Study of the crystal transparency changes of ECAL CMS

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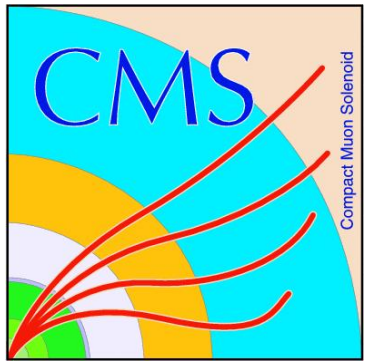


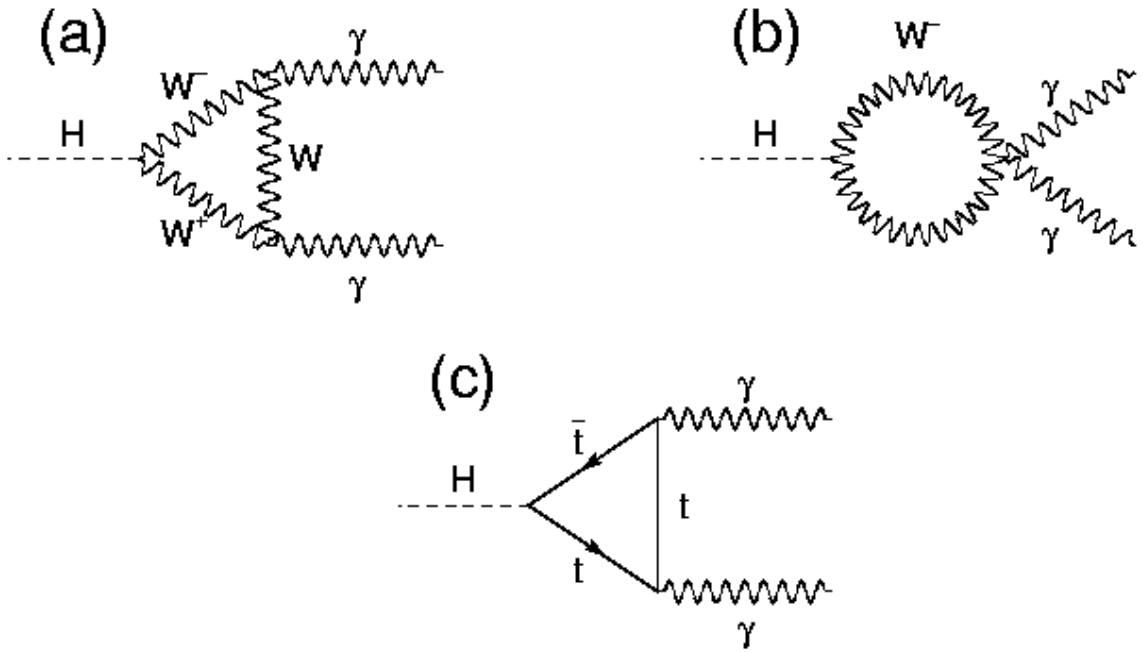
Outline

- CMS
- Higgs$\rightarrow \gamma\gamma$ decay
- ECAL
- ECAL Crystals
- My Project
- Achievements
- Future work

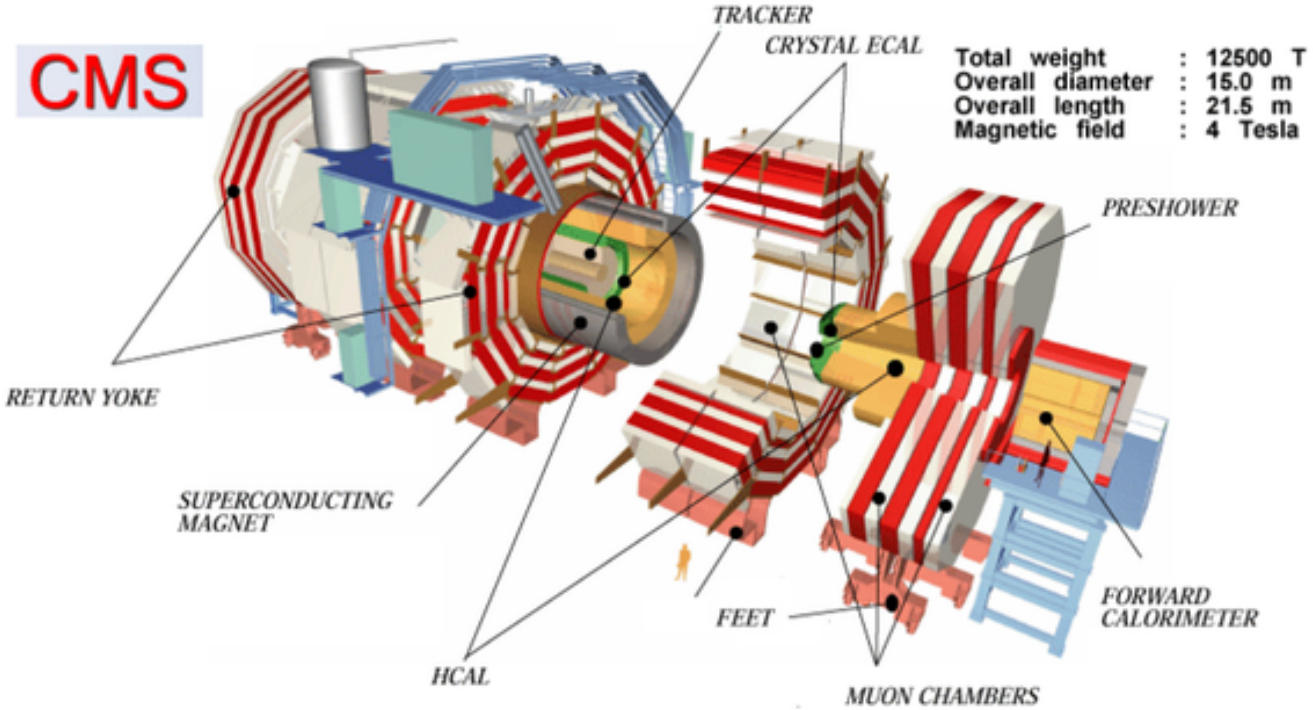
The Compact Muon Solenoid

Higgs $\rightarrow \gamma\gamma$ decay

- Most promising channel for mass between 114 and 130 GeV.



ECAL


CMS
TRACKER
CRYSTAL ECAL
Total weight : 12500 T
Overall diameter : 15.0 m
Overall length : 21.5 m
Magnetic field : 4 Tesla
PRESHOWER
RETURN YOKE
SUPERCONDUCTING MAGNET
FEET
FORWARD CALORIMETER
HCAL
MUON CHAMBERS

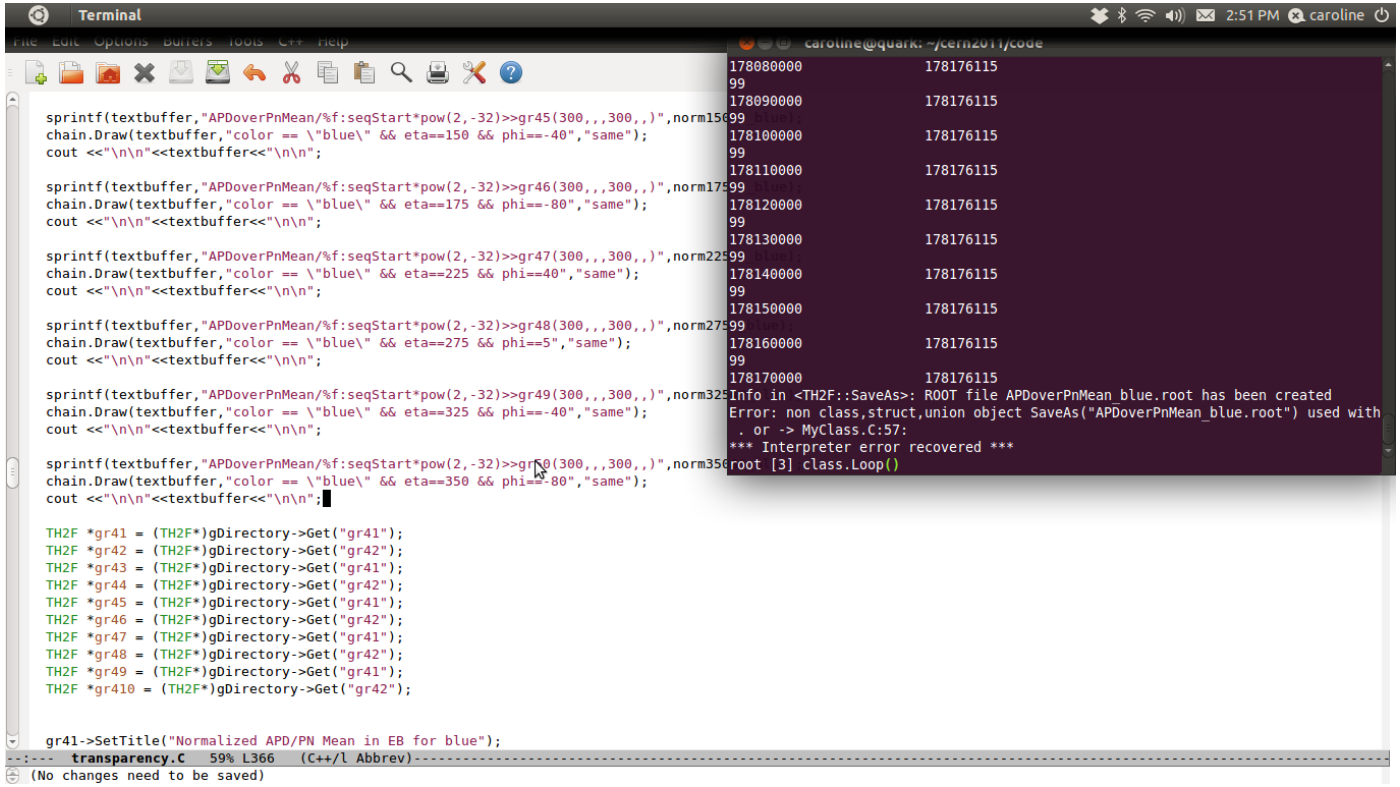
ECAL Crystals

- Tungstate crystals ($PbWO_4$)
- EB region: 61,200 crystals
- EC region: 7,324 crystals
- Readout: APD
- Reference system: PN diodes
- LED light injection system

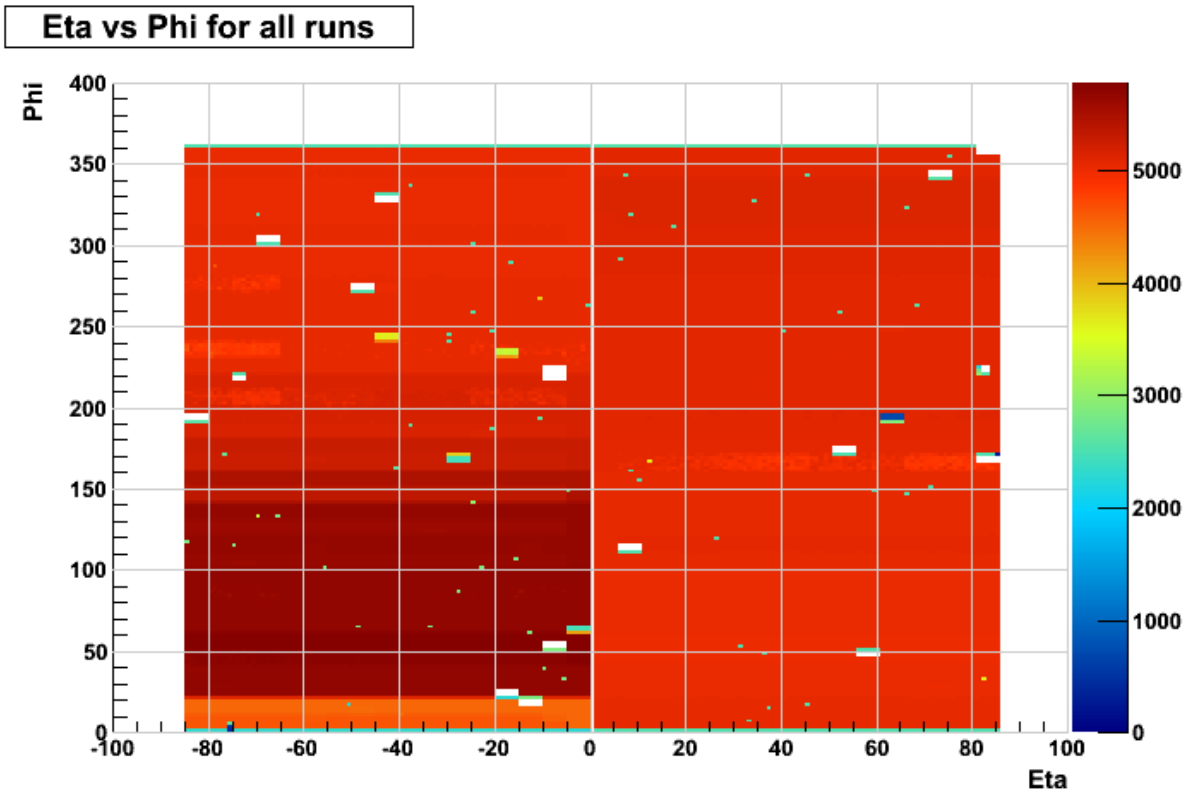
My Project

- Study the transient transparency change of the ECAL crystals.
- Goal: Resolution $<0.5\%$ for energies above 100 GeV.

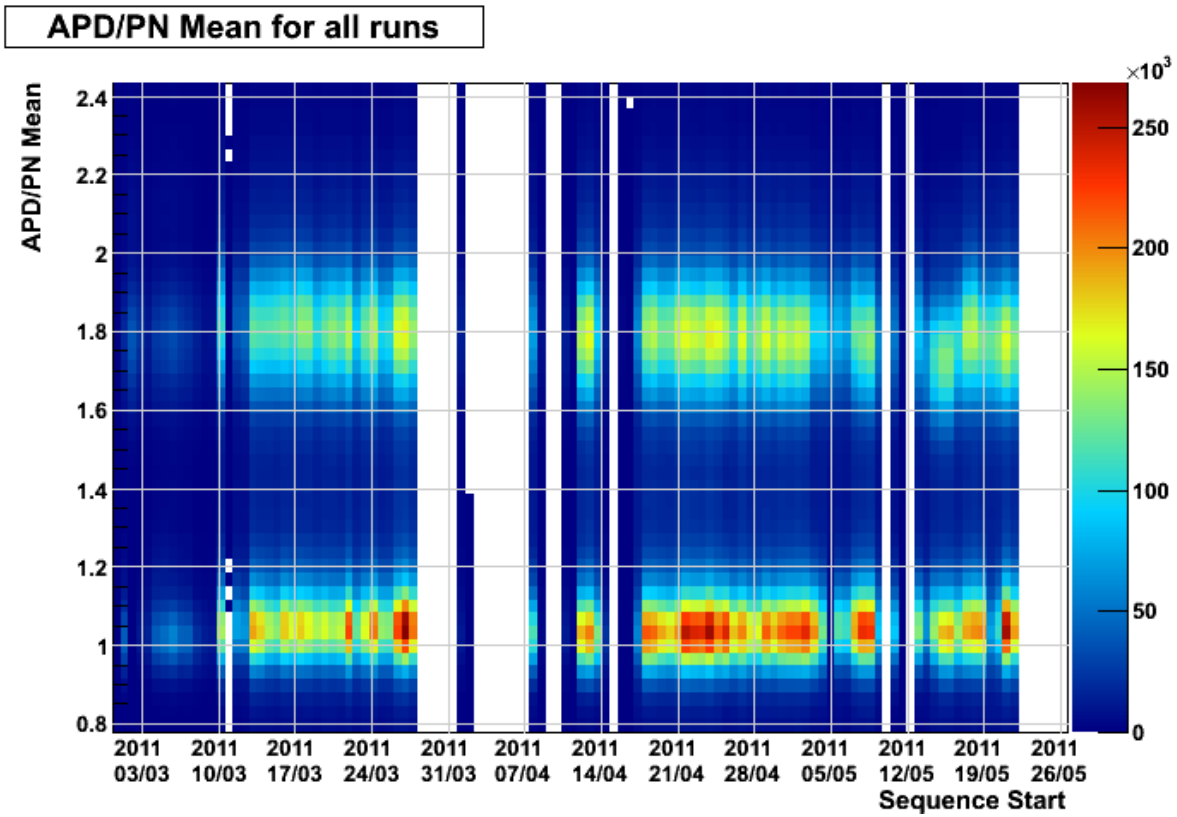
Achievements



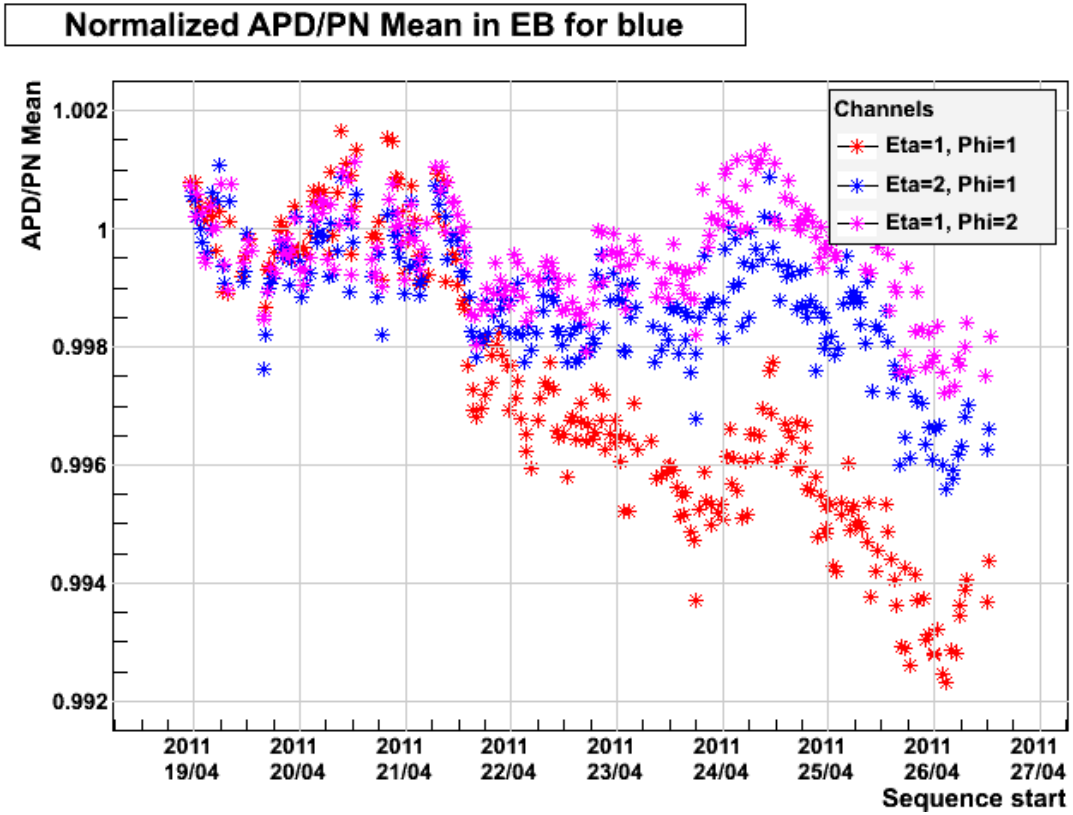
Achievements



Achievements



Achievements



Future work

- Analyze the behavior of all crystals in EB.
- Develop a method to quantify the behavior.
- Extend the analysis to EE.
- Determine the best way to optimize the data resolution.
- Implement an upgraded correction algorithm.

And while we're looking for the Higgs...