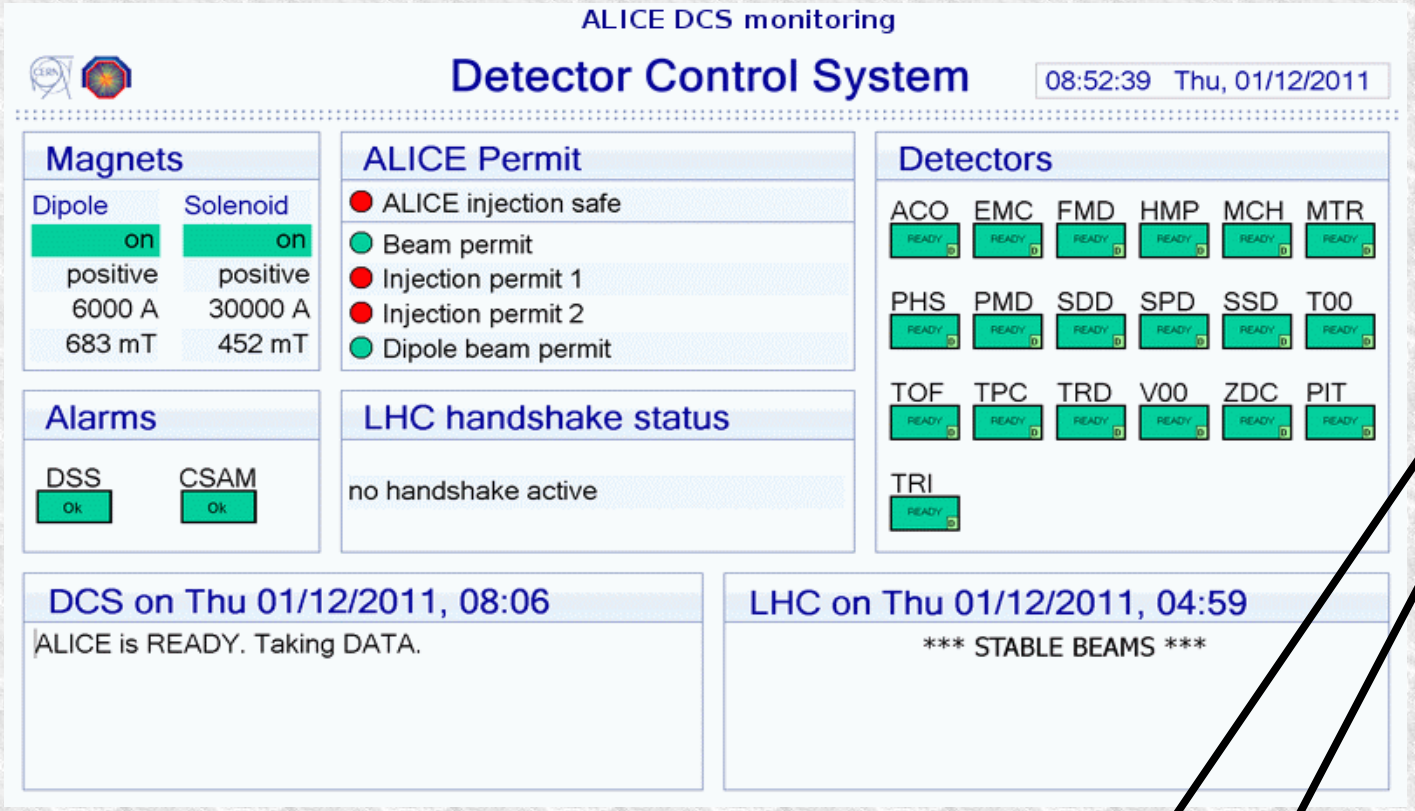
en quelques étapes

Le parcours des données expérimentales

Les faisceaux de particules



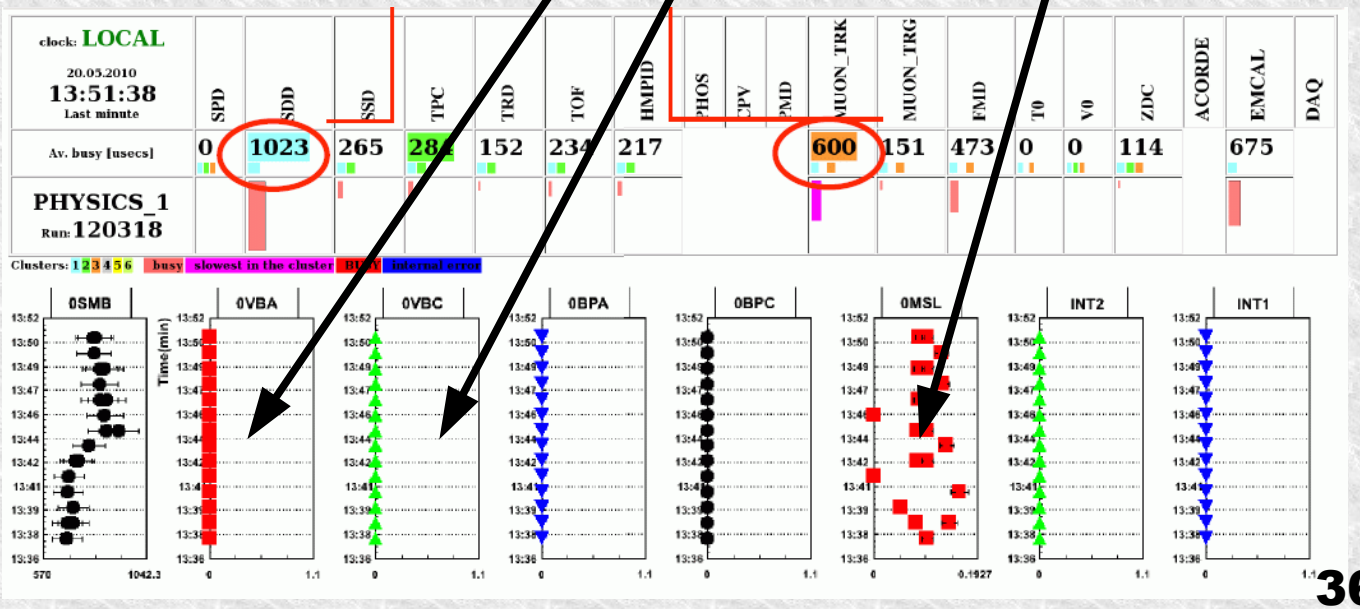
Le détecteur est fonctionnel…



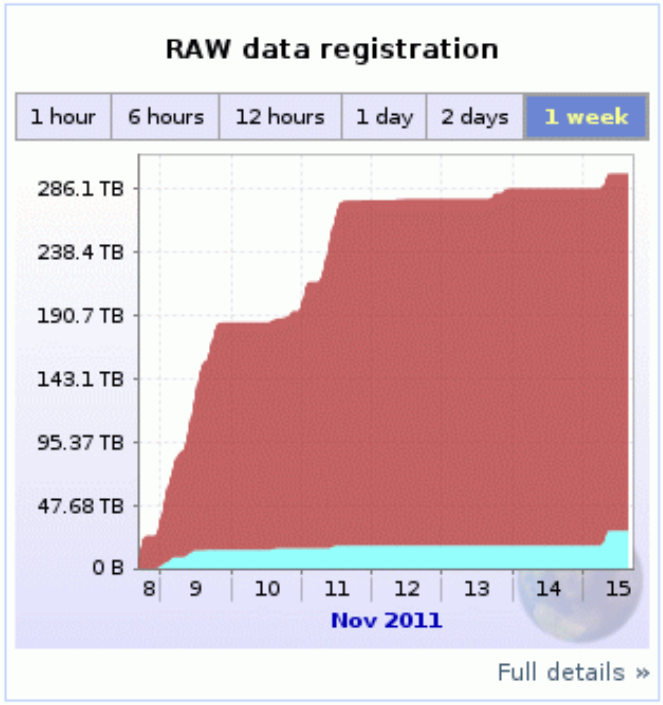
les deux faisceaux

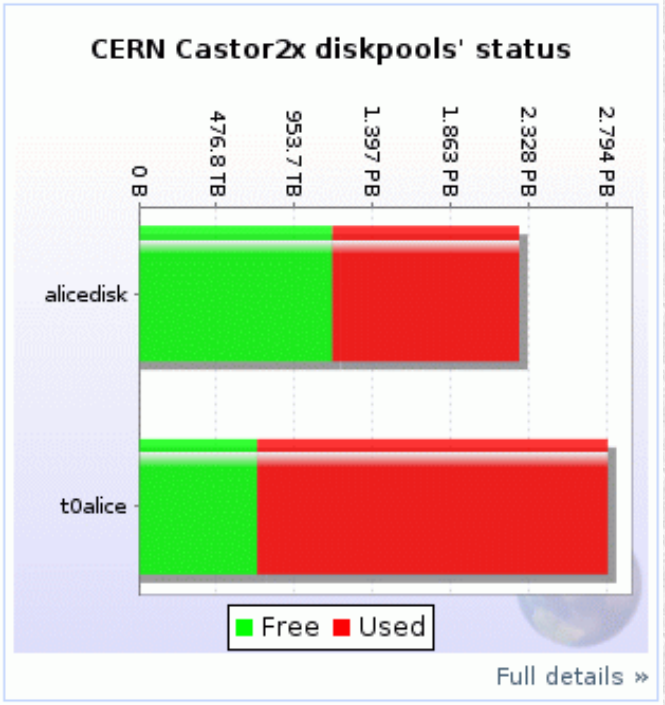
le spectromètre à muons

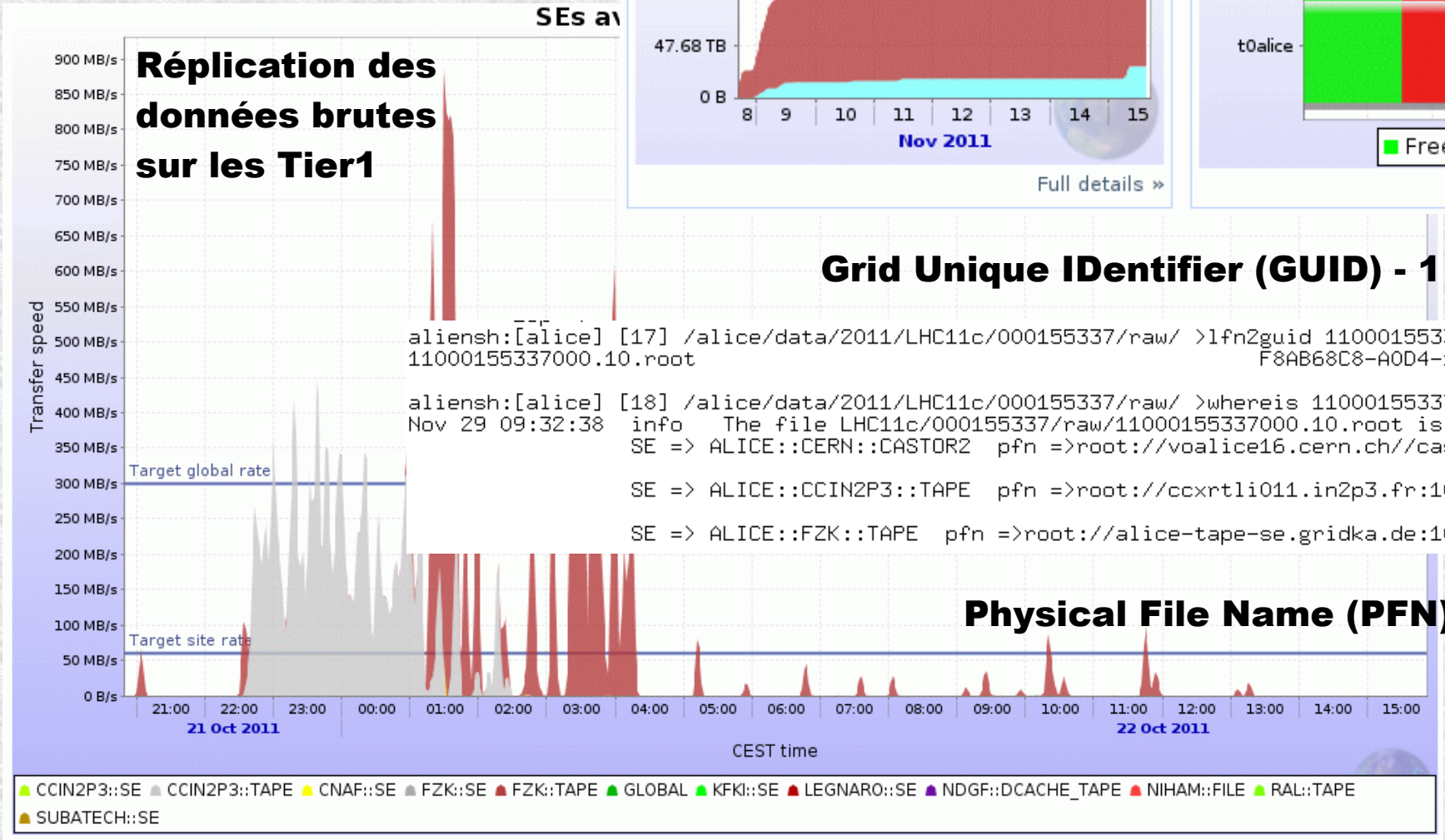
…et il “voit” des collisions.



Transfert (Tier0) et enregistrement (dans le catalogue AliEn) des données brutes







Grid Unique IDentifier (GUID) - 1

```
aliensh:[alice] [17] /alice/data/2011/LHC11c/000155337/raw/ >lfn2guid 11000155337000.10.root
11000155337000.10.root                                    F8AB68C8-A0D4-11E0-9717-2523A10ABEEF

aliensh:[alice] [18] /alice/data/2011/LHC11c/000155337/raw/ >whereis 11000155337000.10.root
Nov 29 09:32:38  info    The file LHC11c/000155337/raw/11000155337000.10.root is in
                 SE => ALICE::CERN::CASTOR2  pfn =>root://voalice16.cern.ch//castor/cern.ch/alice/raw/

                 SE => ALICE::CCIN2P3::TAPE  pfn =>root://ccxrtli011.in2p3.fr:1095//08/18738/F8AB68C8-

                 SE => ALICE::FZK::TAPE  pfn =>root://alice-tape-se.gridka.de:1094//08/18738/f8ab68c8-
```

Physical File Name (PFN) - 1, 2, 3, ...

Client AliEn + certificat GRID2-FR + enregistrement VO ALICE = accès au catalogue AliEn (console shell client)

Run 155337
(p+p)
Durée = 01:53:57
~2.5 Mil evs

```
aliensh:[alice] [15] /alice/data/2011/LHC11c/000155337/raw/ >ls -l
-rwxr-xr-x   alidaq   alidaq      544484090 Jun 27 20:08    11000155337000.10.root
-rwxr-xr-x   alidaq   alidaq      535275108 Jun 27 20:09    11000155337000.11.root
-rwxr-xr-x   alidaq   alidaq      552910406 Jun 27 20:08    11000155337000.12.root
-rwxr-xr-x   alidaq   alidaq      533039470 Jun 27 20:09    11000155337000.13.root
-rwxr-xr-x   alidaq   alidaq      539852908 Jun 27 20:09    11000155337000.14.root
-rwxr-xr-x   alidaq   alidaq      538900107 Jun 27 20:09    11000155337000.15.root
-rwxr-xr-x   alidaq   alidaq      512745815 Jun 27 20:09    11000155337000.20.root
-rwxr-xr-x   alidaq   alidaq      507614735 Jun 27 20:09    11000155337000.21.root
-rwxr-xr-x   alidaq   alidaq      522604072 Jun 27 20:09    11000155337000.22.root
```

données brutes
426 fichiers
~150 Go

RAW Production Cycles

Filters	Chunks		Events	AliEn job		QA	Software versions		Partition	Pass	Output dir	Comment
Run number	OK/All	%	(reco)	Job ID	Err		ROOT	ALIROOT				Filter
155384	232 / 450	51.6%	1,588,699	104348959	✔		v5-28-00d	v4-20-Rev-30	LHC11c	1	/alice/data/2011/LHC11c/000155384/ESDs/pass1	7000 GeV (- -)
155367	148 / 150	98.7%	367,671	104349615	✔		v5-28-00d	v4-20-Rev-30	LHC11c	1	/alice/data/2011/LHC11c/000155367/ESDs/pass1	7000 GeV (- -)
155365	514 / 600	85.7%	3,940,195	104349873	✔		v5-28-00d	v4-20-Rev-30	LHC11c	1	/alice/data/2011/LHC11c/000155365/ESDs/pass1	7000 GeV (- -)
155337	420 / 426	98.6%	2,478,908	104615841	✔		v5-28-00d	v4-20-Rev-30	LHC11c	1	/alice/data/2011/LHC11c/000155337/ESDs/pass1	7000 GeV (- -)
154930	146 / 150	97.3%	197,743	104695554	✔		v5-28-00d	v4-20-Rev-30	LHC11c	1	/alice/data/2011/LHC11c/000154930/ESDs/pass1	Cosmics (- -)

```
aliensh:[alice] [36] /alice/data/2011/LHC11c/000155337/ESDs/pass1/11000155337000.10/ >ls -l
-rwxr-xr-x   alidaq   alidaq        1238170 Jul 01 02:20    AliESDfriends.root
-rwxr-xr-x   alidaq   alidaq      187233811 Jul 01 02:20    AliESDs.root
-rwxr-xr-x   alidaq   alidaq         800146 Jul 01 02:20    log_archive
-rwxr-xr-x   alidaq   alidaq        1546560 Jul 01 02:20    Merged.QA.Data.root
-rwxr-xr-x   alidaq   alidaq          15185 Jul 01 02:20    Run155337.Event0_8400.ESD.tag.root
-rwxr-xr-x   alidaq   alidaq      190034218 Jul 01 02:20    root_archive.zip
-rwxr-xr-x   alidaq   alidaq            131 Jul 01 02:20    stderr.log
-rwxr-xr-x   alidaq   alidaq       37238761 Jul 01 02:20    stdout.log
-rwxr-xr-x   alidaq   alidaq          13041 Jul 01 02:20    tag.log
```

Reconstruction Pass1 = ~50 Go (ESD – données sommaire “Event Summary Data”)

Répliques: ALICE::Subatech::SE , ALICE::Madrid::SE

Filtrage(s) final(s) sur les données sommaires (ESD)

Production details: **FILTER_p-p_059_LHC11c: No tender, default train**

Job info		Events				Software versions			
PID	Run no.	Input	Processed	%	Filtered	ROOT	AliROOT	Output directory	%
105447373	155337	2,478,908	2,472,283	99.73%	1,788,976	v5-28-00-1	v4-21-28-AN	/alice/data/2011/LHC11c/000155337/ESDs/pass1/AOD059	100%

1.7 Mil evs (sur 2.5 au départ)

```
aliensh:[alice] [62] /alice/data/2011/LHC11c/000155337/ESDs/pass1/AOD059/0001/ >ls -l
-rwxr-xr-x   alidaq   alidaq          3899 Jul 06 01:17    33531_33531_0_24324.stat
-rwxr-xr-x   alidaq   alidaq         34167 Jul 06 01:17    AliAOD.Dielectron.root
-rwxr-xr-x   alidaq   alidaq        887152 Jul 06 01:17    AliAOD.Jets.root
-rwxr-xr-x   alidaq   alidaq       5328812 Jul 06 01:17    AliAOD.Muons.root
-rwxr-xr-x   alidaq   alidaq      29520454 Jul 06 01:17    AliAOD.root
-rwxr-xr-x   alidaq   alidaq       5152756 Jul 06 01:17    AliAOD.VertexingHF.root
-rwxr-xr-x   alidaq   alidaq          1284 Jul 06 01:17    AnalysisResults.root
-rwxr-xr-x   alidaq   alidaq        774066 Jul 06 01:17    EventStat_temp.root
-rwxr-xr-x   alidaq   alidaq         75354 Jul 06 01:17    PWG3histograms.root
-rwxr-xr-x   alidaq   alidaq        519414 Jul 06 01:17    PWG4histograms.root
-rwxr-xr-x   alidaq   alidaq      42298520 Jul 06 01:17    root_archive.zip
```

AOD – données objet d'analyse "Analysis Object Data"
~2.8 Go

Répliques: KISTI, LLNL, Hiroshima, Kosice

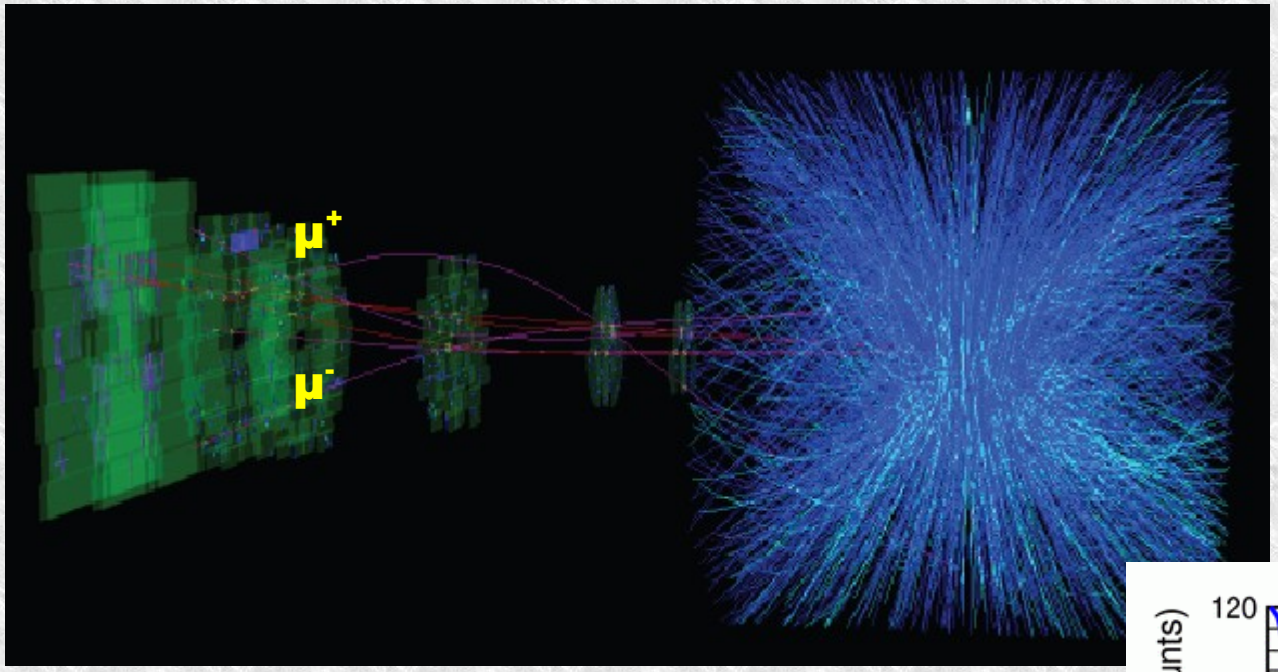
- **analyse orientée – AOD général, Dielectron, Jets, Muon, etc.**

- **groupes de travail: PWG2, PWG3, PWG4 (Physics Working Group)**

- **l'équipe ALICE du LPC membre du groupe PWG3 "saveurs lourdes"**

- **données "légères" sur les ressources locales de l'utilisateur**

L'information utile, la physique



Identification et mesure des particules:

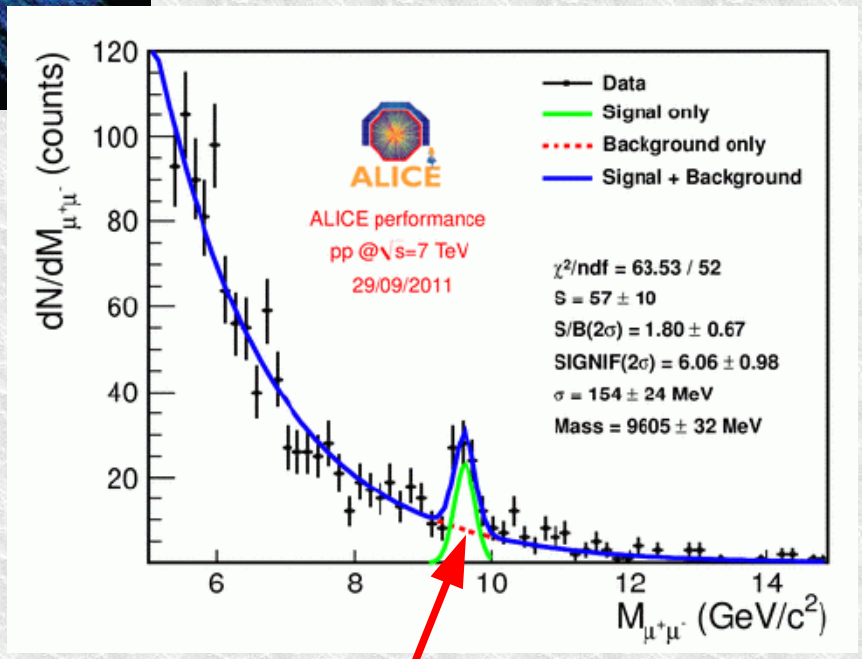
1 muon positif +
1 muon négatif

Énergie: p_1 , p_2

Direction de déplacement: (η_1, ϕ_1) (η_2, ϕ_2)

Combinaison: masse invariante

$$M_{inv}^2 = 2 \cdot p_{T1} \cdot p_{T2} \cdot \left[\cosh(\eta_1 - \eta_2) - \cosh(\phi_1 - \phi_2)\right]$$



X.Lopez

manifestation de l'interaction forte entre deux quarks

La calibration du détecteur

- les paramètres de fonctionnement (...vieillissement du détecteur)

- variations enregistrées pas plus souvant que par “run” (max. quelques heures)
  = période continue d'acquisition (START-STOP)

Exemple: “LocalTriggerBoardMasks”

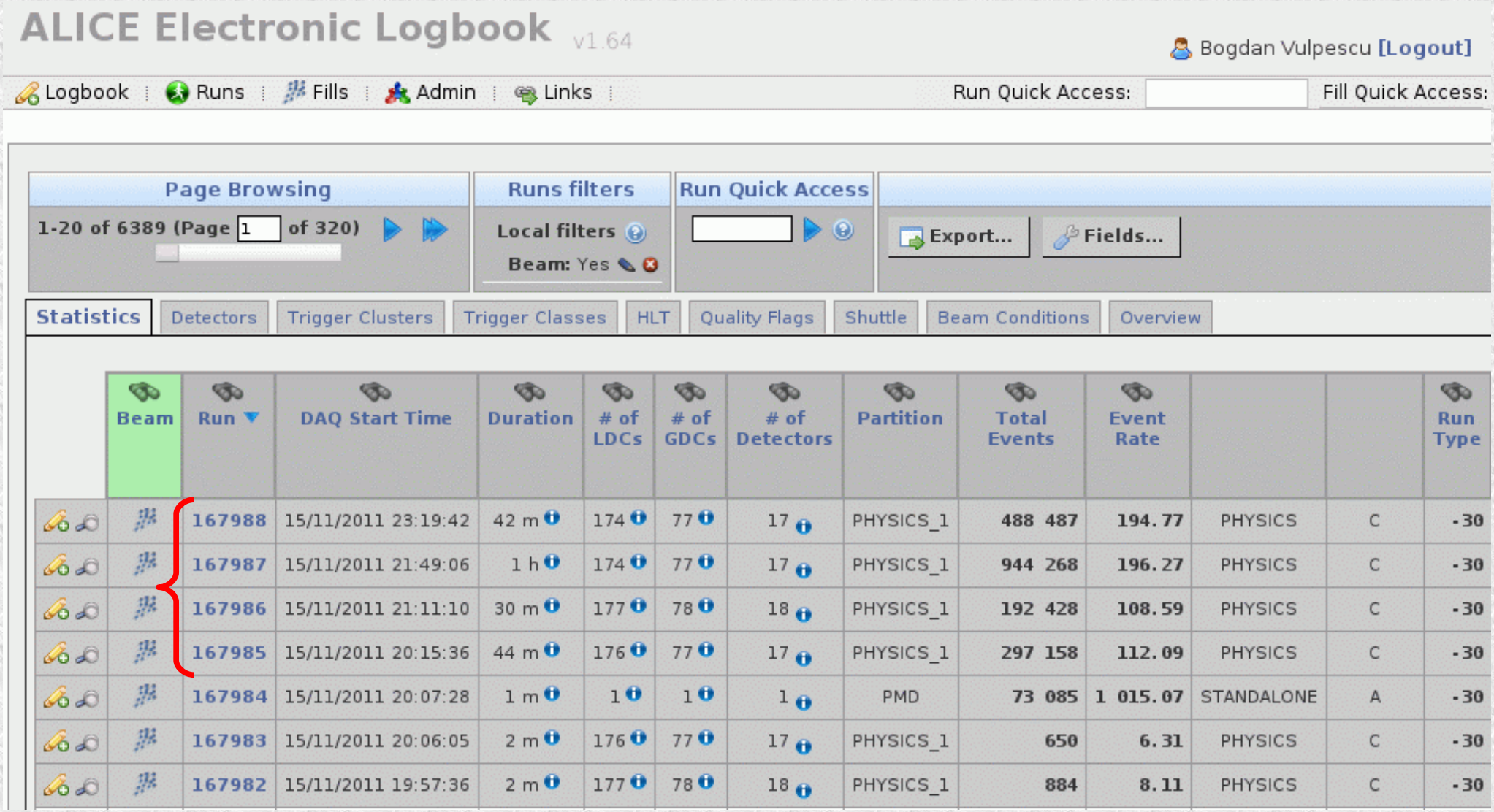
- voies d'électronique en panne ou bruyantes éliminées dans la reconstruction du signal (on utilise des impulsions de calibration pour les identifier)

```
aliensh:[alice] [69] /alice/data/2011/OCDB/MUON/Calib/LocalTriggerBoardMasks/ >ls -l
-rwxr-xr-x   alidaq   alidaq          4254 Apr 26 12:04    Run0_999999999_v1_s0.root
-rwxr-xr-x   alidaq   alidaq          4278 Apr 26 12:04    Run141993_999999999_v2_s0.root
-rwxr-xr-x   alidaq   alidaq          3814 Apr 26 12:04    Run142641_999999999_v3_s0.root
-rwxr-xr-x   alidaq   alidaq          4039 Apr 26 12:04    Run142642_999999999_v4_s0.root
-rwxr-xr-x   alidaq   alidaq          4222 Apr 26 12:04    Run142656_999999999_v5_s0.root
-rwxr-xr-x   alidaq   alidaq          4223 Apr 26 12:04    Run143847_999999999_v6_s0.root
-rwxr-xr-x   alidaq   alidaq          4233 Apr 26 12:04    Run146205_999999999_v7_s0.root
-rwxr-xr-x   alidaq   alidaq          4223 Apr 26 12:04    Run146228_999999999_v8_s0.root
-rwxr-xr-x   alidaq   alidaq          4223 Apr 26 12:04    Run148573_999999999_v9_s0.root
-rwxr-xr-x   alidaq   alidaq          4229 May 13 07:06    Run151303_999999999_v10_s0.root
-rwxr-xr-x   alidaq   alidaq          4237 May 13 07:21    Run151305_999999999_v11_s0.root
-rwxr-xr-x   alidaq   alidaq          4233 May 13 10:41    Run151314_999999999_v12_s0.root
-rwxr-xr-x   alidaq   alidaq          4237 Aug 21 16:33    Run159554_999999999_v13_s0.root
-rwxr-xr-x   alidaq   alidaq          4240 Oct 11 21:05    Run163498_999999999_v14_s0.root
-rwxr-xr-x   alidaq   alidaq          4241 Oct 13 17:32    Run163739_999999999_v15_s0.root
```

Run 155337: ce paramètre a été modifié après le run 151314 et il reste inchangé jusqu'au run 159554

OCDB – Offline Conditions Data Base

Le registre central de “comptabilité”



ALICE Electronic Logbook v1.64

Bogdan Vulpescu [Logout]

Logbook | Runs | Fills | Admin | Links | Run Quick Access: | Fill Quick Access:

Page Browsing: 1-20 of 6389 (Page 1 of 320)

Runs filters: Local filters; Beam: Yes

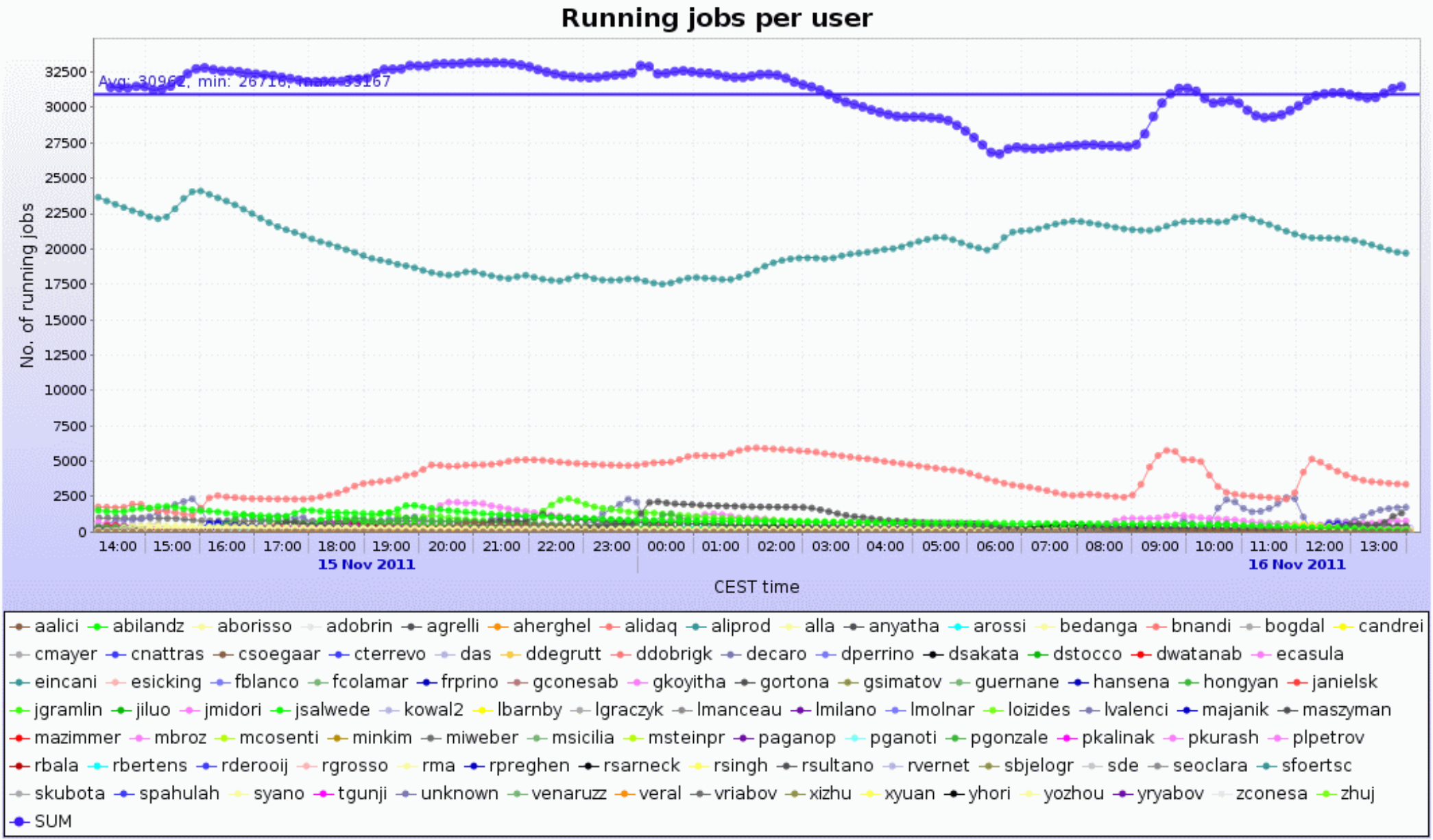
Run Quick Access

Export... Fields...

Statistics | Detectors | Trigger Clusters | Trigger Classes | HLT | Quality Flags | Shuttle | Beam Conditions | Overview

Beam	Run	DAQ Start Time	Duration	# of LDCs	# of GDCs	# of Detectors	Partition	Total Events	Event Rate			Run Type
	167988	15/11/2011 23:19:42	42 m	174	77	17	PHYSICS_1	488 487	194.77	PHYSICS	C	-30
	167987	15/11/2011 21:49:06	1 h	174	77	17	PHYSICS_1	944 268	196.27	PHYSICS	C	-30
	167986	15/11/2011 21:11:10	30 m	177	78	18	PHYSICS_1	192 428	108.59	PHYSICS	C	-30
	167985	15/11/2011 20:15:36	44 m	176	77	17	PHYSICS_1	297 158	112.09	PHYSICS	C	-30
	167984	15/11/2011 20:07:28	1 m	1	1	1	PMD	73 085	1 015.07	STANDALONE	A	-30
	167983	15/11/2011 20:06:05	2 m	176	77	17	PHYSICS_1	650	6.31	PHYSICS	C	-30
	167982	15/11/2011 19:57:36	2 m	177	78	18	PHYSICS_1	884	8.11	PHYSICS	C	-30

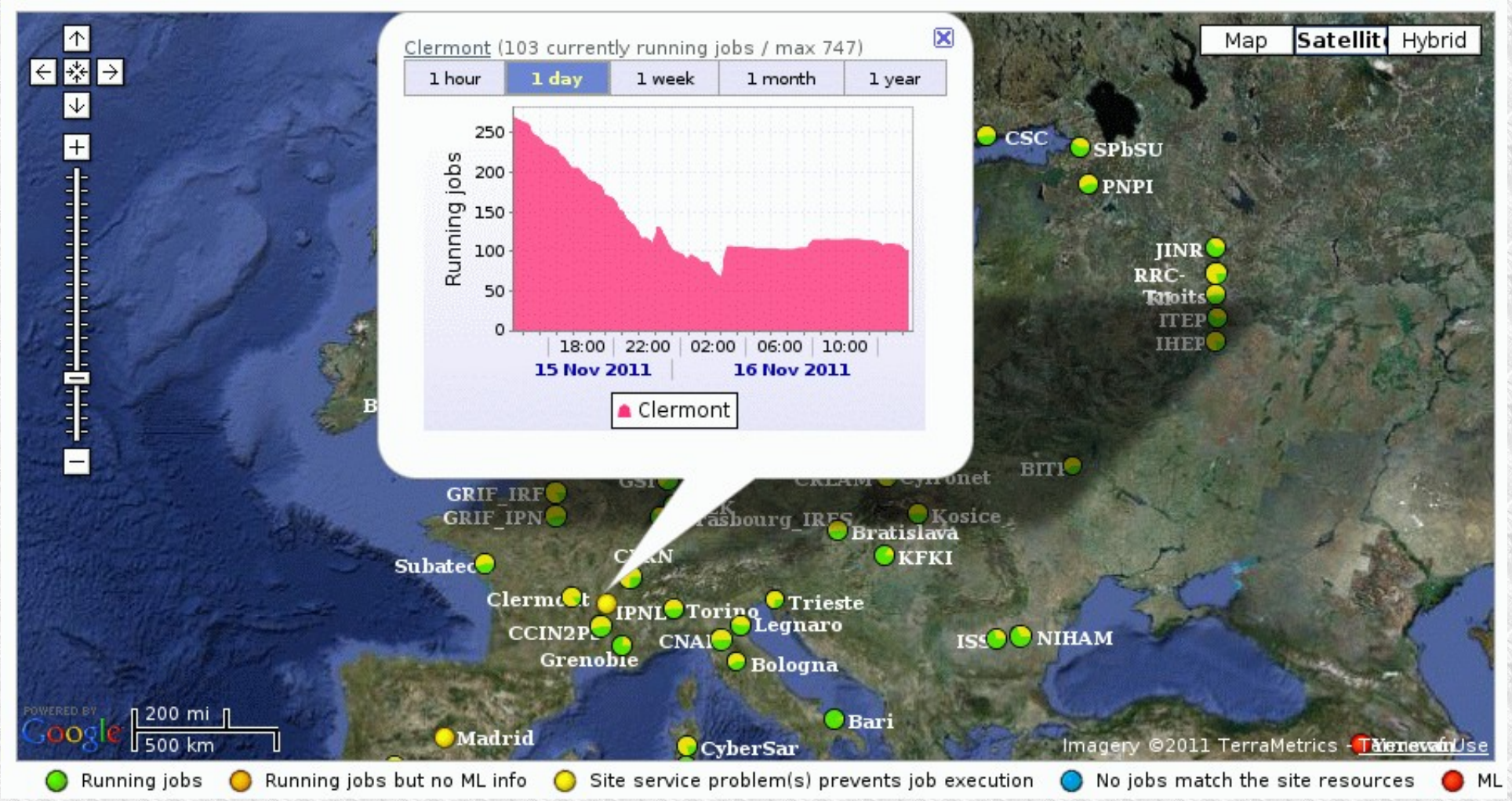
Le suivi de l'activité offline sur la grille de calcul



MonALISA

monitoring agents using a large integrated services architecture

http://alimonitor.cern.ch



MonALISA information
Version: 1.9.6 (JDK 1.6.0_24)
Running on: clrvoboxalicce1.in2p3.fr
Administrator: Jean-Claude Chevaleyre <Jean-Claude.Chevaleyre@clermont.in2p3.fr>

Service health
NTP: UNSYNC, offset: -0.002s

Services status
AliEn: v2-19.133

ClusterMonitor: **OK**
PackMan: **OK**
CE: **OK**
CE info: At the moment we are busy (we ...
Max running jobs: 800
Max queued jobs: 50

Proxies status

AliEn proxy: **OK** (9:25)
Delegated proxy: **OK** (9:34)
Proxy server: **OK** (9:34)
Proxy of the machine: **OK** (18:13)

SAM tests

Delegated proxy duration: n/a
Proxy of the machine: n/a
Proxy renewal: n/a
Proxy server registration: n/a
RB status: n/a
Software area: n/a
User proxy registration: n/a
WMS stats: n/a

Current jobs status

Assigned: 0
Running: **103**
Saving: 0

Accounting (last 24h)

Success jobs: **539** (profile)
Failed jobs: **0**
Error jobs: **125**
kSI2k units: 205 / 654 pledged

Site averages (last 24h)

Active nodes: 83.58
Average kSI2k/node: 1.509

Storages status

Name	Status	Size	Used	Free	Usage	No of files	Type	ADD test
ALICE::Clermont::SE	OK	179.9 TB	101.8%	-	183.2 TB	3.973 M	File	FAIL

VoBox health

CPUs: 4x 3200MHz
Mem usage: 66.2% of 1.964 GB
Processes: 149
Sockets: 38 TCP / 23 UDP
Uptime: 72 days, 07:20

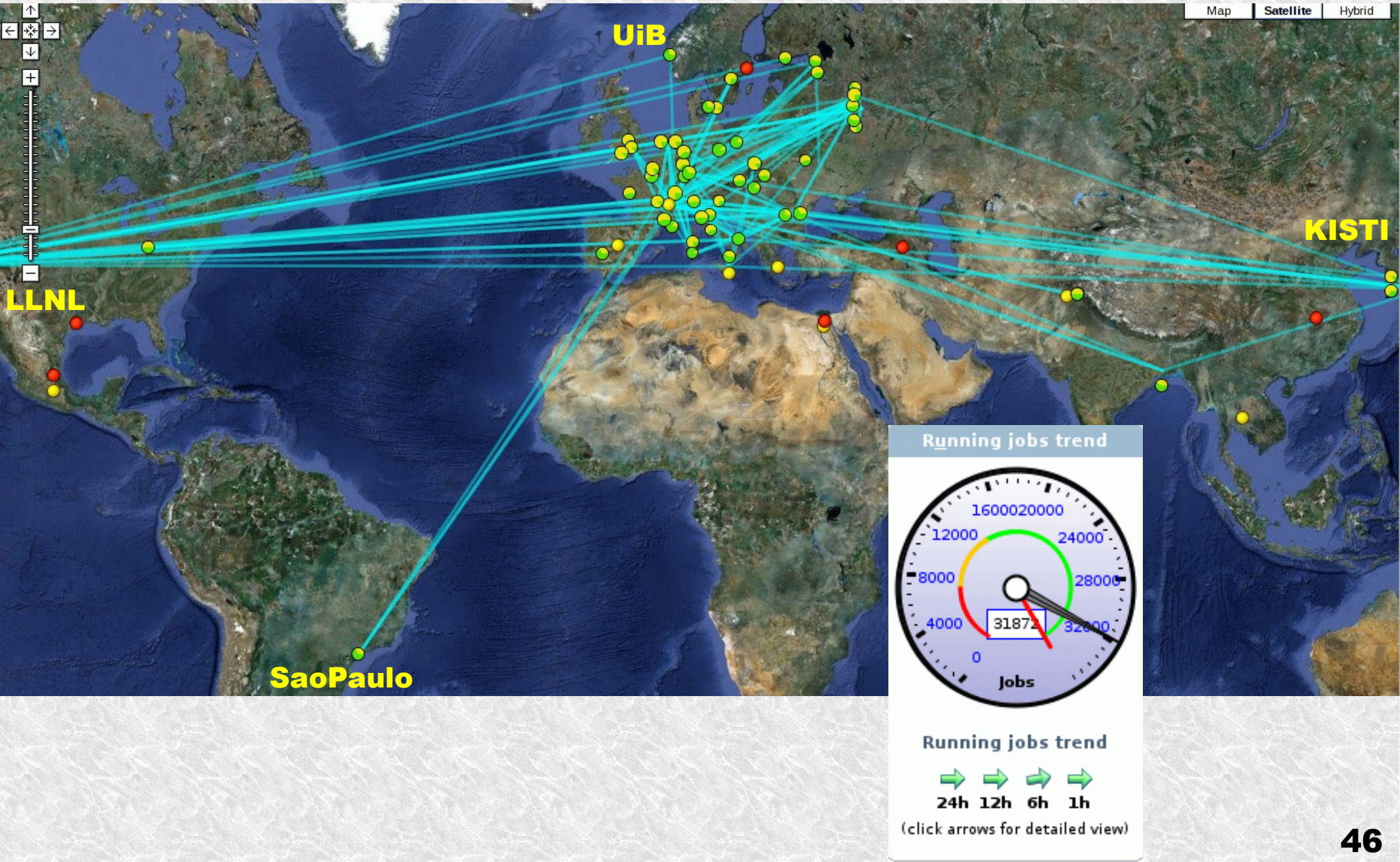
CPU usage (last 1h avg)

Load: ***0.111***
User: 1.492%
System: 0.479%
IOWait: 0.018%
Idle: 97.92%
Int: 0.015%
Soft int: 0.08%
Nice: 0%
Steal: 0%

AliEn LDAP var	VoBox path	Size	Used	Free	Use%
TMP	/home/alicesgm/ALICE/tmp	137.4 GB	33.36 GB	96.98 GB	26%
LOG	/home/alicesgm/alien-logs	137.4 GB	33.36 GB	96.98 GB	26%
CACHE	/home/alicesgm/ALICE/cache	137.4 GB	33.36 GB	96.98 GB	26%

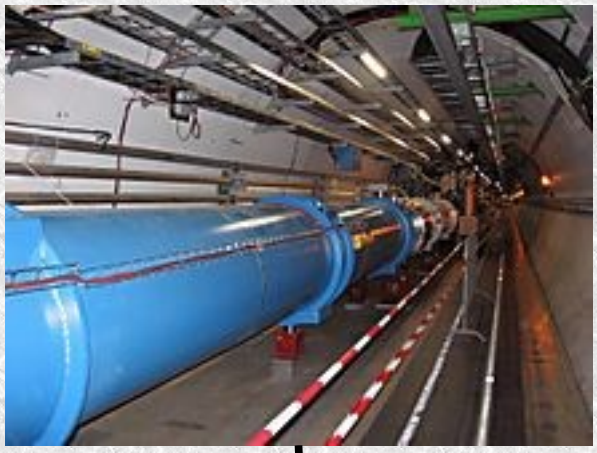
Le monde de ALICE vu par MonALISA

en bleu: transfert XRootD

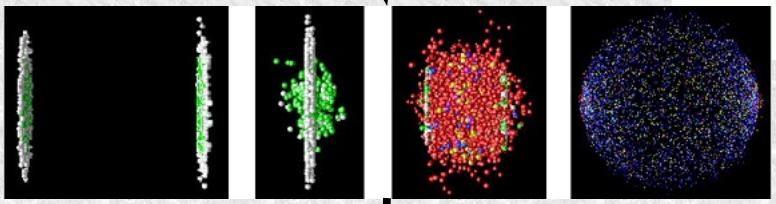


Conclusion

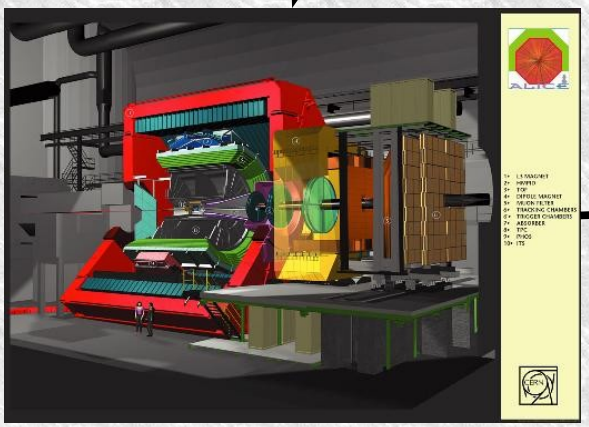
LHC@CERN



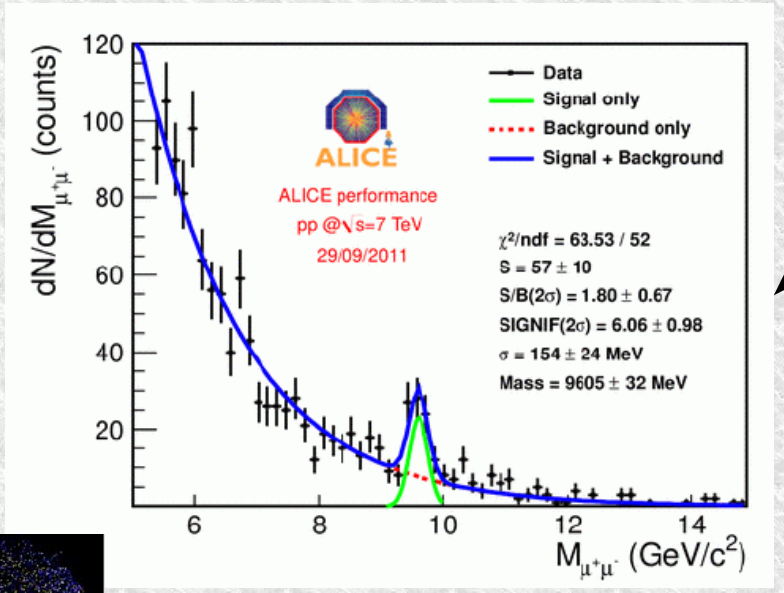
Pb+Pb



ALICE

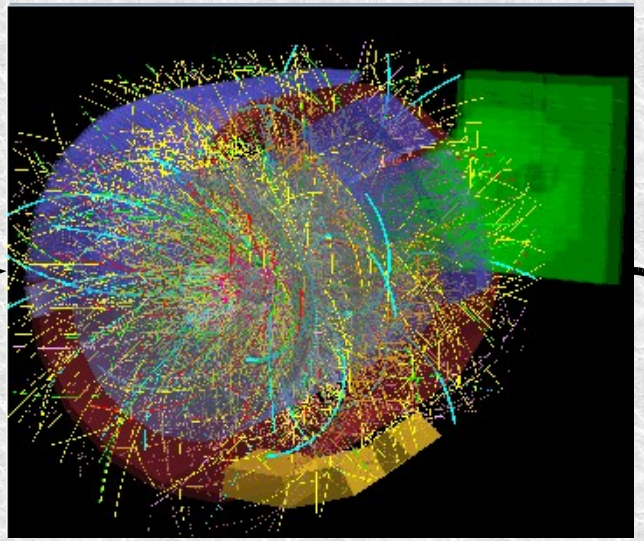


Analyse finale et résultats



X.Lopez

"Event display"



Tier2@LPC

Tier2+Tier1 AliEn

Tier0@CERN