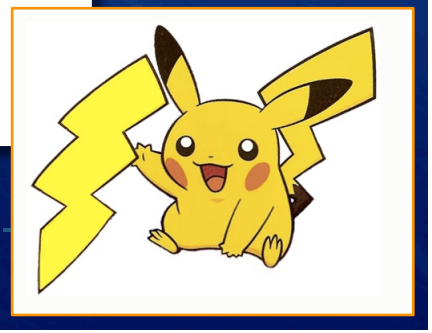
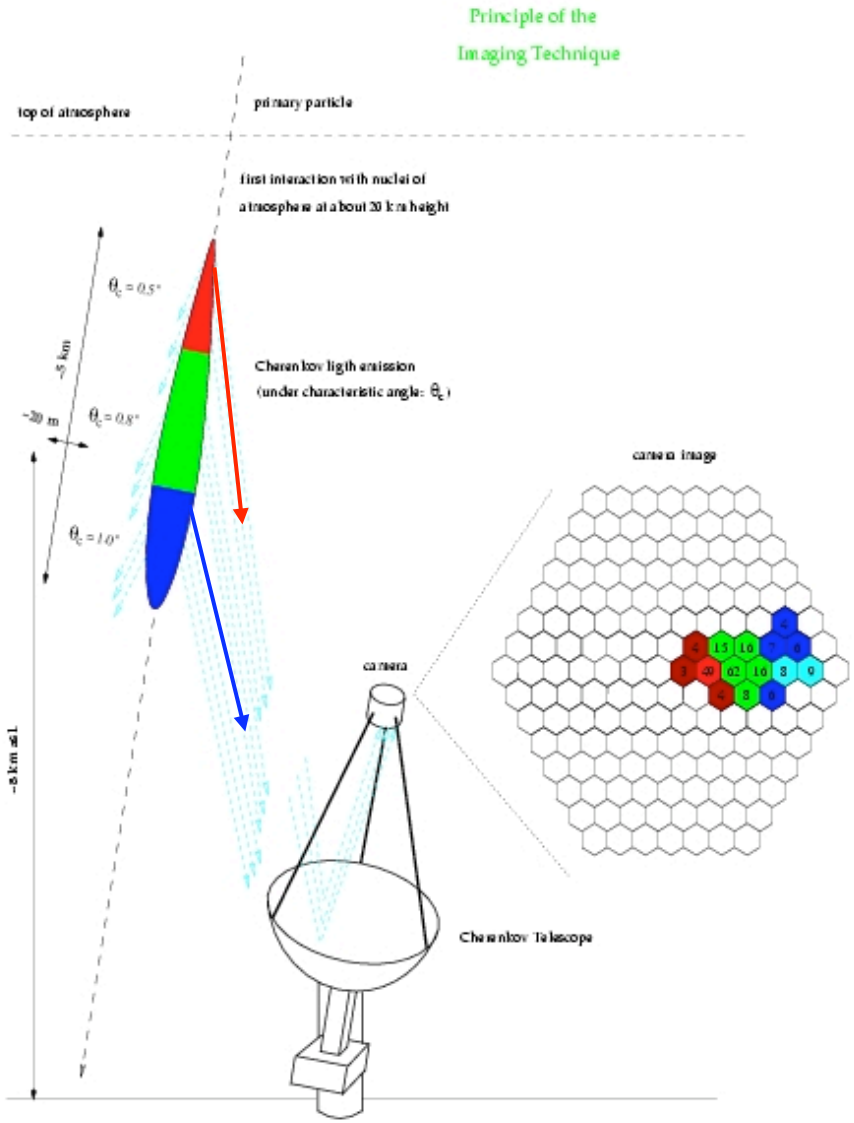
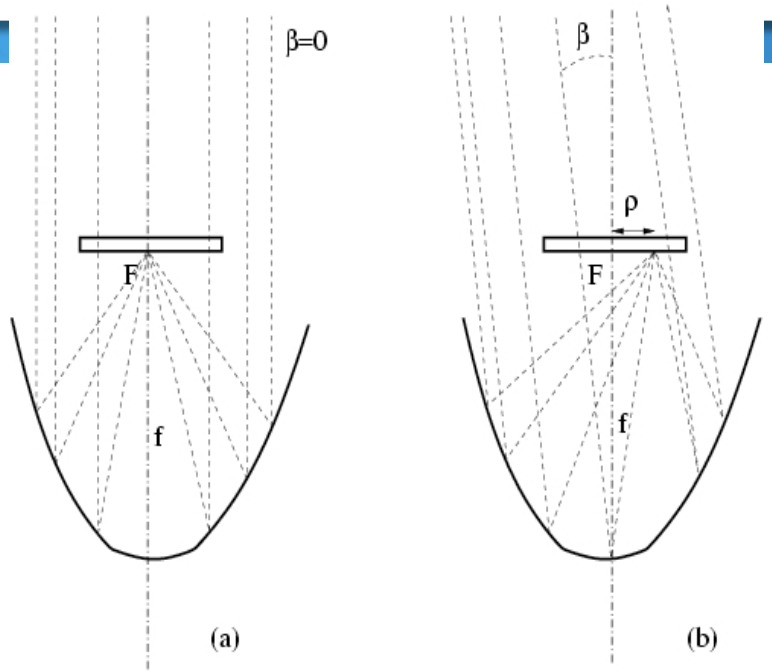
The **gamma signal** events: let's gonna catch 'em all!



We were just talking about…





Closer in the atmosphere

Larger Cherenkov angle

↓

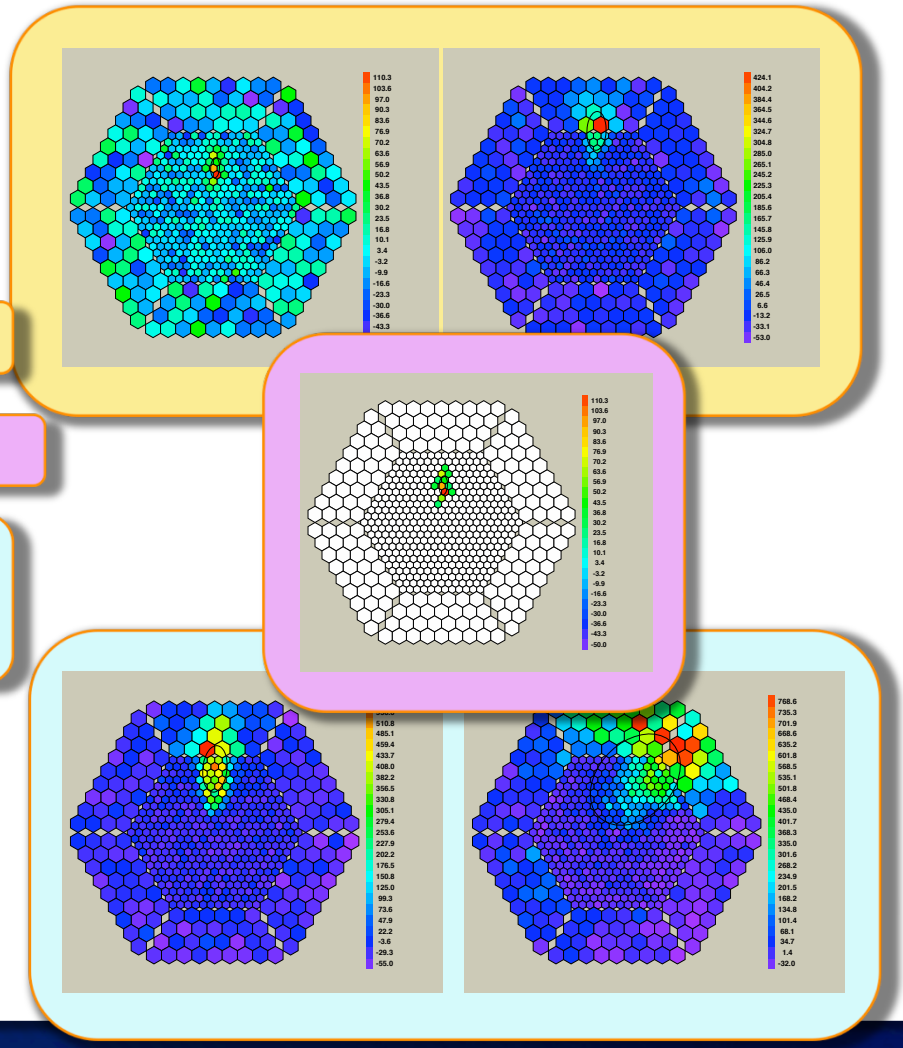
Photons collected far from the camera center

But this was just the beginning…

Study the image:
understand something about its primary particle.

We need to:

1. Calibrate the image
2. Clean the image
3. Recognize the correct images (gammas originated)



1. Calibration: a quite familiar example

Your chemistry teacher

Your physics teacher

Your philosophy teacher

Your english teacher

Your performance evaluation depends on how much you were prepared, but not only…

Each one of your teacher has different evaluation criteria.
8 in Physics is not like 8 in Philosophy!

At the beginning you needed to understand that.

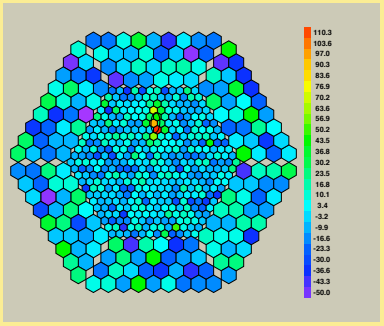
You were just "calibrating" yourself and your expectations, on the teacher you were having.

Calibration in MAGIC

Each pixel of the camera (PMT)…is like… a teacher.
The same number of photons, hitting different pixels, give you different response.

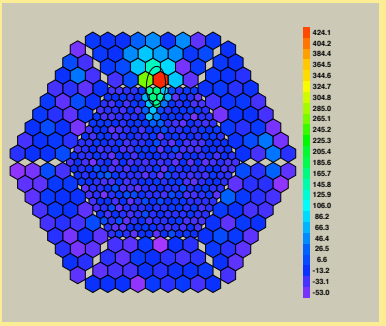
You must calibrate it: you fire the camera with a calibration 'fire' (laser or similar) of known number of photons. And look at the response. So you can correct the value of real cosmic events, in order to properly evaluate the number of hitting photons.

It's like attending at examinations of your friends, in order to calibrate yourself.. you can understand how much "happy" you would be, receiving a certain evaluation by your teacher.

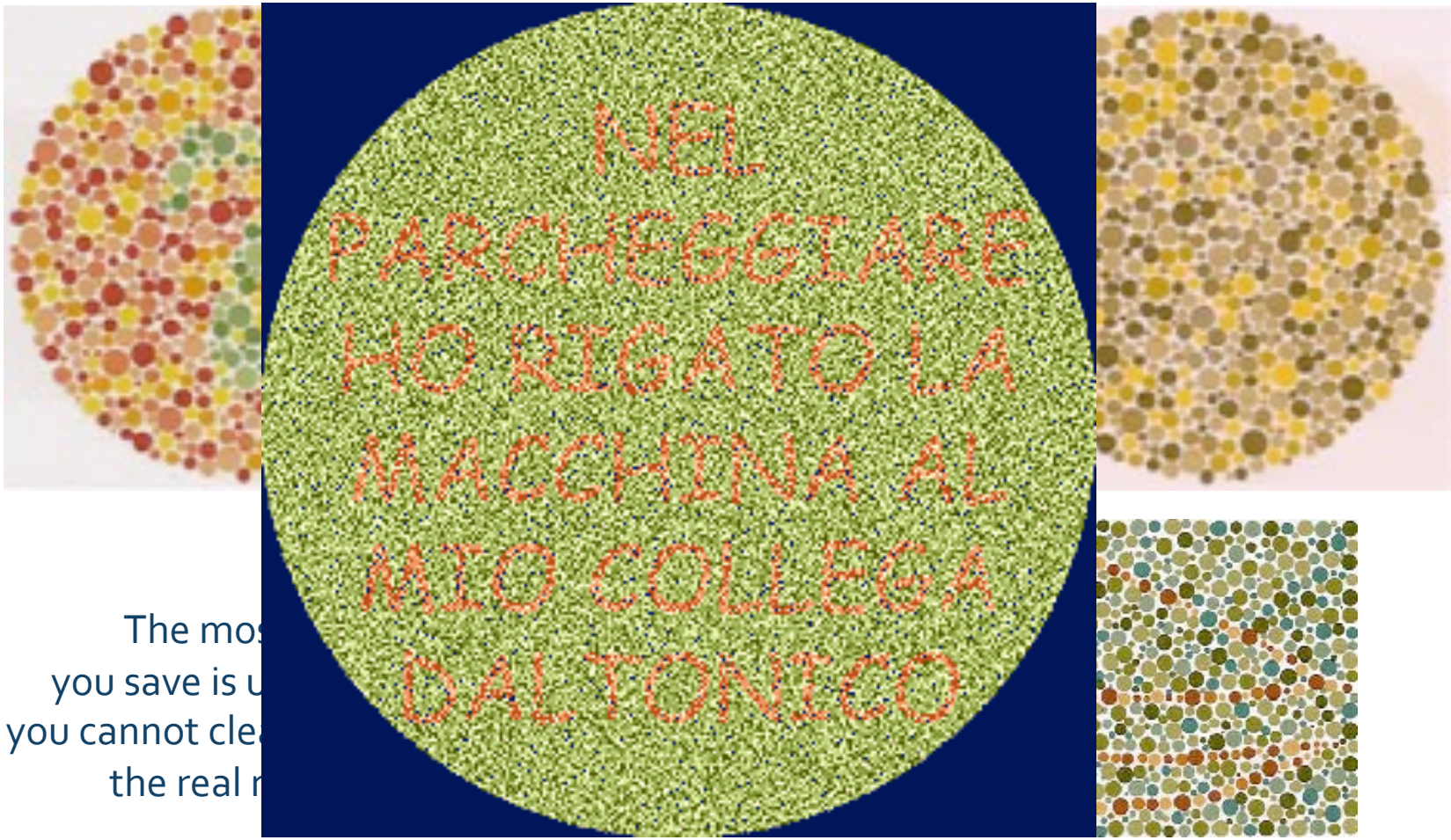


A typical not calibrated event: the camera has a lot of noise, due to the different response of each pixel

Effect of the calibration (and pedestal) correction for an image.
The camera looks more uniform!



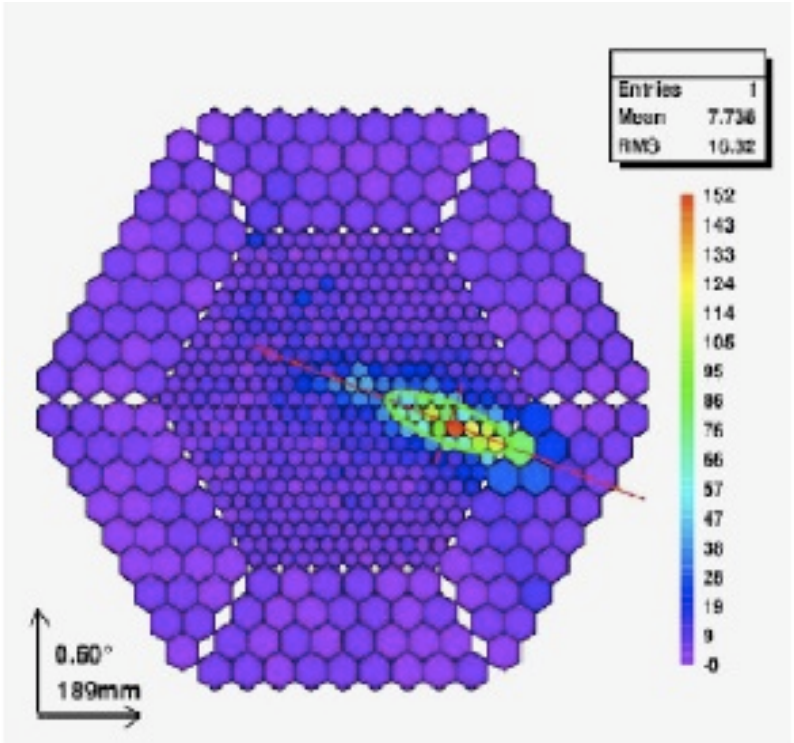
2. Image Cleaning

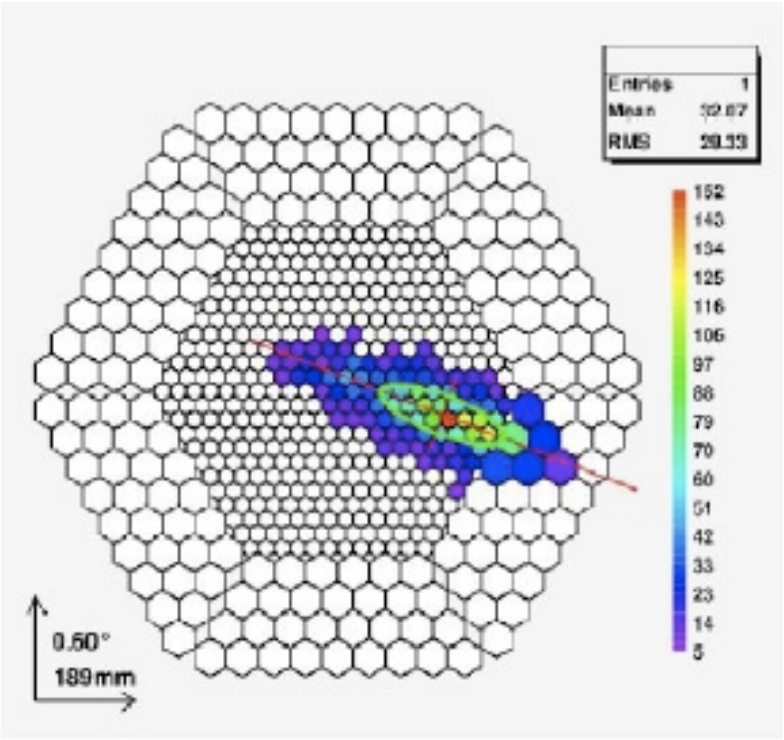


The mos
you save is u
If you cannot cle
the real r

MAGIC case:

Many different techniques, using the condition of neighbouring and also the time information in the arrival of the photons in the camera





3. Recognize wrt what?

The main problem in quite almost the experiments is the

NOISE

Our noise is … the charged cosmic radiation (!!!), alias the

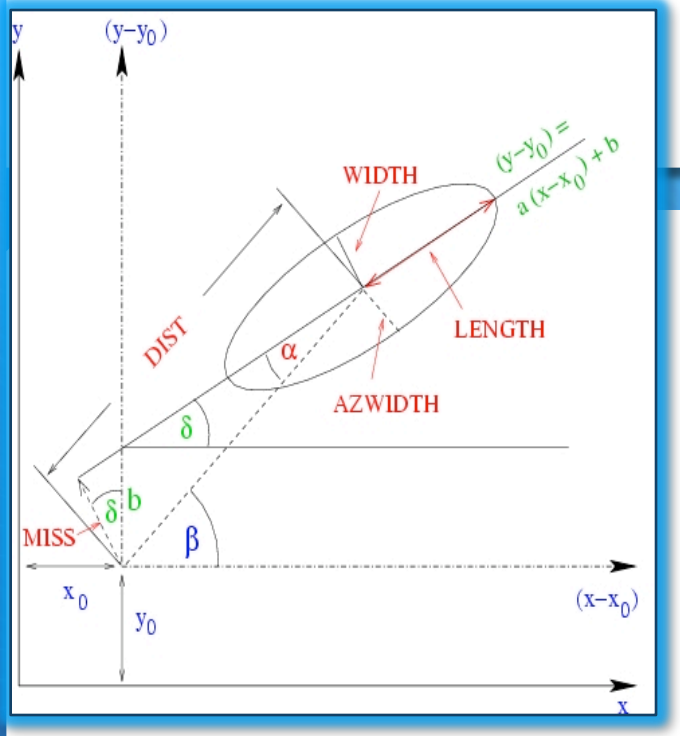
HADRONS generated showers

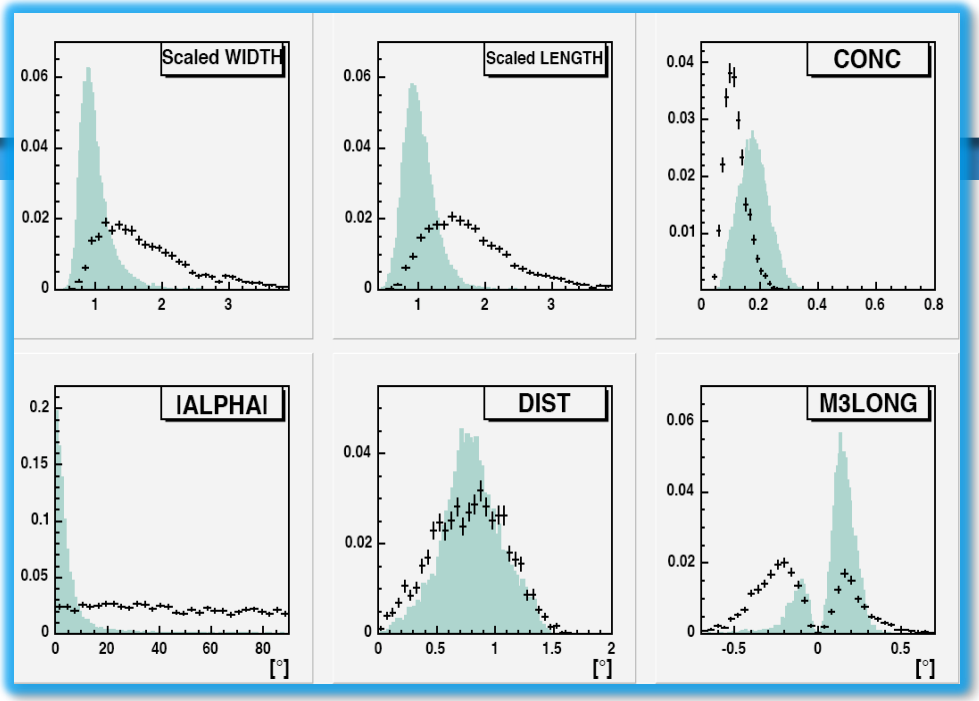
The winning strategy was the

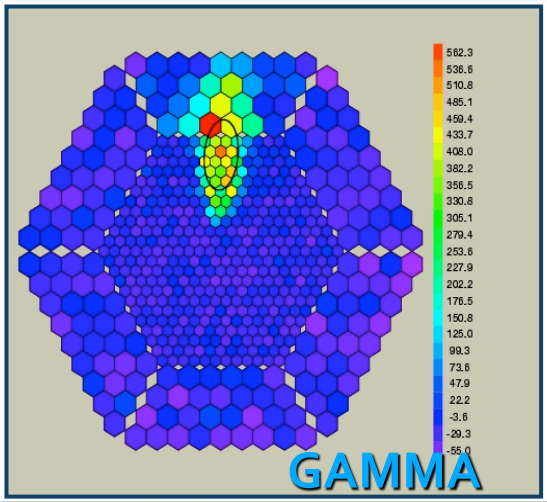
approximation of the image (mainly) to an ellypse,

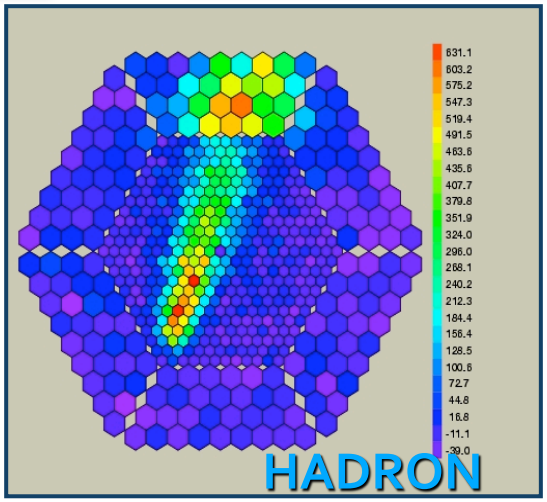
To recognize hadrons and gammas, by the so called..

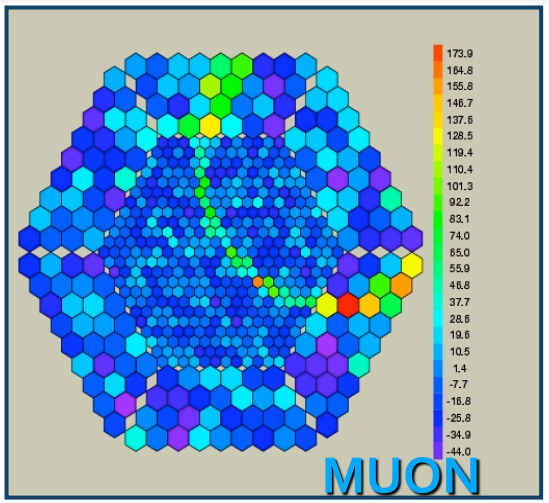
Hillas Parameters







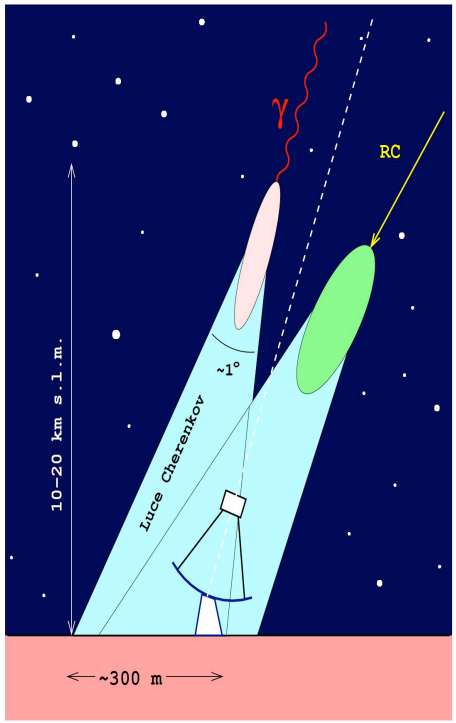


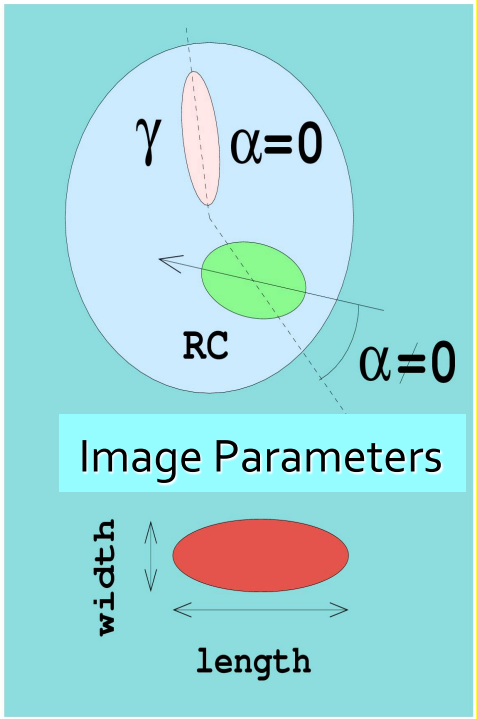


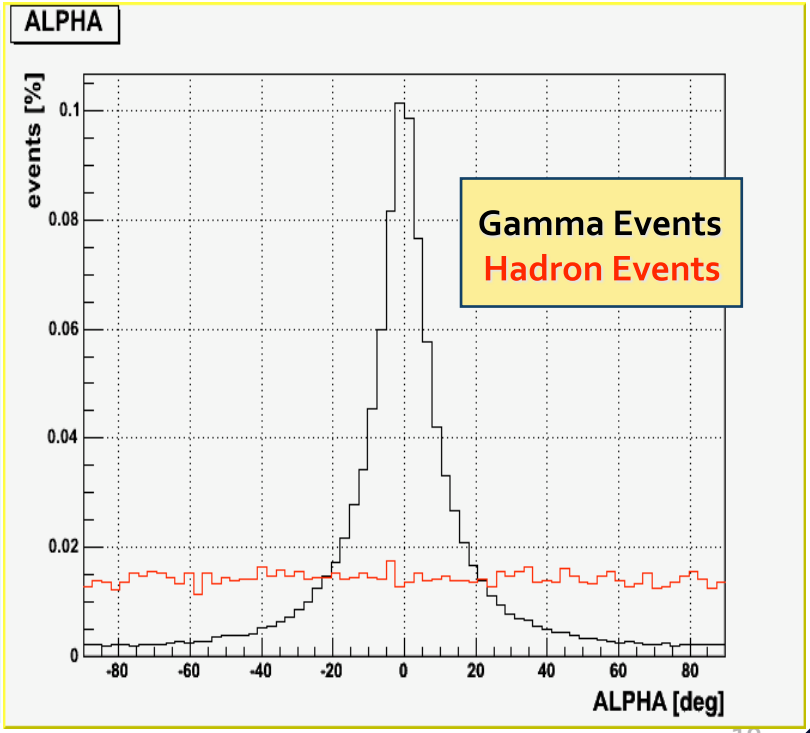
The Alpha Hillas Parameter

Primary particle incoming with the same pointing direction: Longitudinal axis of the image point close to the center of the camera (small ALPHA value).

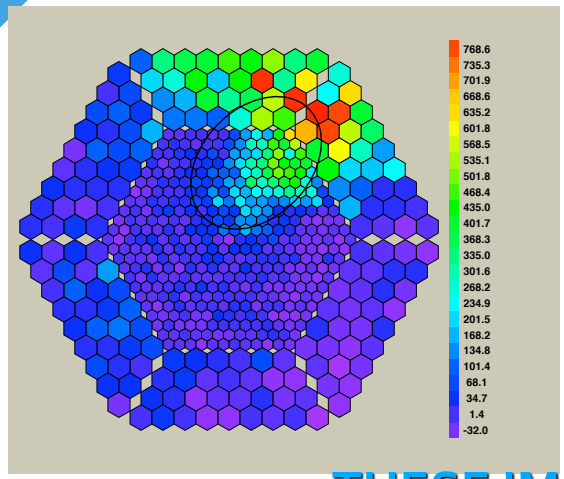
Primary particle with a different direction: Longitudinal axis of the image not center-oriented (generic ALPHA value).

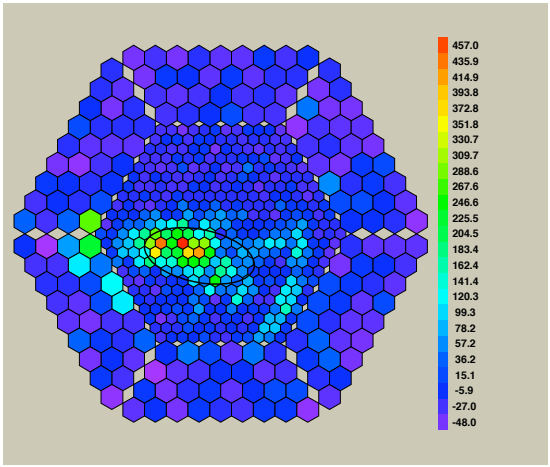


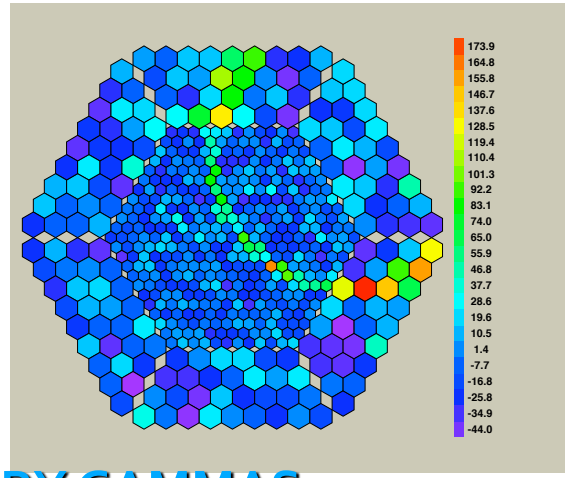




Alpha is not enough

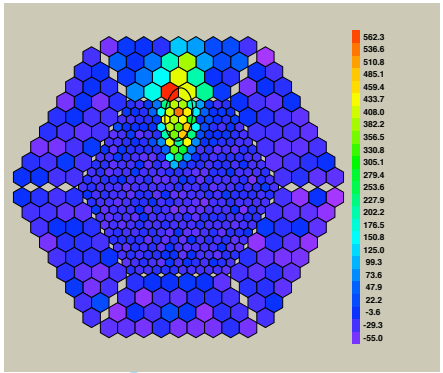






THESE IMAGES ARE NOT GENERATED BY GAMMAS

By looking at the images do you have the feeling that gamma and hadrons are different?



GAMMA

Could you recognize them?
How would you explain your laptop how to do that?

Exercise

Today you will try to deal with
REAL MAGIC DATA!!!!

We ask you to check the number of gammas and hadrons in a sample,
BY HAND (or, better, by your eyes!).

Finally, we ask you to calculate, with our help, the estimation of the flux you will obtain!