

The background of the slide is a dark night sky. A bright star is visible in the upper left, with a long, dense trail of white lines radiating from it across the sky, resembling a star trail or a comet's path. The sky is filled with numerous small, distant stars. In the lower portion of the image, the dark silhouette of a mountain range is visible against the horizon. The overall scene is a composite of astronomical imagery and a landscape.

A Look at the Space from Various Angles

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Introduction

For the first experience with Centro Fermi we have focused our analysis activity on the angular distribution of secondary cosmic radiation: in particular on swarms of muons.

Experimental Setup

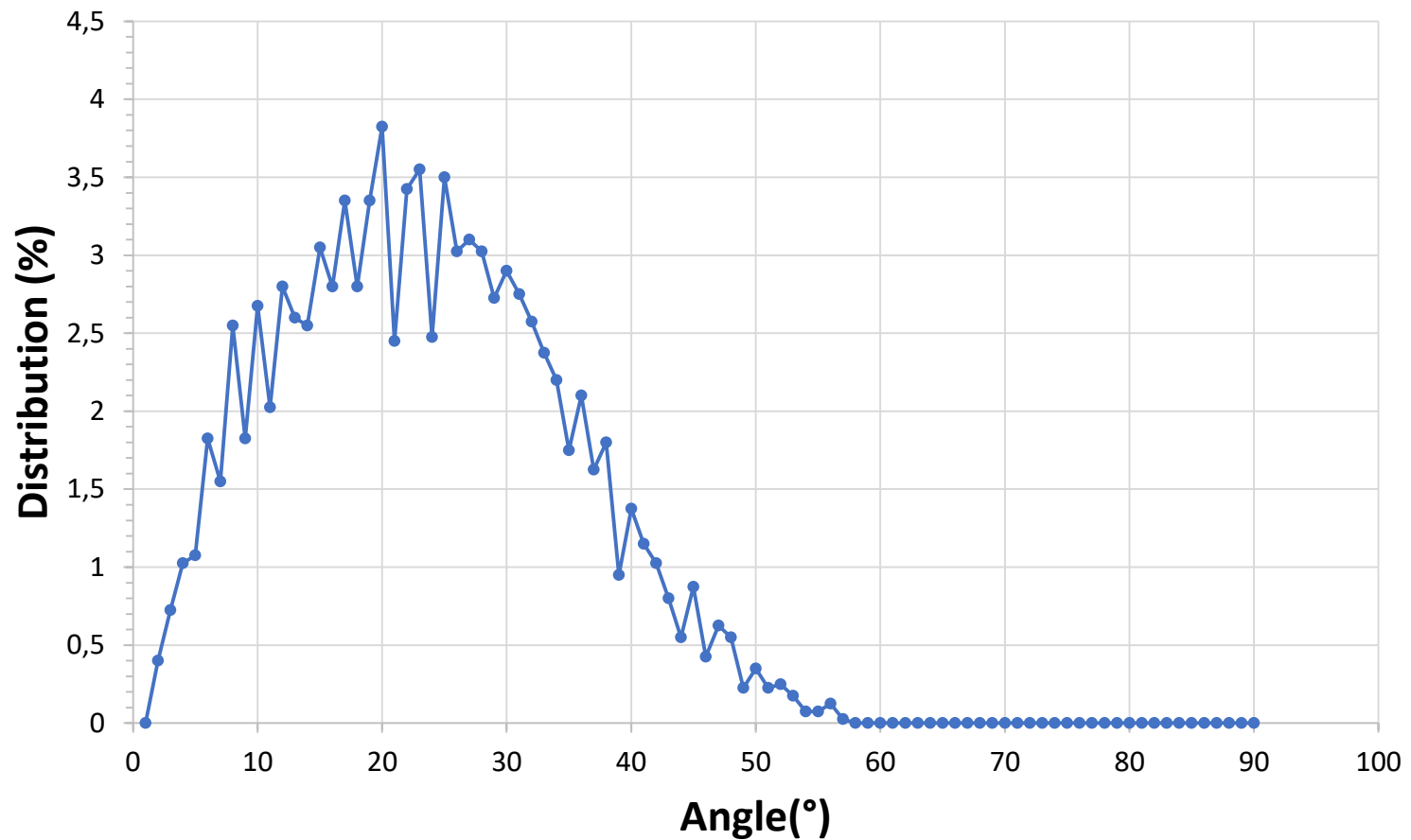
The collection of data is based on two detectors which are situated in two locations in Veneto, one is Treviso (*TREV-01* from 2018-11-21 to 2018-11-21) and the other one is Vicenza (*VICE-01* from 2018-11-21 to 2018-11-21). By selecting the data only regarding the zenithal angle we have eliminated uncertainties due to the instrumentation, such as χ^2 and geometrical limitations.

The background of the slide is a dark night sky. In the upper left, a bright star with a four-pointed diffraction pattern is visible. Numerous white lines, representing meteor streaks, are scattered across the sky, with a higher concentration in the upper left and lower right. The lower portion of the image shows a dark silhouette of a horizon or landscape.

Analysis 1

We proceeded with the normalization of data after it was imported onto Excel spreadsheets. We created two columns, one for the angles and the other one for the frequencies. Graphically representing the results, we compared it to the MonteCarlo simulations (ideal simulations in an isotropic environment based on the geometry of the telescopes).

Distribution of cosmic rays in function of angles

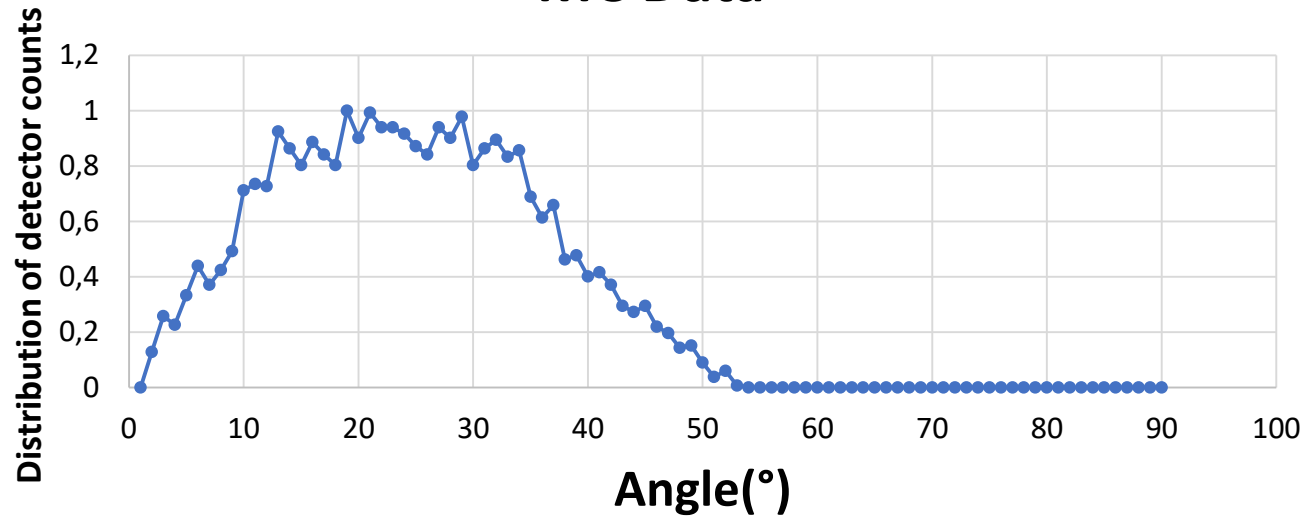




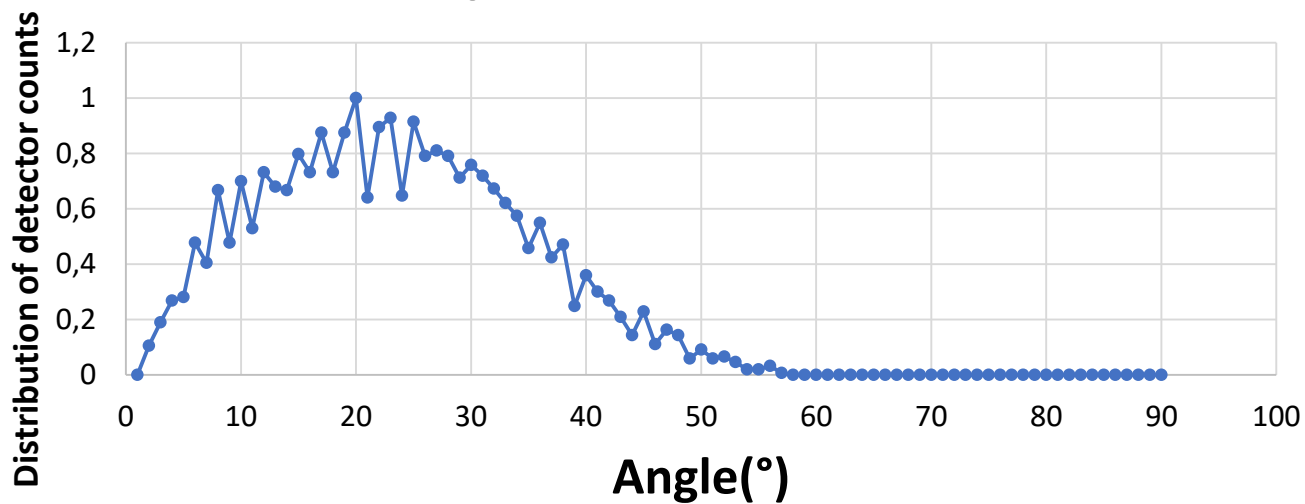
Analysis 1

We divided our data for the maximum value of frequencies in order to demonstrate better a relationship between the angle and detector counts avoiding absolute values.

MC Data

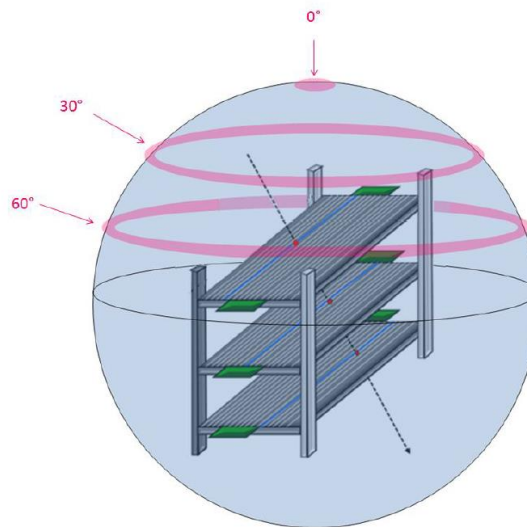


Experimental Data



Results 1

We interpreted the graphics considering that for great angles the telescope is limited by its geometry and for slight solid angles we don't have a lot of counts. This is due to the fact that we have smaller areas of sky at the same distant from the telescope.



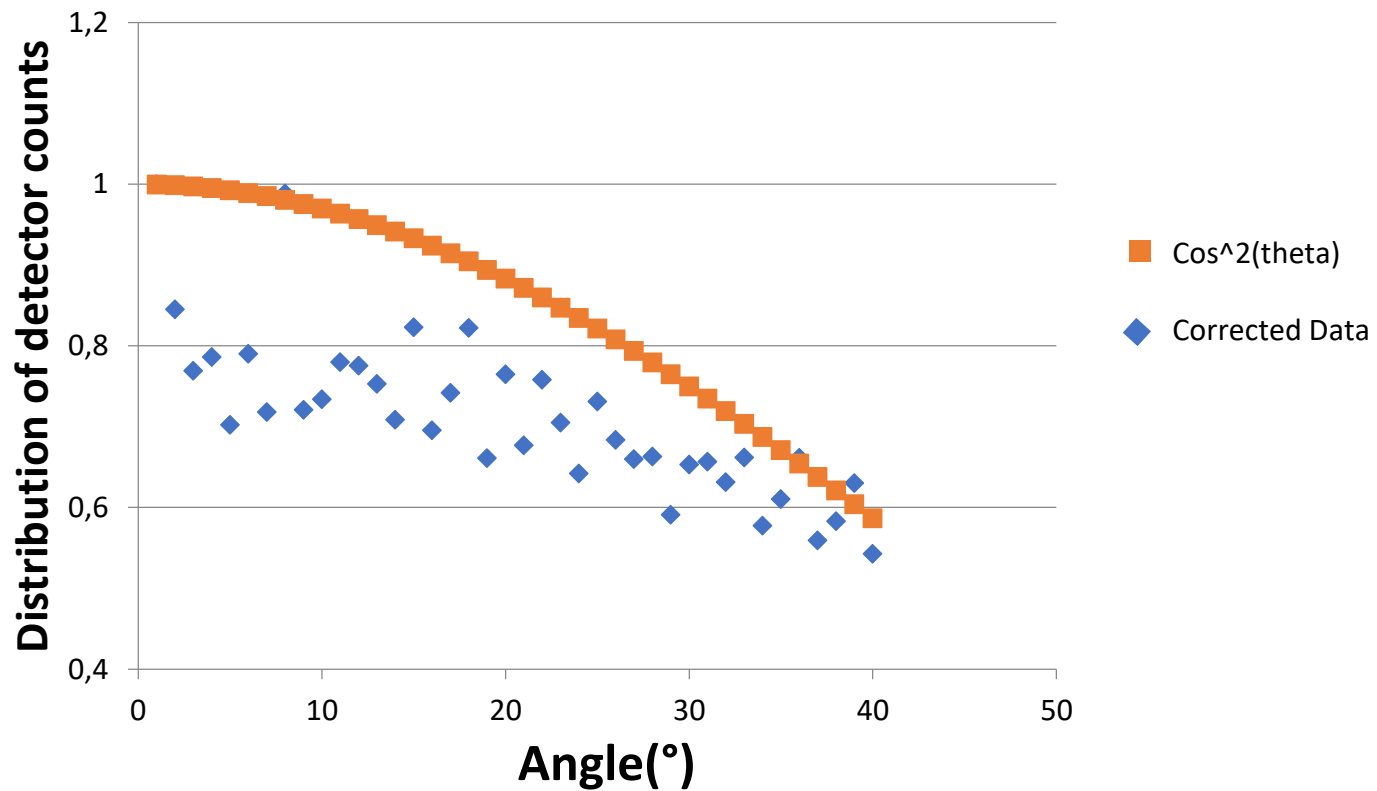
A visualization of a cosmic ray shower against a starry night sky. Numerous white lines radiate from a point, representing the paths of secondary particles. A bright star with a four-pointed diffraction pattern is visible in the upper left. The bottom of the image shows a dark silhouette of a forest or landscape.

Analysis 2

We went on with our analysis to find an ideal description of the angular distribution of cosmic rays, removing all the problems faced in Analysis 1.


At the end we tried to find a mathematical function that would fit our graphic.

Theoretical measurement



Results 2

The results have shown a few discrepancies from the simulation but they were predictable because of slight measurement uncertainties with the telescope. One reason could also be the fact that we didn't use a great number of data.

A night sky with a meteor shower. Numerous bright white streaks (meteors) are visible against a dark blue and black background. A bright star with a four-pointed diffraction pattern is located in the upper left. In the lower portion of the image, the dark silhouette of a city skyline is visible, with some lights glowing from the buildings. The overall scene is a composite image used as a background for a text box.

**Thank you for your attention
and we look forward to your
comments and questions**