

# ATLAS activity at IN2P3/CNRS

- Detector commissioning
- Physics analysis
- Software and Computing
- New “initiatives”
  - Luminosity/ $\sigma$  tot
  - R&D pixels

# LABORATORIES INVOLVED:

- Annecy LAPP    7+3 staff +5 visitor\*\* +5 PhD
- Clermont LPC    5+3 staff +2 visitor +2 PhD
- Grenoble LPSC   5+3 staff +1 visitor +3 PhD
- Marseille CPPM 11+3 staff +2 visitor +5 PhD
- Orsay LAL        12+2 staff +2 visitor +7 PhD
- Paris LPNHE     6+4 staff +2 visitor +3 PhD

\*\*soon also T.Kondo

+2 physicists at Tier1 Lyon

+~15 engineers (electronique,software)

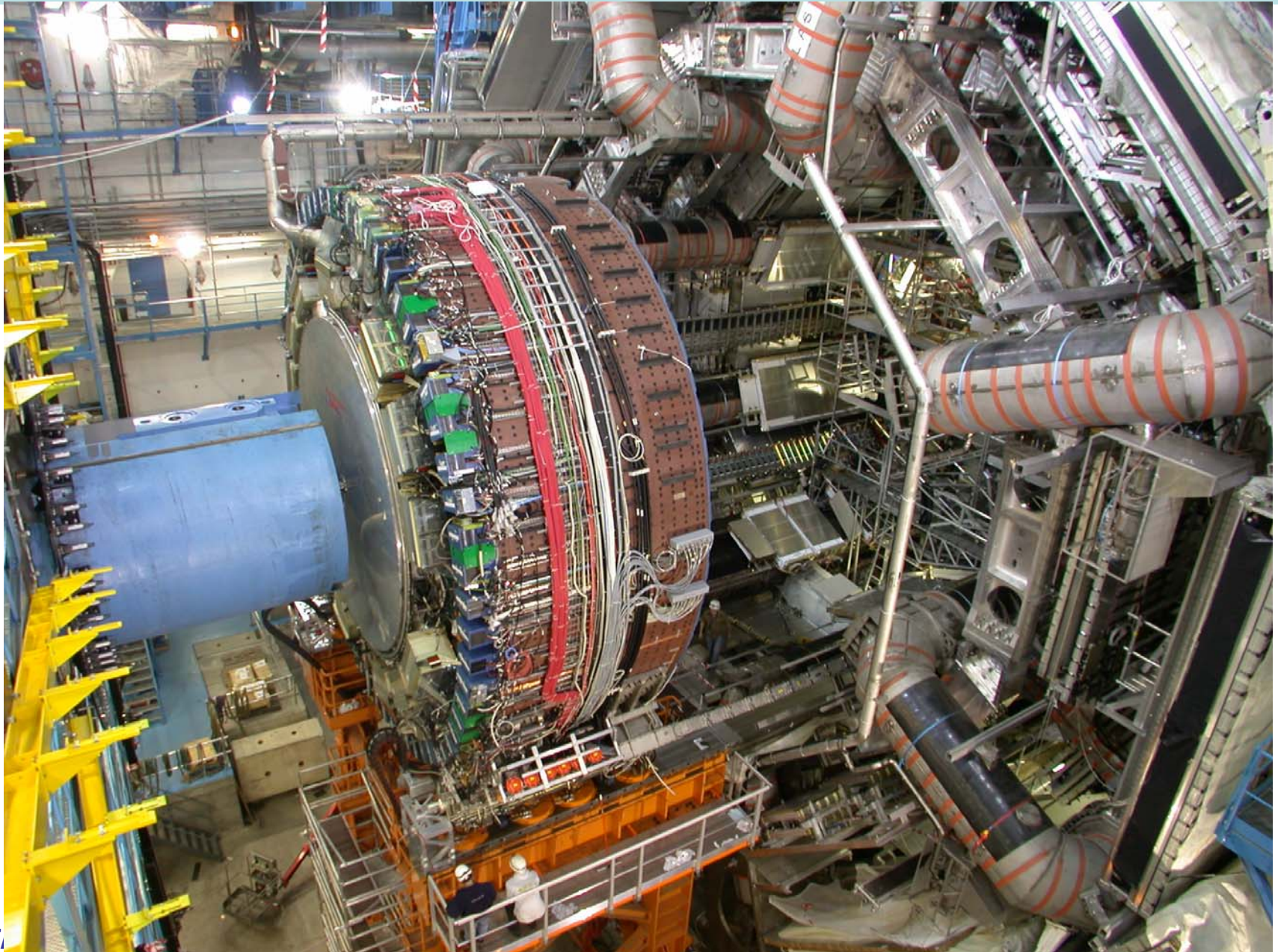
+ at construction peak about 50 dedicated technical staffs

Close collaboration with IRFU/CEA

-first on detector construction

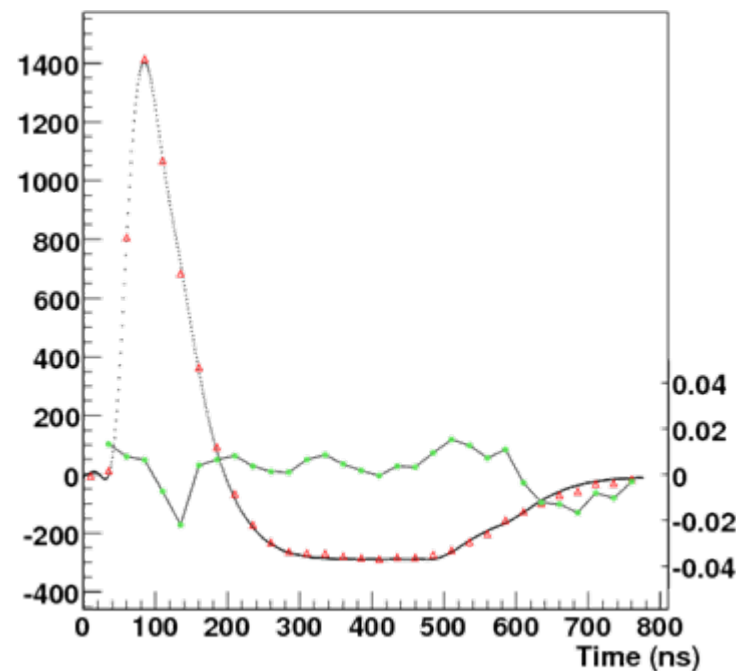
-now on Computing(CAF) and Physics(PAF)

# Atlas-february 2007



# Construction & commissioning

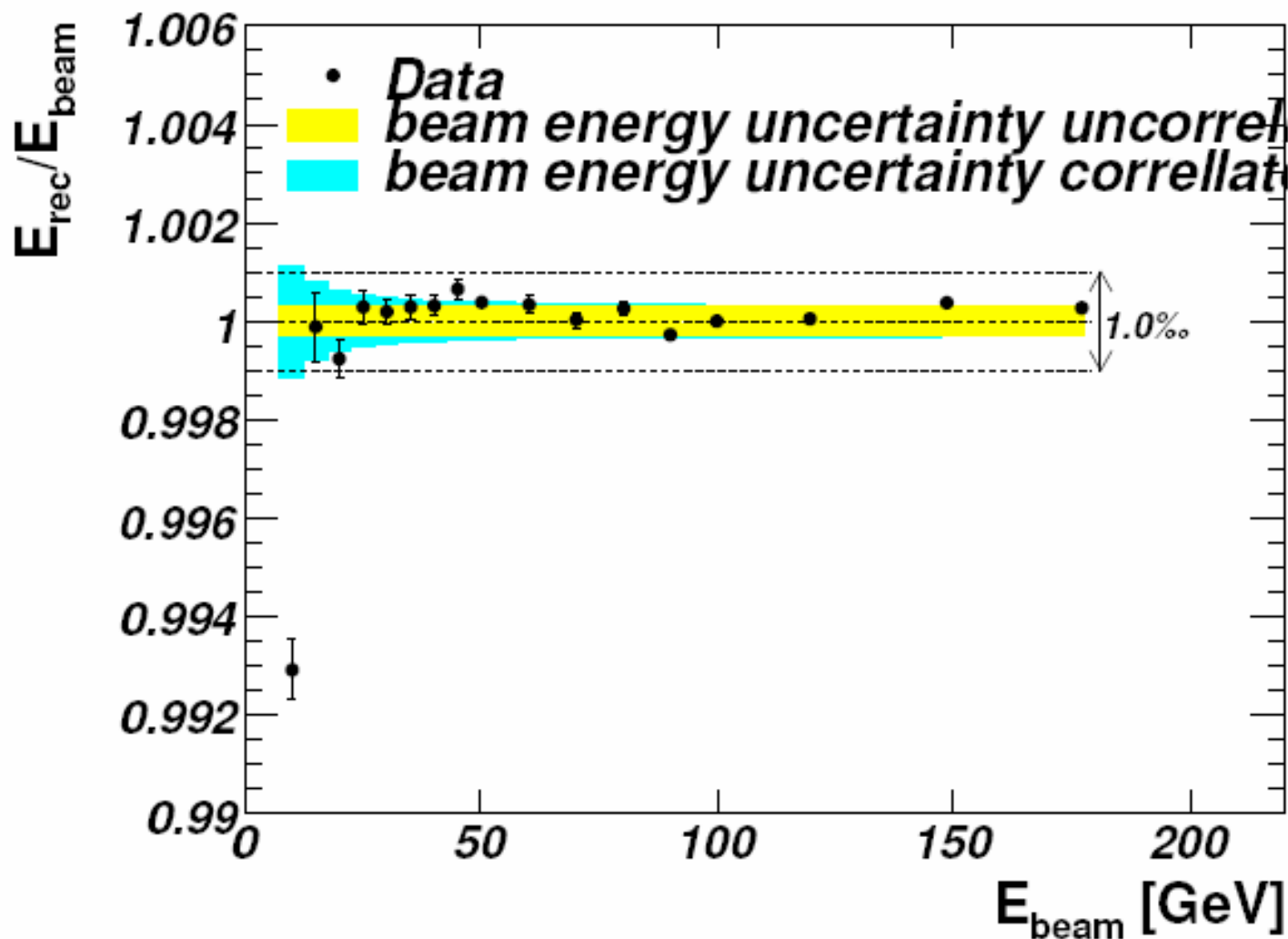
- LAr Calorimeter :  
(Annecy, Grenoble, Marseille,  
Orsay, Paris)  
major contribution to all aspects



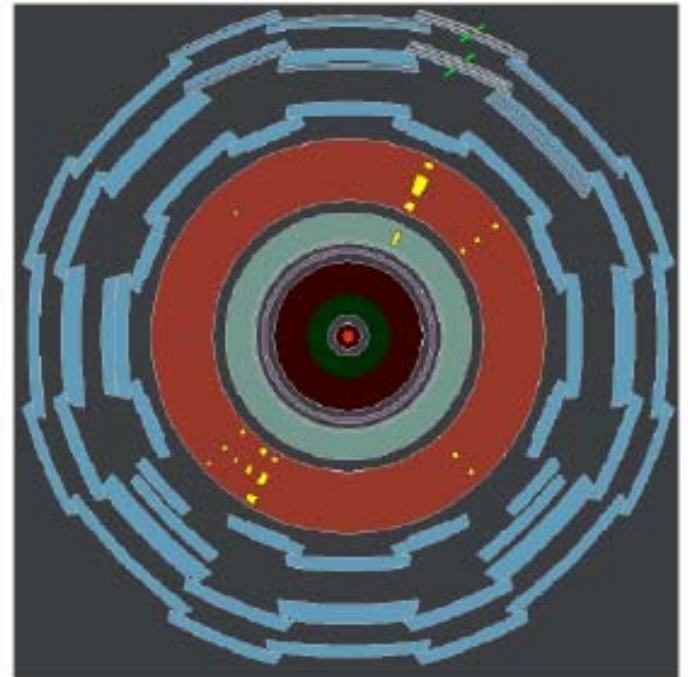
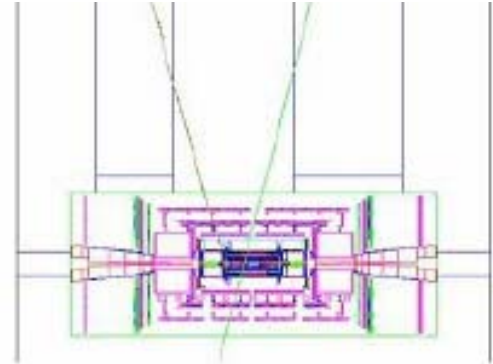
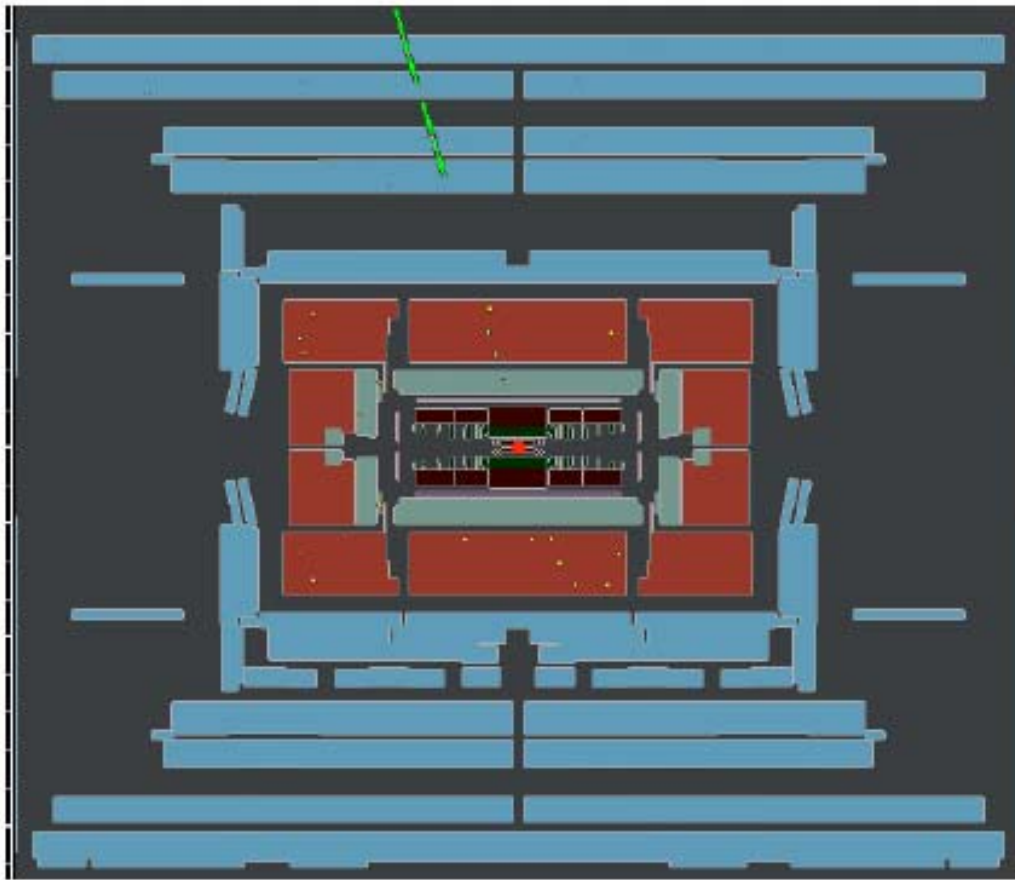
- Tile calorimeter : Clermont Fd (electronique)
- Pixels : Marseille
- Trigger (LVL1=Grenoble,HLT=Marseille+Orsay)



# Examples of performance in test beam



# Example of a cosmic event



# Physics analysis

- Standard model(Annecy,Orsay)
  - Top (Clermont,Grenoble,Marseille,Paris)
  - Higgs
    - 2 photons(Annecy,Grenoble,Orsay,Paris) \*\*
    - 4 leptons (Orsay)
    - VBF  $\tau\tau$  (Orsay) \*\*
    - ttH (Marseille)
  - SuSY (Orsay) \*\*
  - Exotics(Annecy,Clermont,Grenoble)
- \*\*strong contribution of Japan, and active collaboration with french labs
- All streams used(e-gamma,muons,jets,Taus,Et-miss)

# Software

- Strong contribution to e-gamma
- Participation to vertexing(Marseille)
- Coordination of reconstruction (D.Rousseau)
- Core software
  - AMI(Grenoble)
  - CMT(Orsay)
  - Conditions Data Bases
  - Event Data Model(R.D.Schaffer)

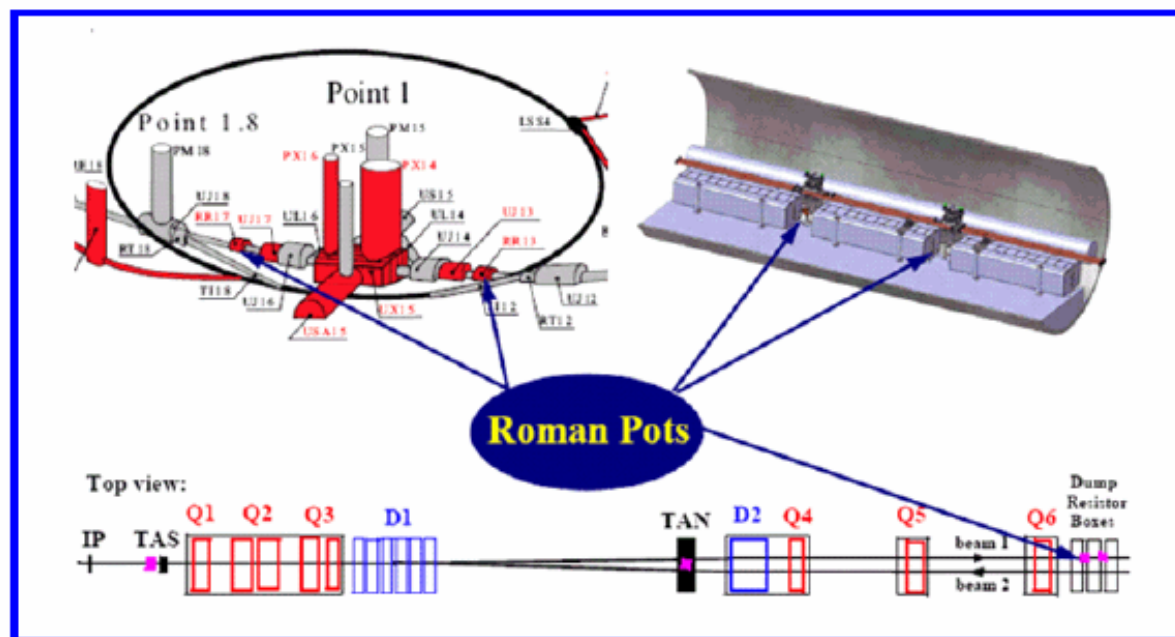
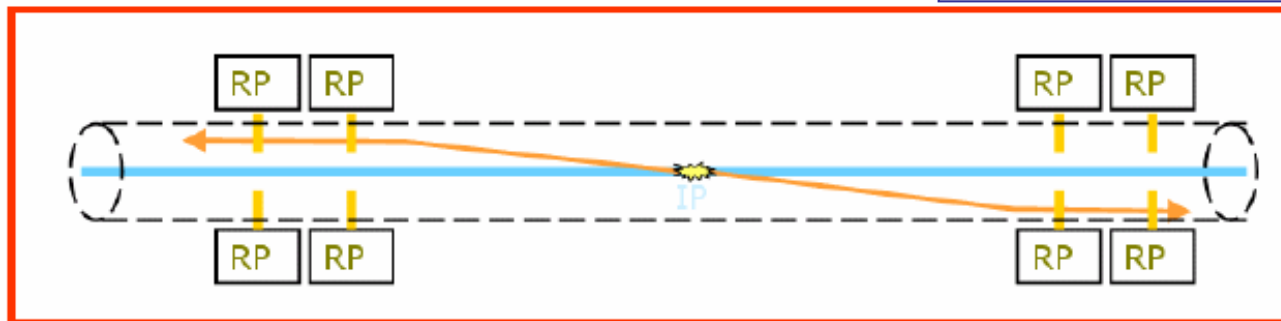


# Computing

- Tier1 in Lyon
- 4 french Tiers2(Annecy,Clermont,Lyon/AF,GRIF)
- Tokyo as one of the foreign Tiers2
- Good opportunity to collaborate on Physics analyses

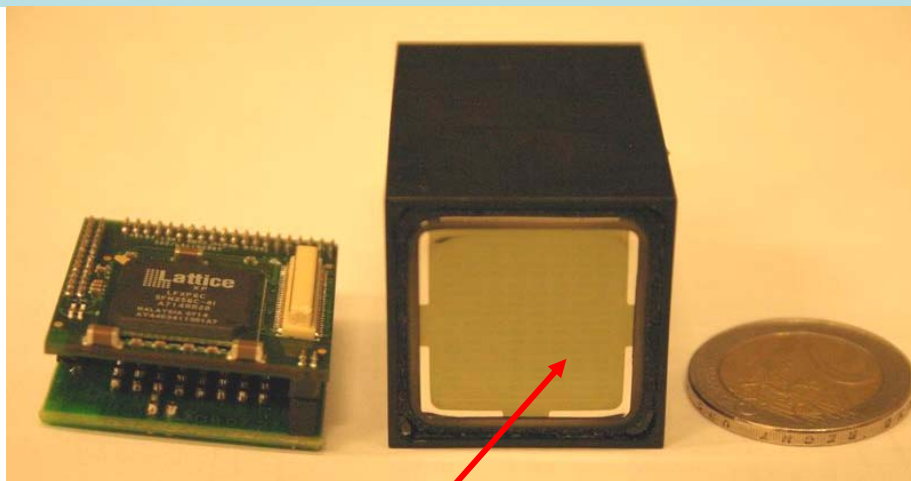
# Luminosity and total cross-section

Elastic scattering in  
Coulomb-interference region

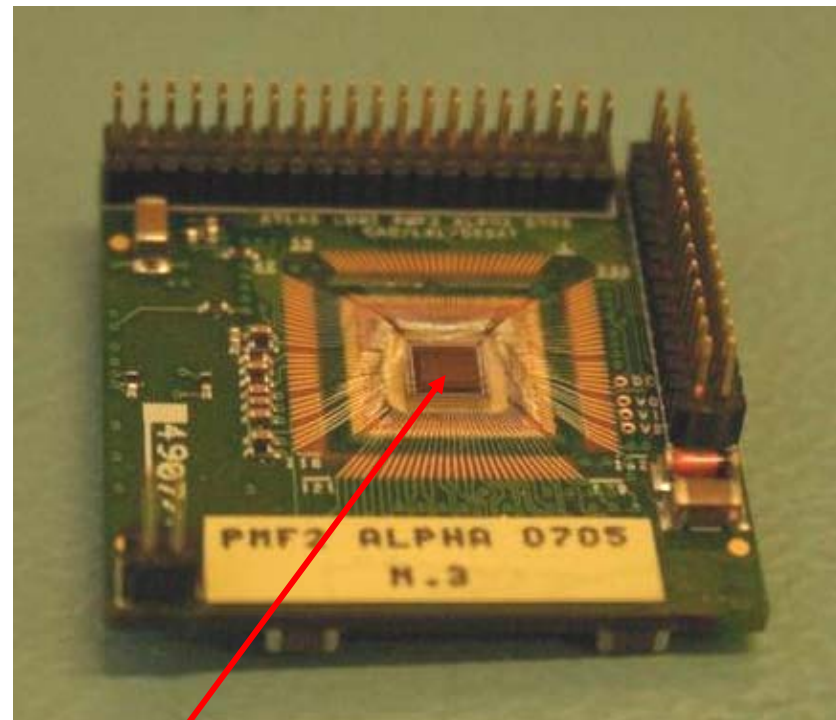


- Absolute
- Luminosity
- For
- ATLAS

# Electronics for ALFA



64 ch Hamamatsu PMT



MAROC2 chip (AMS 0.35 $\mu\text{m}$ )  
developped at Orsay, bounded at CERN  
Functions :

- channel by channel PMT gain correction
- Fast trigger
- readout



Prototype  
Detector



4907

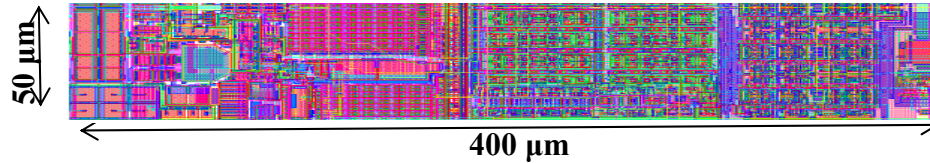
PMF2 ALPHA 0705  
N.3

# R&D for super-LHC

- Developments for LAr calorimeter electronics replacement
- Building-up on CPPM experience in present Atlas pixels
  - Setting-up a **sizeable team for generic R&D on**
    - pixel sensors and mechanics and, mostly
    - **pixel front-end electronics**
      - groups involved: Marseille, Orsay, Paris
    - invest in 3D electronics
    - in collaboration with other Atlas groups(Germany)
    - synergy with ILC developpers (french, Fermilab)

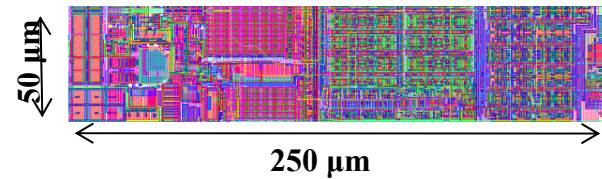


# Hybrid pixel detectors :An example of roadmap towards sLHC



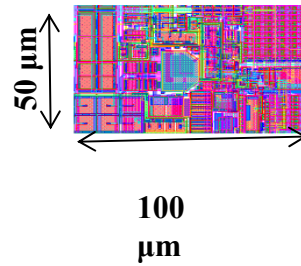
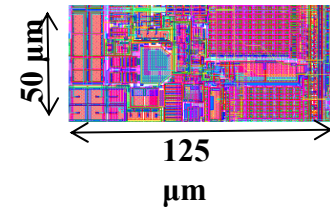
FE-I3 CMOS  
250 nm

Done : ATLAS



FE-I4 CMOS  
130 nm

Design



Drastic pixel dimension  
reduction (*cost effective  
compared to smallest  
technologies ?*)

Thought

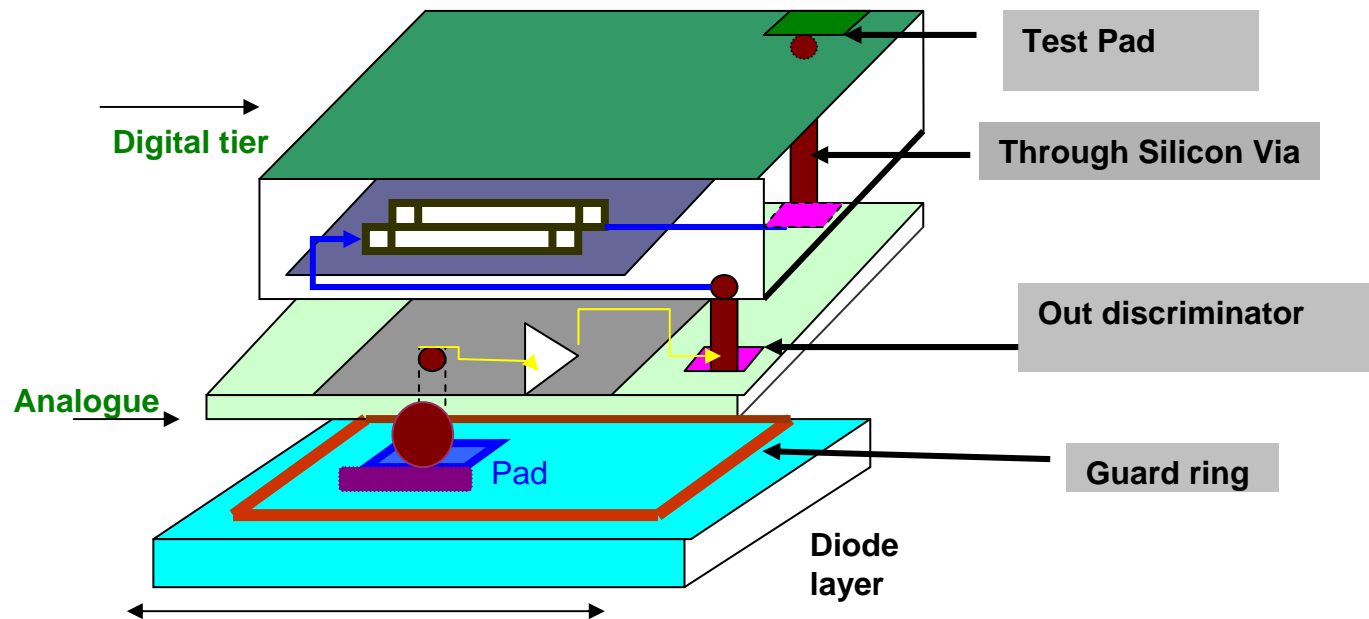
4 sides buttable structures  
New mechanical possibilities

Dream ?

# First 3D sketch

« 3D » generic structure includes :

- Analogue low noise amplifier 130 nm IBM
- Low Threshold discriminator
- Fifo and ADC



# Industrial partners

- LETI / France
- IZM / Germany
- IBM
- Tezzaron (Singapore)

# Summary

- Several places where to collaborate in Atlas physics
- Computing = a good opportunity to share data and tools
- Opportunities in new initiatives?(sLHC)?