

# TILECAL LASER SYSTEM: COMMISSIONING AND FIRST RESULTS



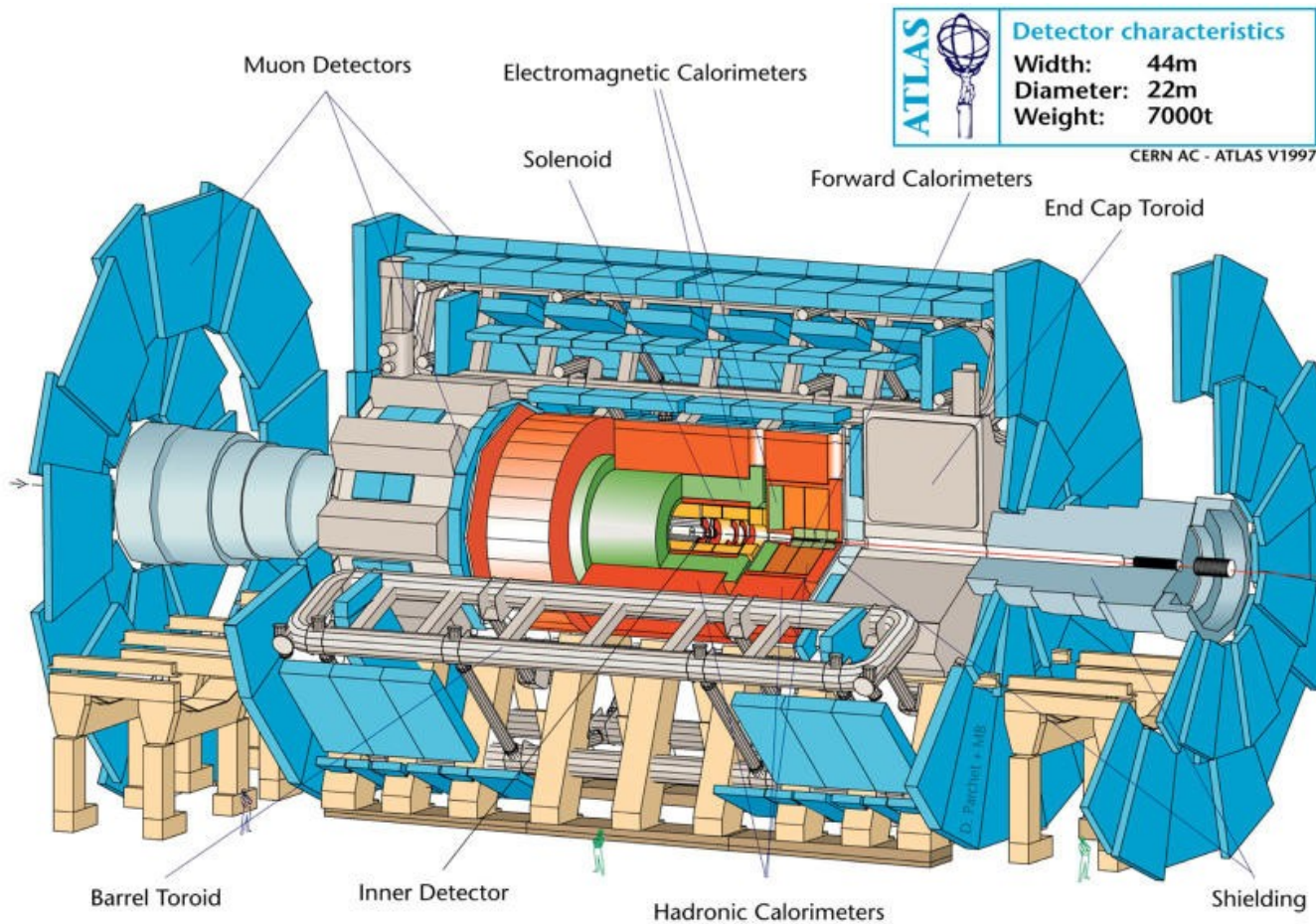
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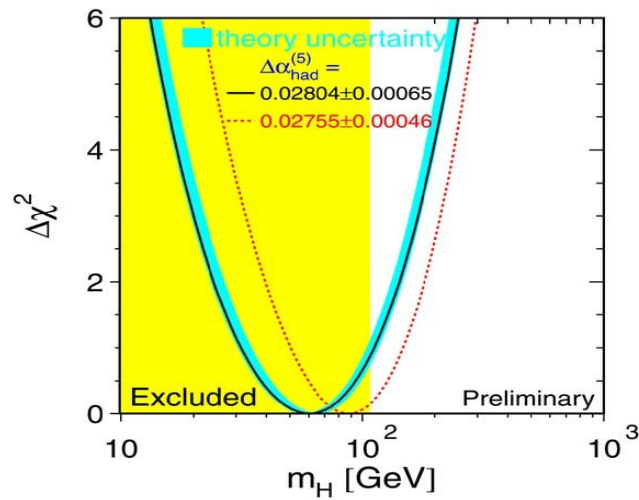
# OUTLOOK

- ATLAS AND TILECAL
- TILECAL LASER SYSTEM
- THE LASER COMMISSIONING
- FIRST RESULTS
- CONCLUSIONS

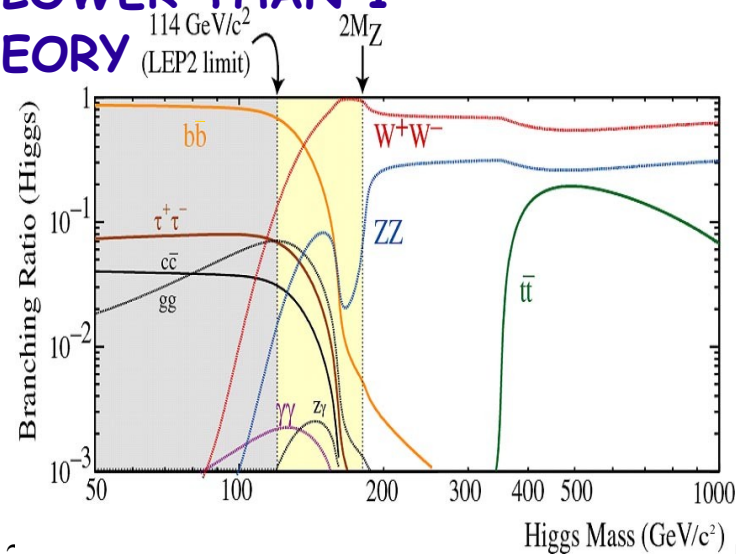
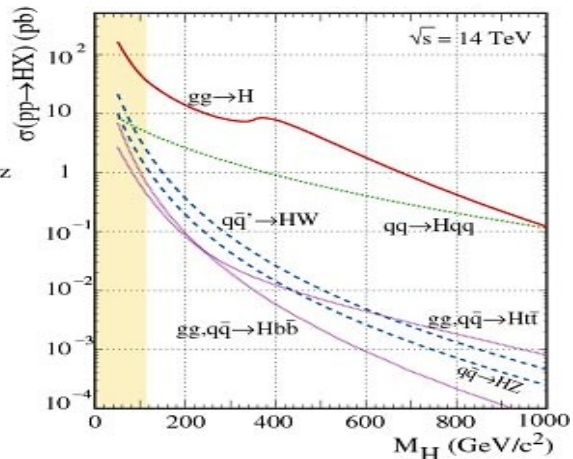
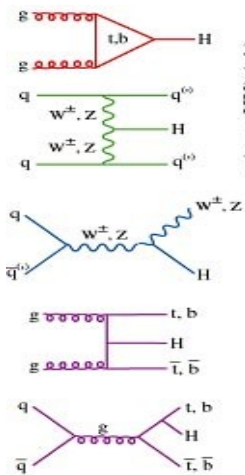
# ATLAS AND TILECAL (1)



# ATLAS AND TILECAL (2)



**HIGGS MASS BIGGER THAN 114 GeV/c<sup>2</sup>  
FROM LEP2 RESULTS AND LOWER THAN 1  
TeV/c<sup>2</sup> FROM THEORY**

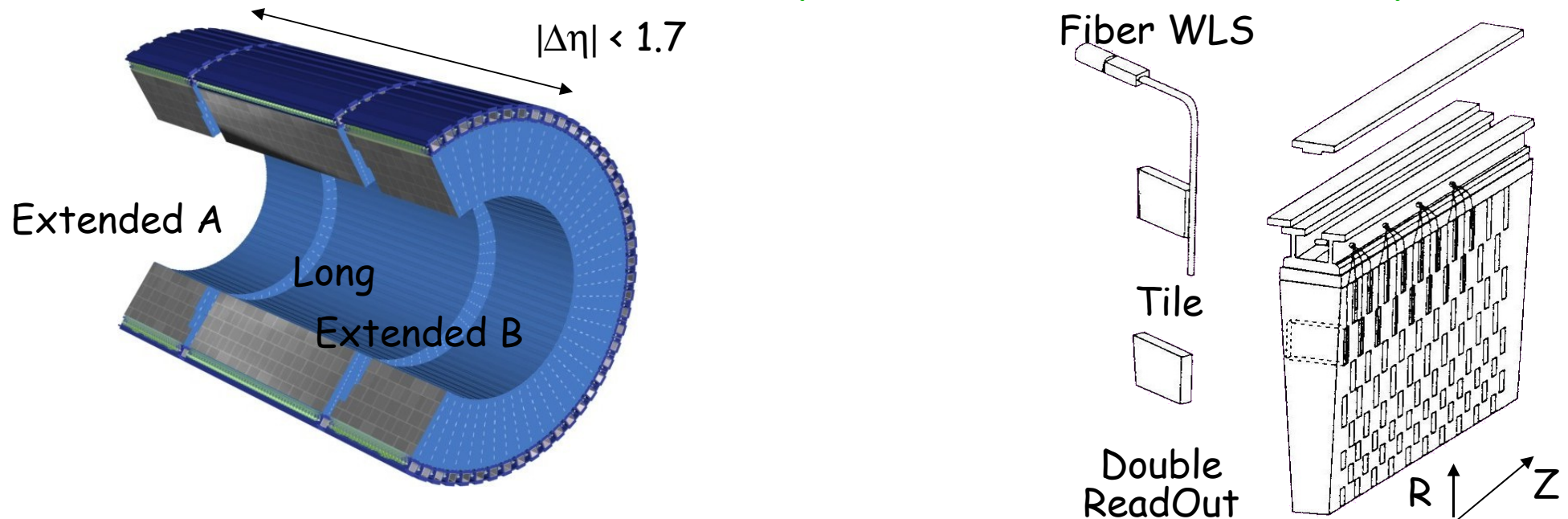


# ATLAS AND TILECAL (3)

ATLAS CALORIMETER IS COMPOSED BY THREE DIFFERENT CYLINDRIC PARTS, THE CENTRAL ONE IS CALLED BARREL, AND THE OTHER TWO ARE CALLED EXTENDED BARRELS.

IN EACH PART WE HAVE 64 SECTORS(MODULES).

THE CALORIMETER IS MADE WITH PLANES OF IRON AND SCINTILLATING TILES(THAT READ THE SIGNALS)



# TILECAL LASER SYSTEM (1)

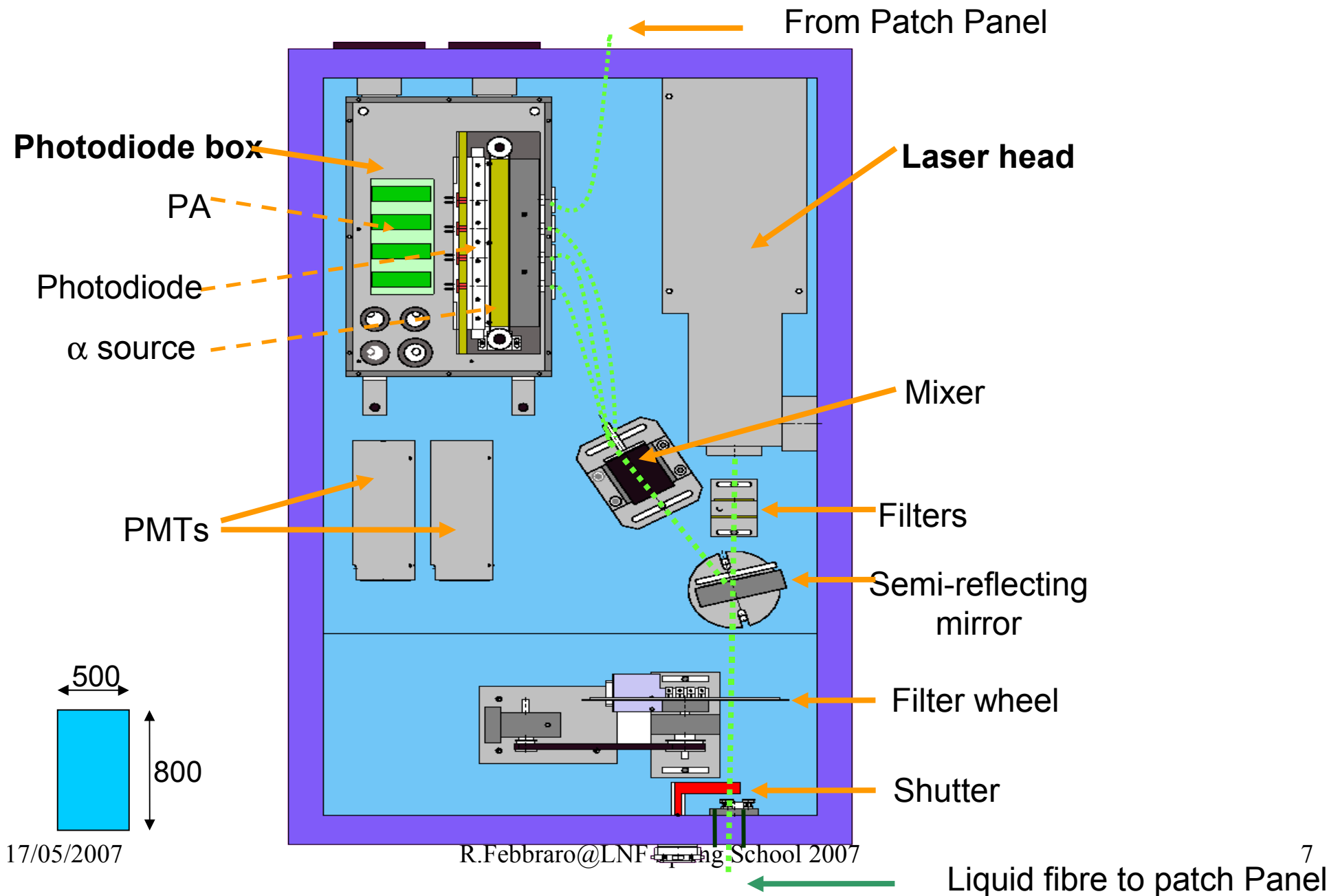
A LASER SYSTEM IS USED TO CONTROL THE STABILITY AND THE LINEARITY OF TILECAL'S PHOTOMULTIPLIERS AND ASSOCIATED ELECTRONICS.

THE GAIN OF PHOTOMULTIPLIERS IS CONTROLLED TOO.

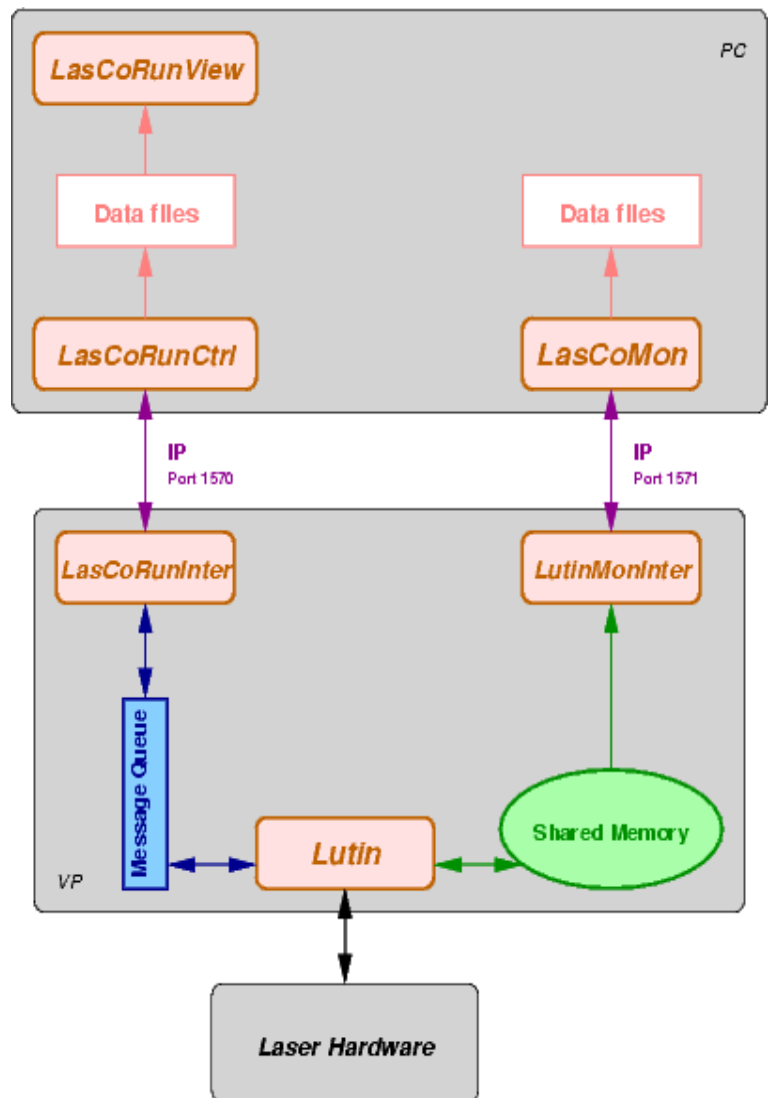
TO DO THAT LASER LIGHT IS SENT ON THE 10000 TILECAL PMT'S OF THE THREE TYPES OF BARREL.



# TILECAL LASER SYSTEM (2)



# TILECAL LASER SYSTEM (3)



*LasCo (for Laser Controller)* is a graphical user interface dedicated to the monitoring and the standalone running of the TileCal Laser System. In this particular environment, standalone means without any input from the official Atlas DAQ or DCS. Therefore, it is intended to be used during the Laser System commissioning, as well as during the future maintenance periods.

*Lutin* is the low level controller which controls directly the laser system hardware.

*The laser software has been designed by David Calvet*

- . The absolute stability of Photodiodes is monitored by alpha particles.
- . The linearity of Photodiode electronics is monitored by Charge injections.



# THE LASER COMMISSIONING

LASER COMMISSIONING IS DIVIDED IN TWO DIFFERENT STEP.  
THE FIRST ONE IS FOR THE LASER SYSTEM NOT YET IMPLEMENTED IN THE  
ATLAS DETECTOR (STANDALONE).  
THE SECOND ONE IS FOR THE LASER IMPLEMENTED IN THE ATLAS  
DETECTOR.

*The first step must achieve two main goals:*

- Certification of the full working of the Laser System.
- A full check of its performances.

Phase	Items	Possible duration
1	PLC	1 day + 1 night
2	Laser	1 day
3	Electronics	1 day
4	Stability and performances	2 or 3 weeks

# STABILITY AND PERFORMANCES

- Follow-up of two kinds of parameters:
  - Slow control parameters: temperature, gas flux, humidity...
  - Fast pulse responses: Pedestal, Charge,  $\alpha$ , Laser.

- Slow control parameters:  
continuously recorded  
→ evolution easily studied over 2 or 3 weeks.

- Fast pulses responses recorded at constant time intervals:

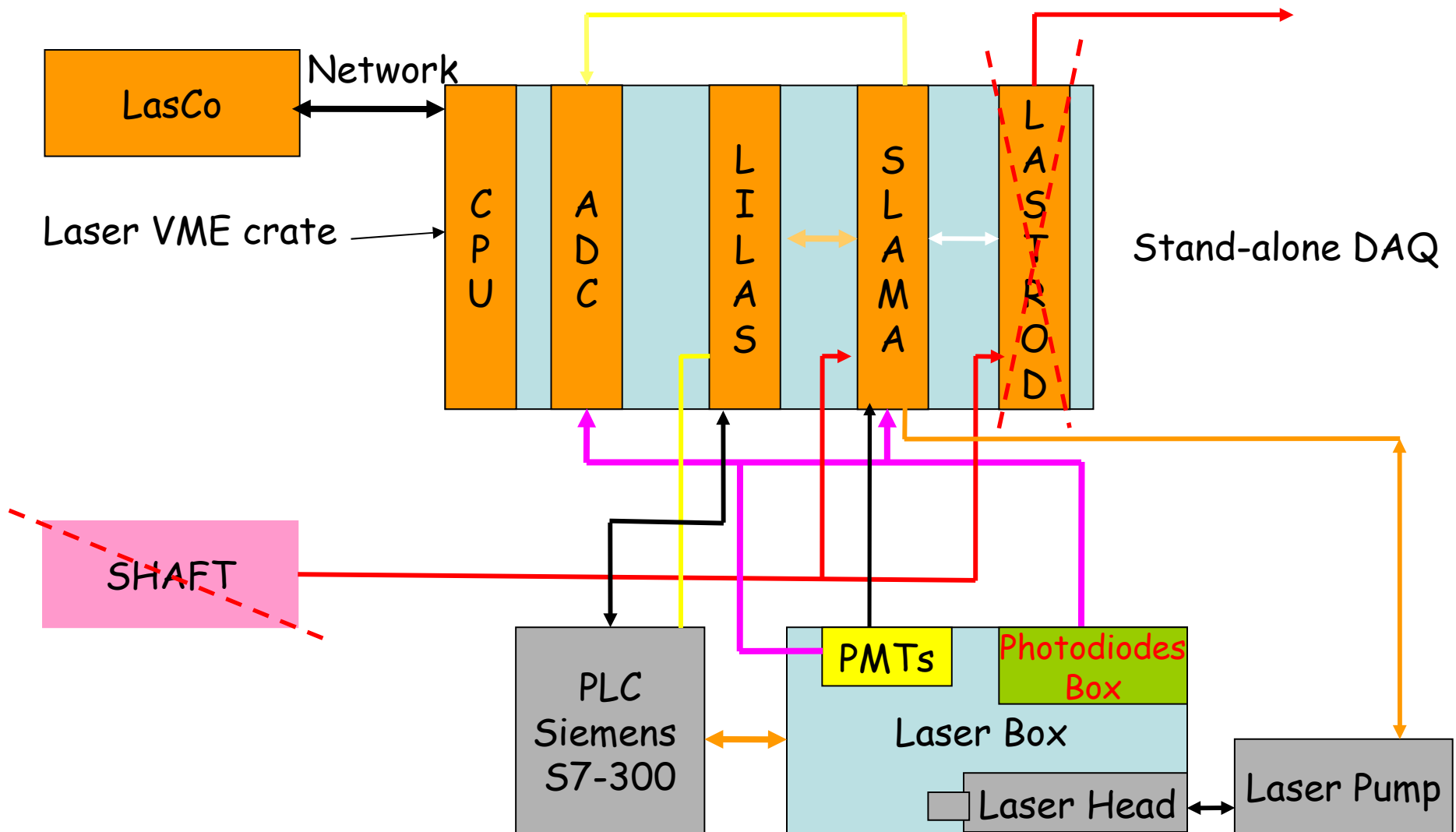
Day 1: Pedestal,  $\alpha$ , single Charge pulse, Charge linearity,  
single Laser pulse, whole Laser range.

Days 2 to n-1 (once per day): Pedestal,  $\alpha$ , single Charge pulse, single Laser pulse.

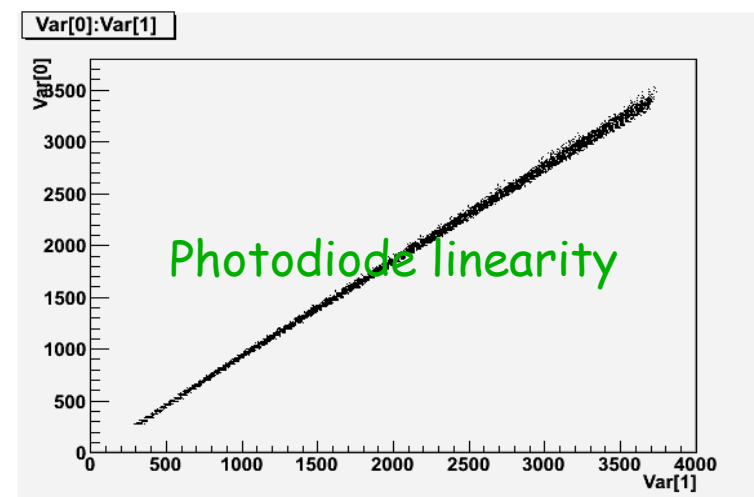
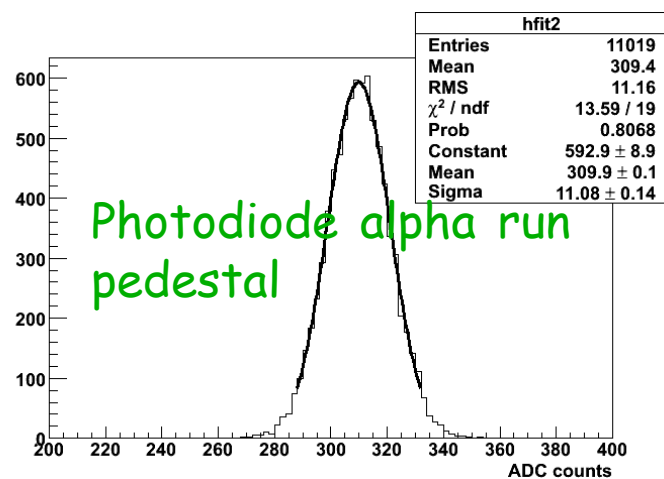
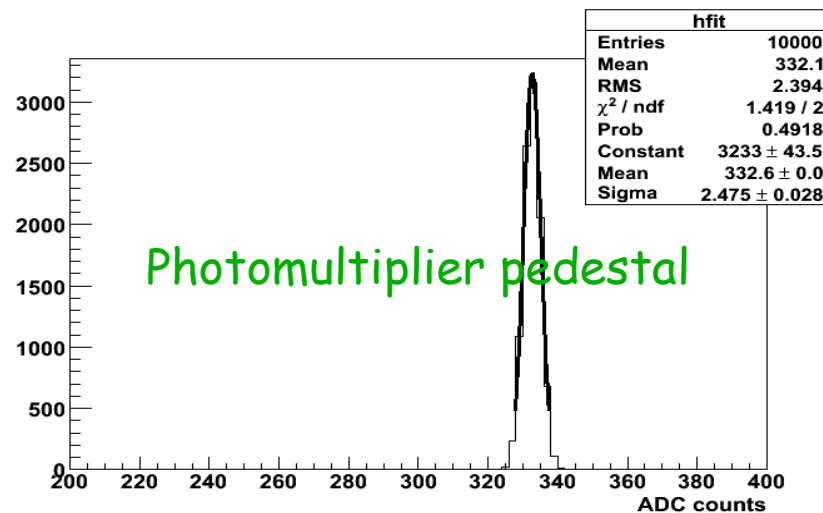
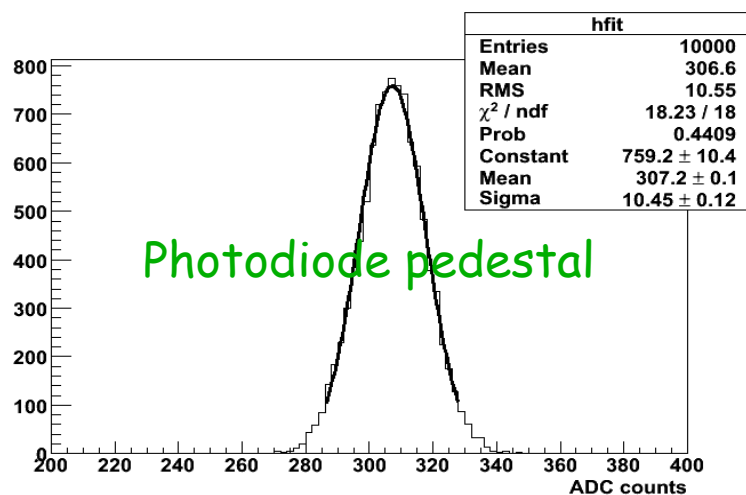
Day n: Pedestal,  $\alpha$ , single Charge pulse, Charge linearity,  
single Laser pulse, whole Laser range.

→ Evolution of the various parameters  
and of the ratios between the 4 Photodiodes (and PMTs with Laser)

# LASER COMMISSIONING SETUP



# FIRST COMMISSIONING RESULTS



# FUTURE ISSUES AND PERSPECTIVESS

- ✧ THE PRELIMINARY RESULTS OBTAINED WITH STEP 1 COMMISSIONING SHOW THAT THE SYSTEM IS STABLE;
- ✧ THIS FIRST STEP WILL BE ACCOMPLISHED AT THE END OF MAY;
- ✧ THE NEXT GOAL IS TO SEND FOR THE FIRST TIME LASER LIGHT ON SOME TILECAL MODULE;
- ✧ AFTER THAT THE LASER SYSTEM WILL BE INSERTED IN THE ATLAS ENVIRONMENT.....

THE WHOLE SYSTEM WILL BE OPERATIONAL IN FALL