

# Design of an automated system for sensitivity characterization of 8" diameter- Hamamatsu R5912 type photomultipliers.

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Gamma Ray Bursts are one of the most powerful events in the universe whose origin is still under examination.

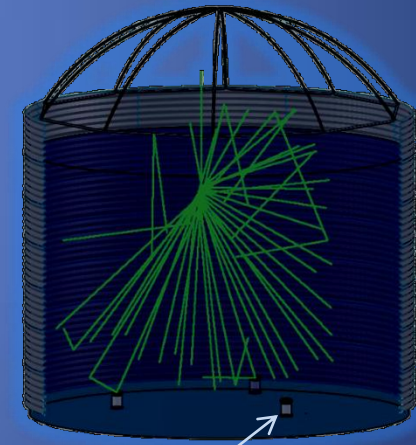
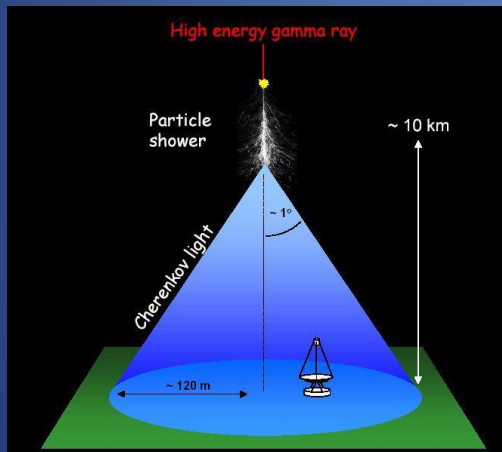
Many instruments for the detection of high-energy gamma rays have been installed worldwide.

Photomultiplier detectors have been used in Water Cherenkov Detectors for the study of gamma rays and high energy astroparticles.

We designed and built a user friendly system to characterize the performance of Hamamatsu R5912 type PMTs to achieve automated measurements of 100 points distributed on the 8" active surface of the  
PMT

Currently three major classes of high-energy detectors exist:

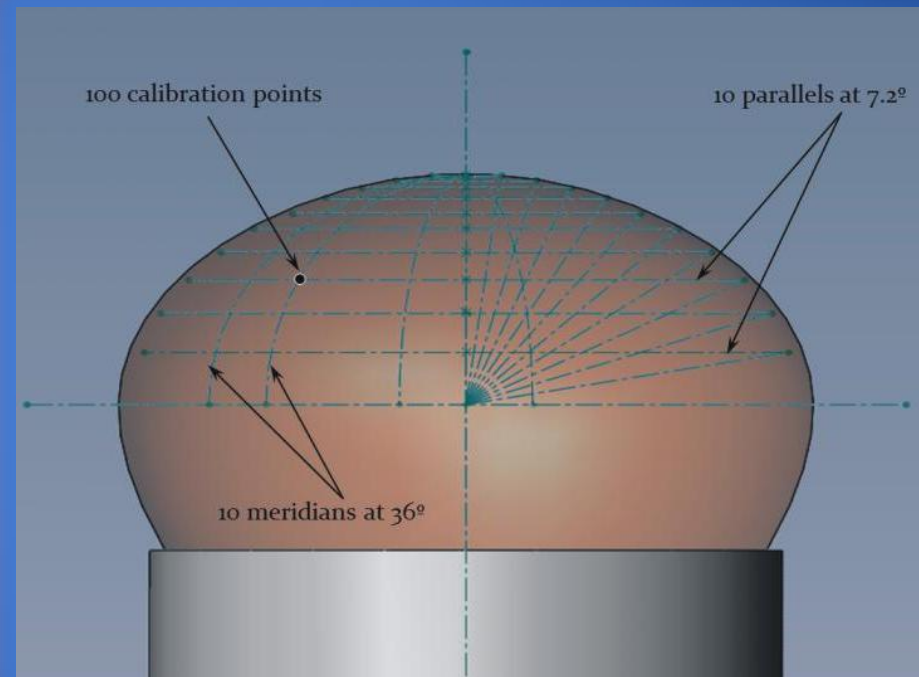
Satellite detectors,  
Imaging Atmospheric Cherenkov Telescopes and  
Extensive Air Shower detector arrays.



PMTs  
to be characterized

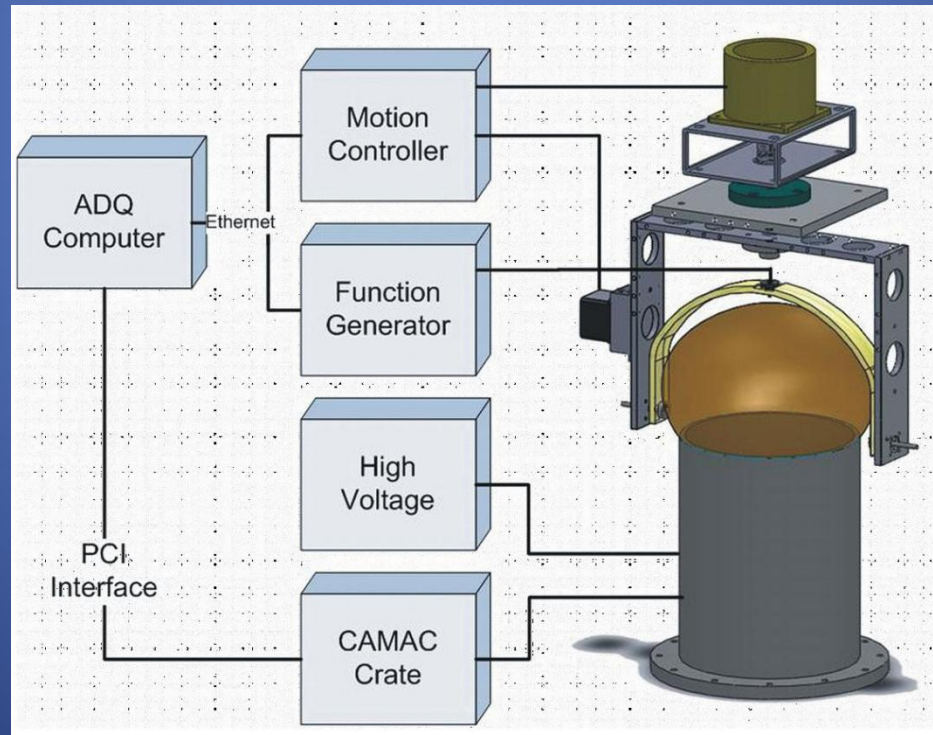
In order to characterize the efficiency and gain of a PMT detector it is necessary to scan its active area.

The active surface was divided in “meridians” and “parallels”. At each intersection there’s a measurement point.



The mechanical device has two orthogonal, rotational axis to position an arched arm which carries, on its apex, the light source (a blue LED).  
It can be moved in azimuth and elevation directions.  
Both rotations are provided by controlled stepper motors and transmission systems.

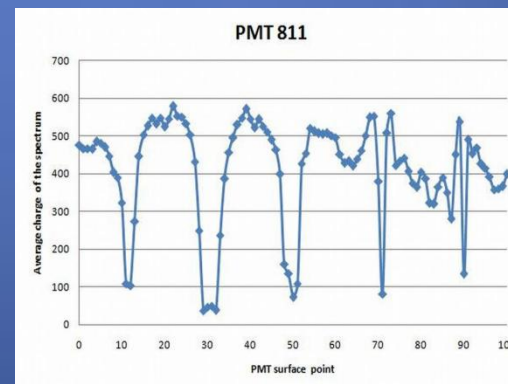
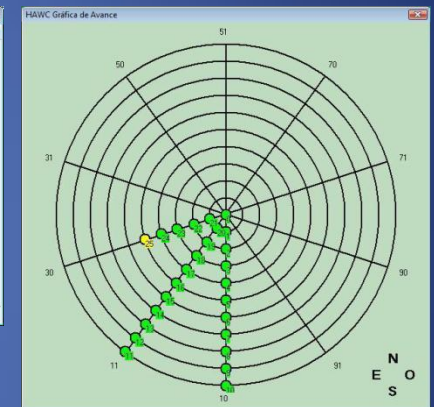
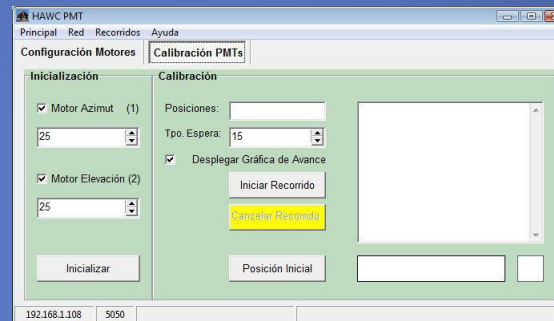
The LED is driven by a function generator .  
The data acquisition has been done by a CAMAC system  
Both are controlled by a computer with MS Windows operating system.



The whole mechanism is allocated inside a light-tight cabinet .



The system has a GUI that is in charge of data acquisition from the points where the LED is positioned.



Recent tests have taken only 15 minutes for a 101 points run on a PMT.