



Laboratoire Leprince-Ringuet

Astroparticules

Particules et interactions fondamentales

50 chercheurs

50 ingénieurs et techniciens

15 doctorants

18 stagiaires



Physique des particules

CMS on the LHC @ CERN

Babar @ SLAC (USA)

T2K @ JPARC à TOKAI (JAPON)

CALICE pour l'ILC

Astroparticules astronomie gamma – (phénomènes violents de l'univers)

FERMI avec NASA (satellite) (LLR > qualité spatiale)

HESS (téléscopes au sol en Namibie)

R&D accélérateurs

GALOP (accélération laser/plasma)

ATF2 @ KEK (Japon)

Application médicale

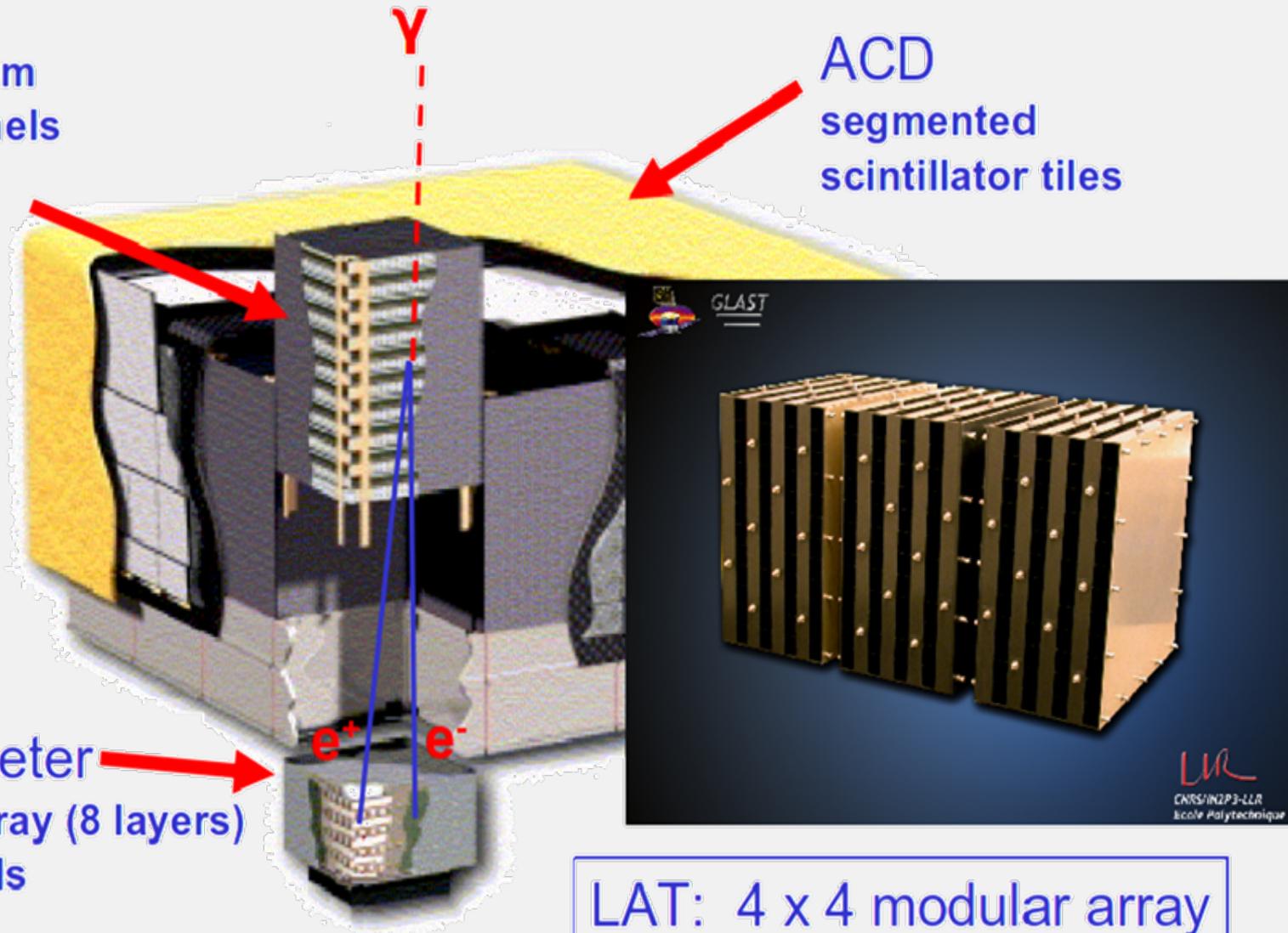
Hadronthérapie au CNAO (beam profiler)

Développement d'un nouveau thème

Photodétecteurs

Fermi Space Telescope

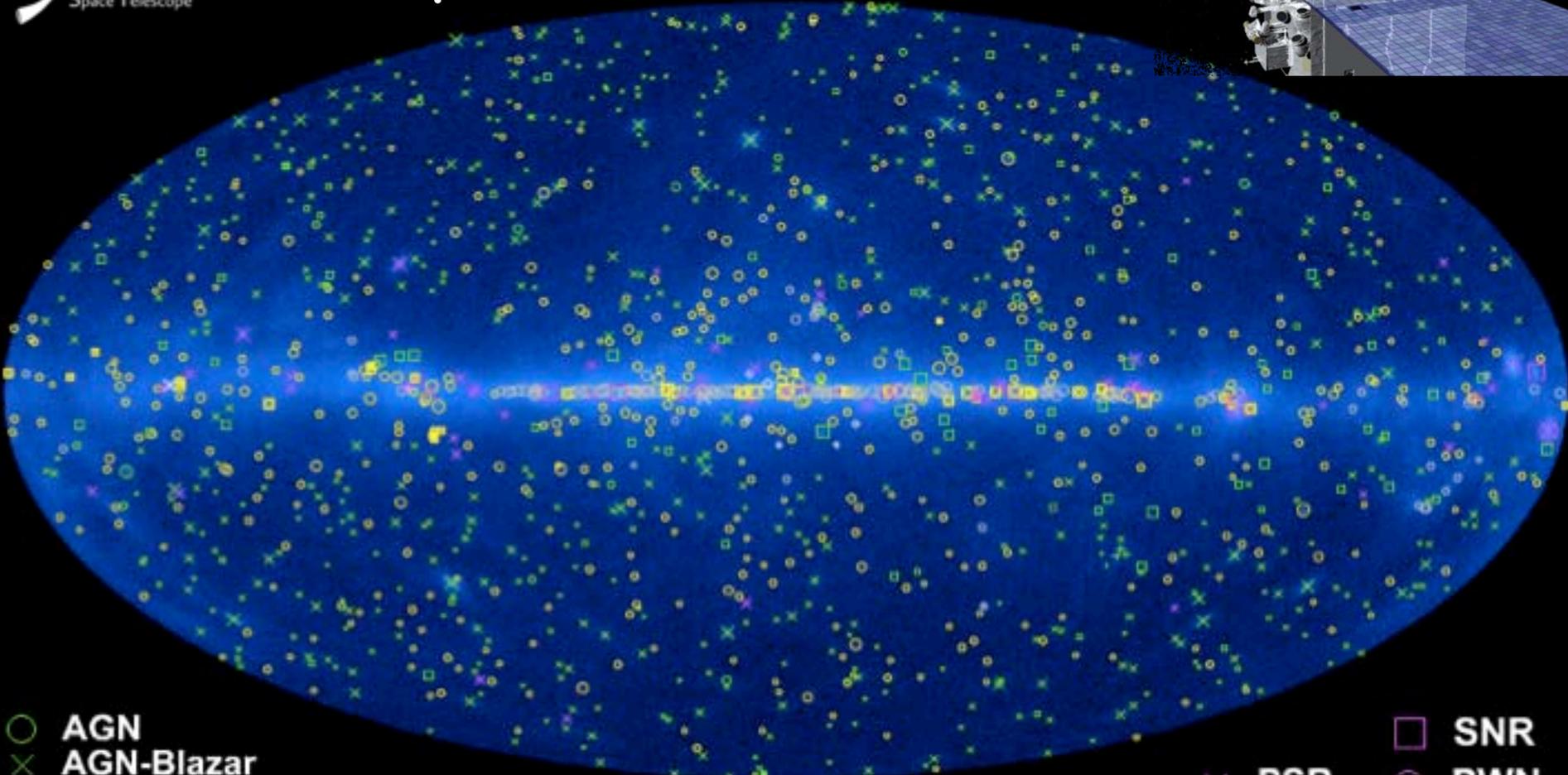
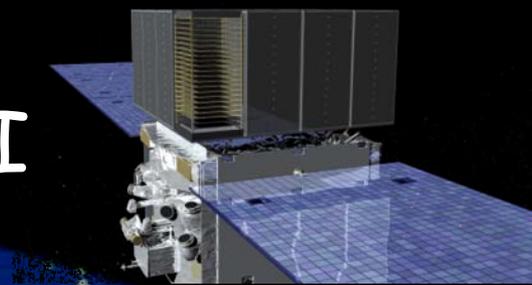
Si Tracker
pitch = $228 \mu\text{m}$
 $8.8 \cdot 10^5$ channels
18 planes



CsI Calorimeter
hodoscopic array (8 layers)
 $6.1 \cdot 10^3$ channels

LAT: 4 x 4 modular array
3000 kg, 650 W
20 MeV – 300 GeV

Sources observées par le satellite FERMI



- | | |
|---|--------------------|
| ○ AGN | □ SNR |
| × AGN-Blazar | × PSR |
| □ AGN-Non Blazar | ○ PWN |
| ○ No Association | ⊗ PSR w/PWN |
| □ Possible Association with SNR and PWN | ◇ Globular Cluster |
| ○ Possible confusion with Galactic diffuse emission | × HXB or MQO |
| □ Starburst Galaxy | |
| + Galaxy | |

Hess & Hess2 en Namibie



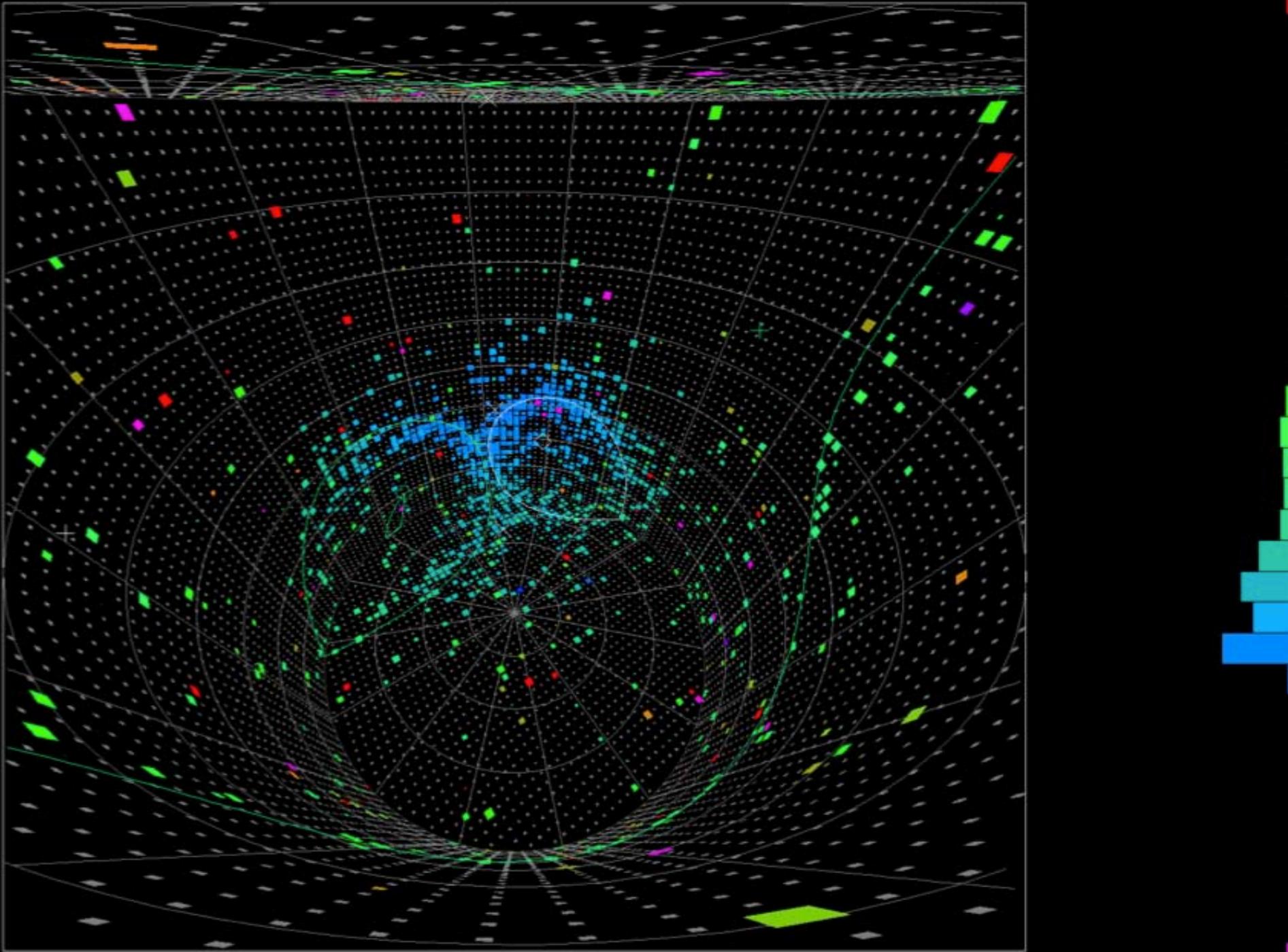
 La caméra du télescope HESS-II



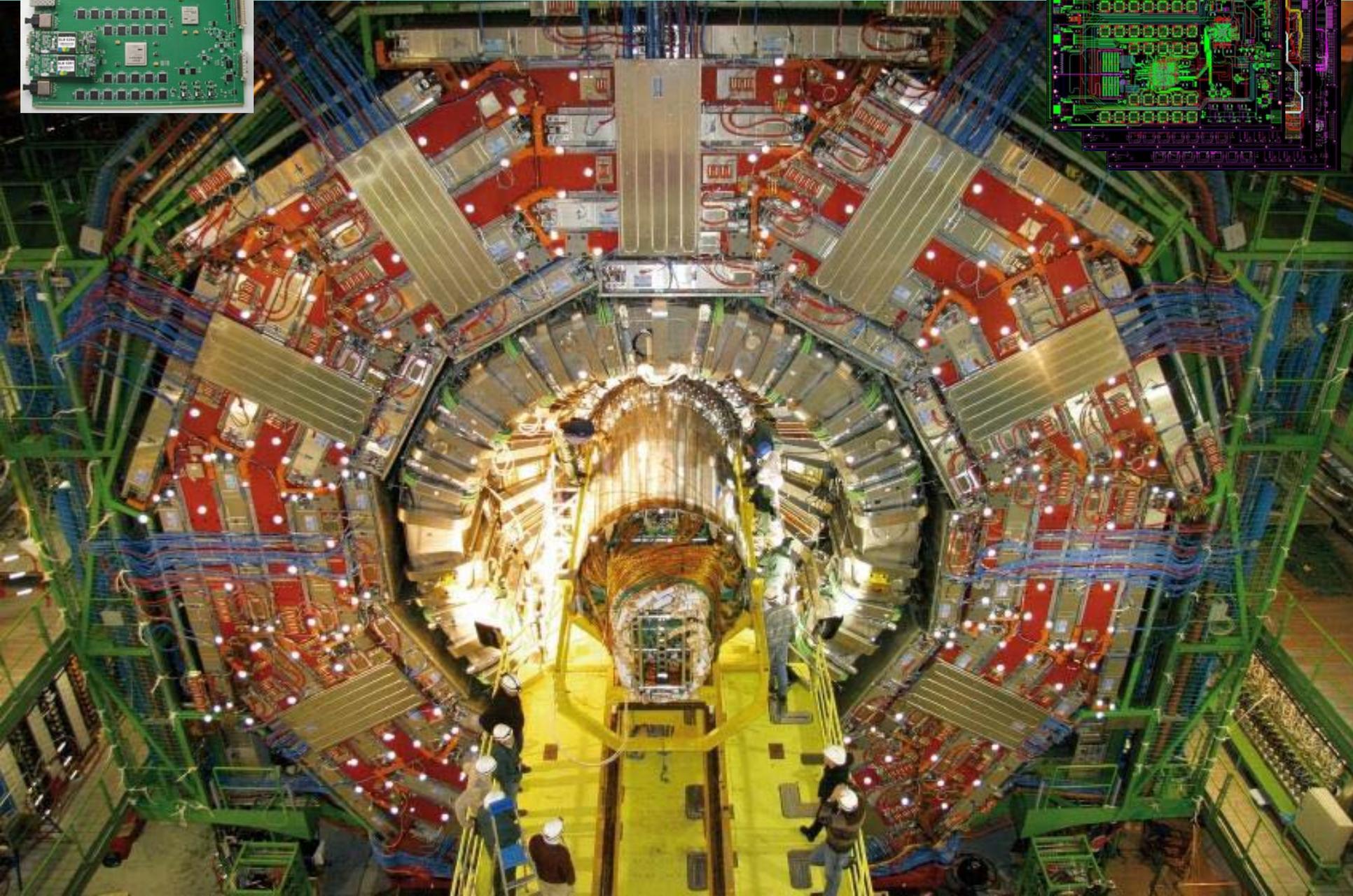
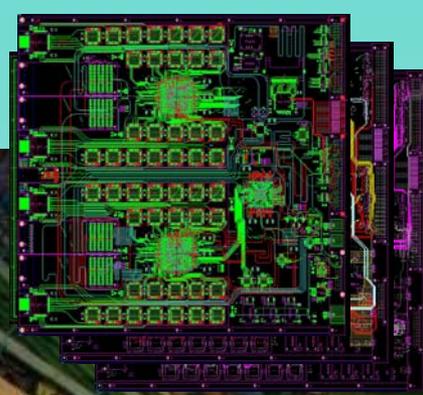
T2K : Tokai to Kamiokande (Japon)

- Neutrino detector INGRID
- Mécanique LLR
- Calibration des 5000 MPPC

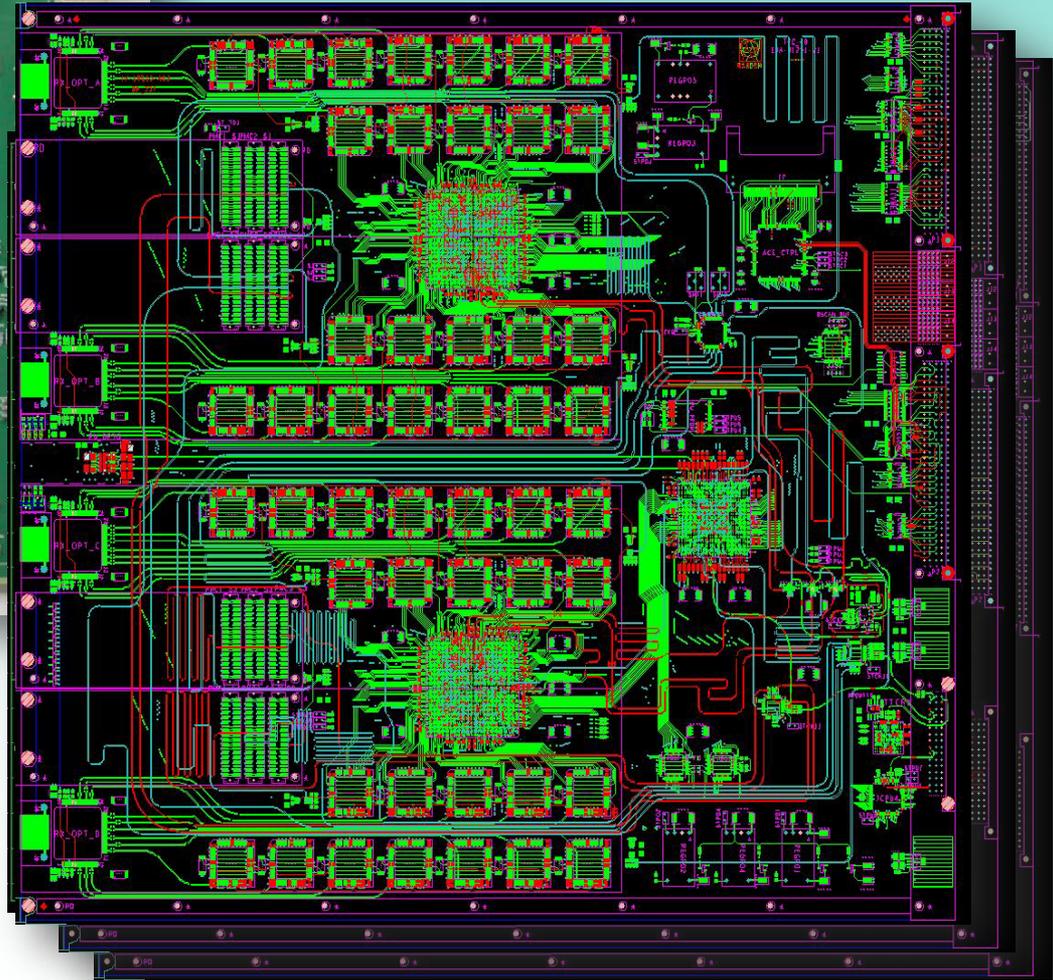
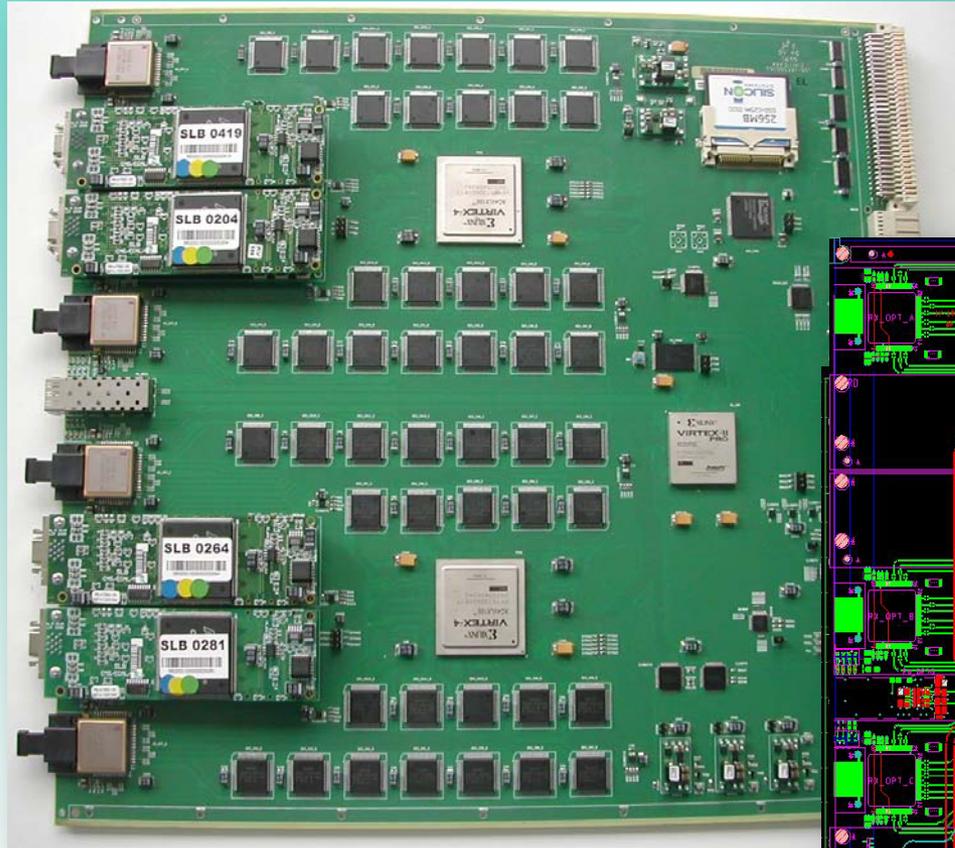




CMS @ LHC (CERN)



TCC for CMS

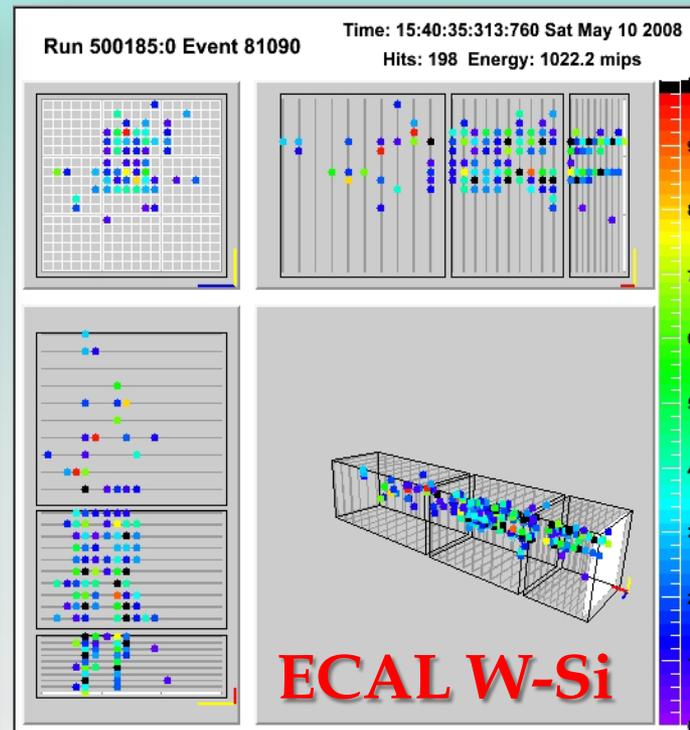
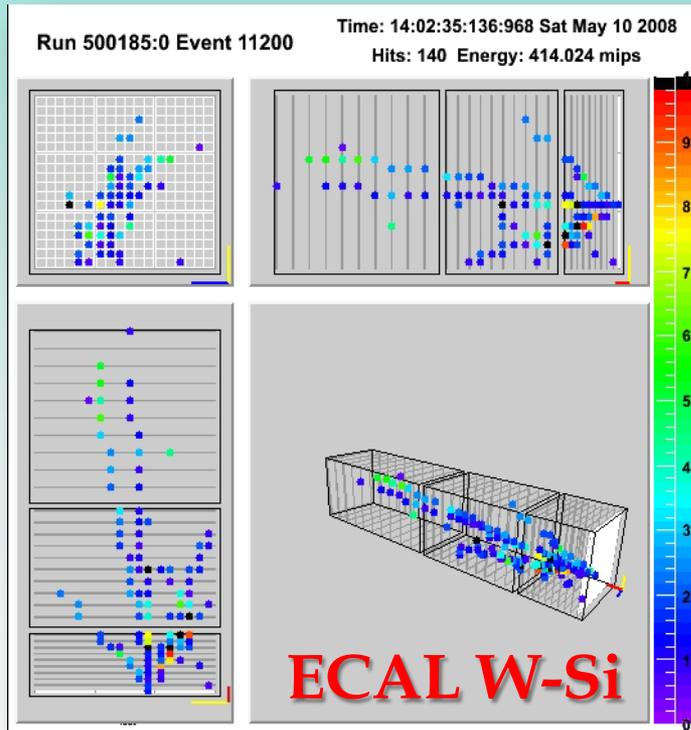


La grille de calcul d'Ile de France



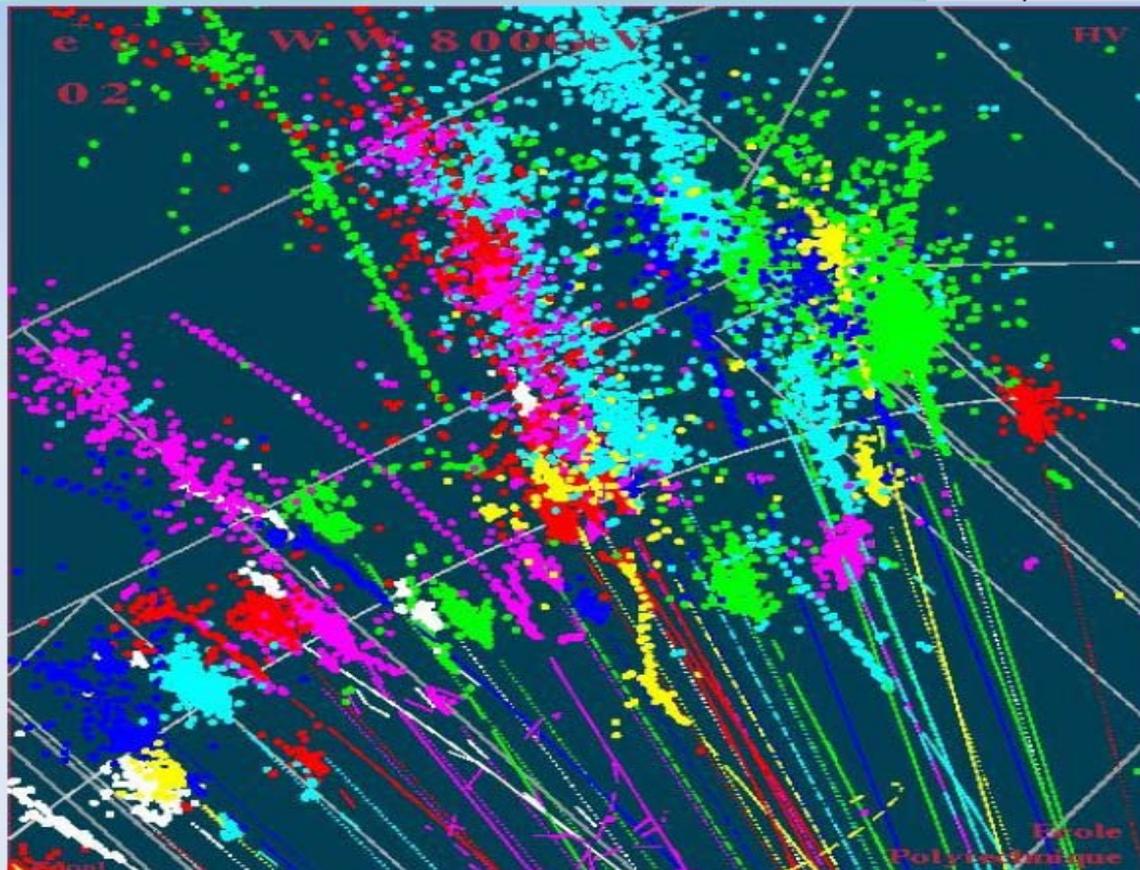
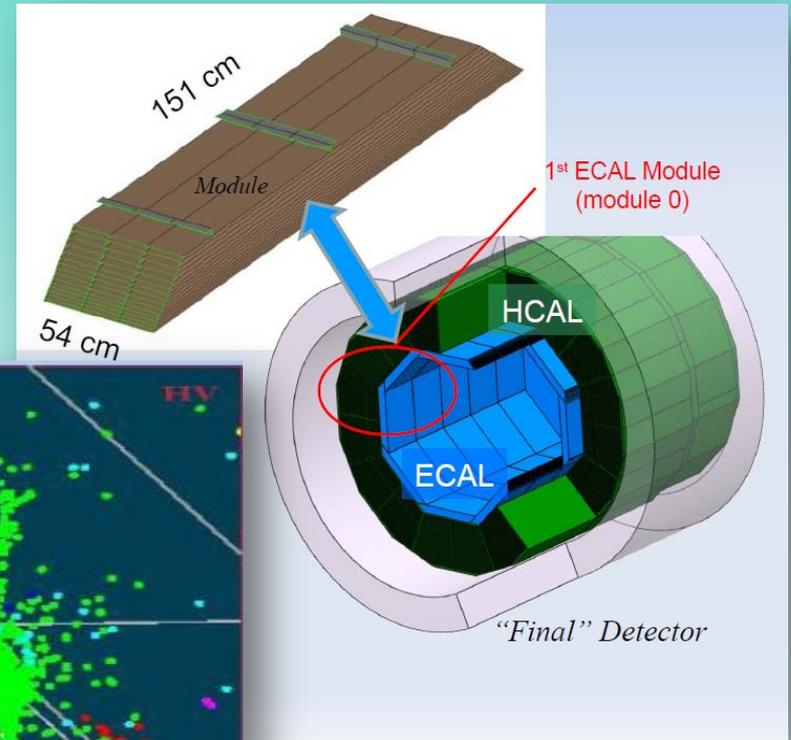
Calorimétrie ultra-granulaire

8 GeV pion beam @ Fermi National Laboratory



Calorimétrie ultra-granulaire

Calorimètre silicium-tungstène

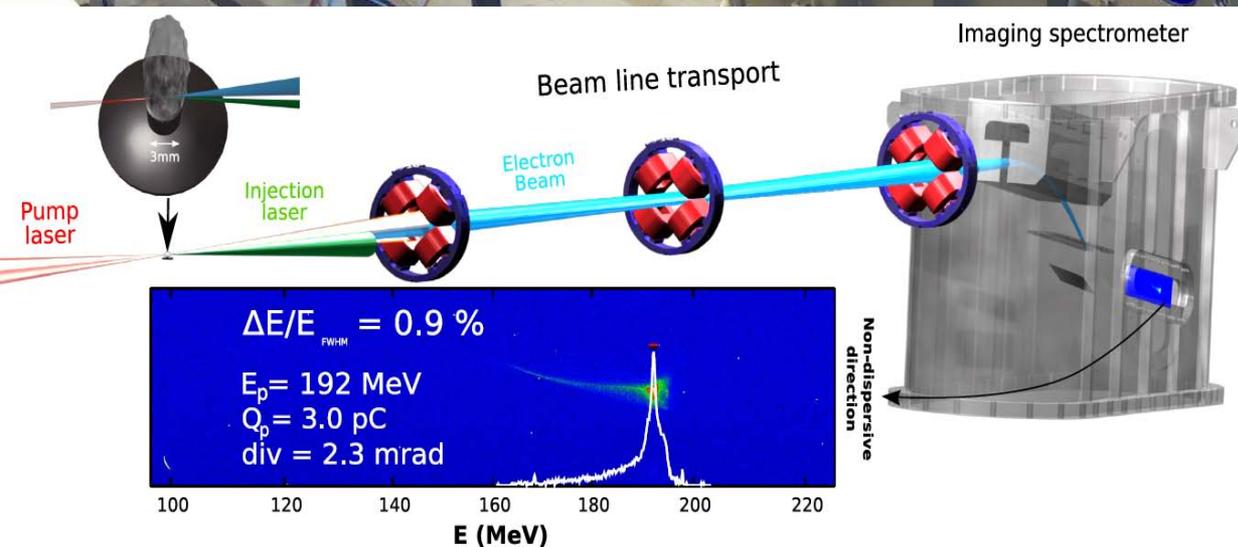




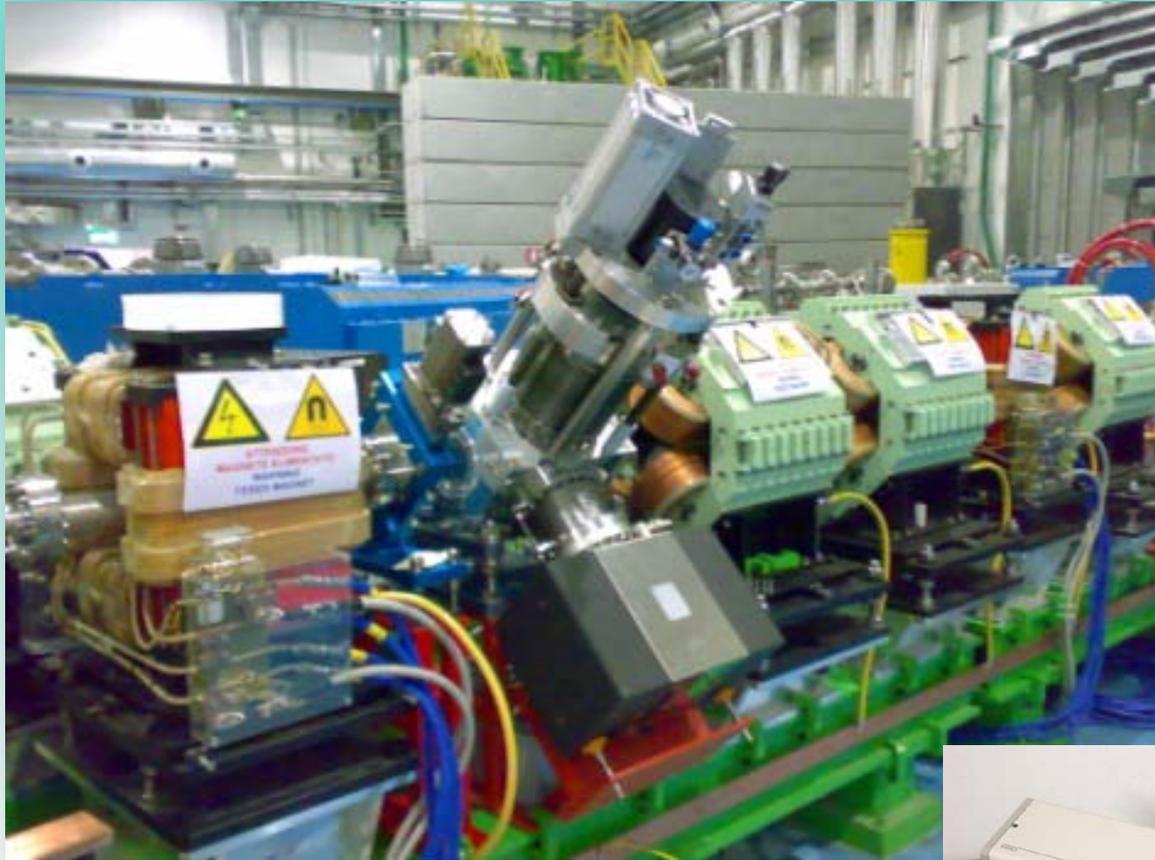
Nombre de canaux :

1/8 of CMS dans un cube de 18 cm de côté !

Accélération Laser-plasma



Détecteurs pour l'hadronthérapie



 Centre Italien pour
l'hadronthérapie
oncologique :
« CNAO »



Instance [System1:H2-009B-SFH] - Running User [user]

Standard Tools
Official Name: H2-009B-SFH v 2.0.0

Lock Unlock

● CNAO-LV1-02_user_VI

✓ Inhibit

Cycle Prog
887704

Cycle Code
0000070002880E07

ErrorCode
0

ErrorString

General Settings

ON/OFF ● Camera Supply

SetBackgr. ● Background

Number Image: 14

Acquisition Settings

SetAcq.Par.

Start Event: Start Sextupole Exposure Time: 20 ms

Start Delay: 0 ms Gain: 1.00

Number Images: 20 Rate: 20.00 Hz

Information

Serial Number: 460231-0

Camera Status: 0

Advanced... ▶ ONESHOT

X Graph

Pos [mm]: 1.220 Intensity: 154615.022

Y Graph

Pos [mm]: 24.524 Intensity: 118433.415

QM control

QIM signals

Acquire QIM

Acq at 20kHz

number of samples: 20000

Gain_0:

Gain_5: