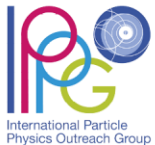


INTERNATIONAL COSMIC DAY

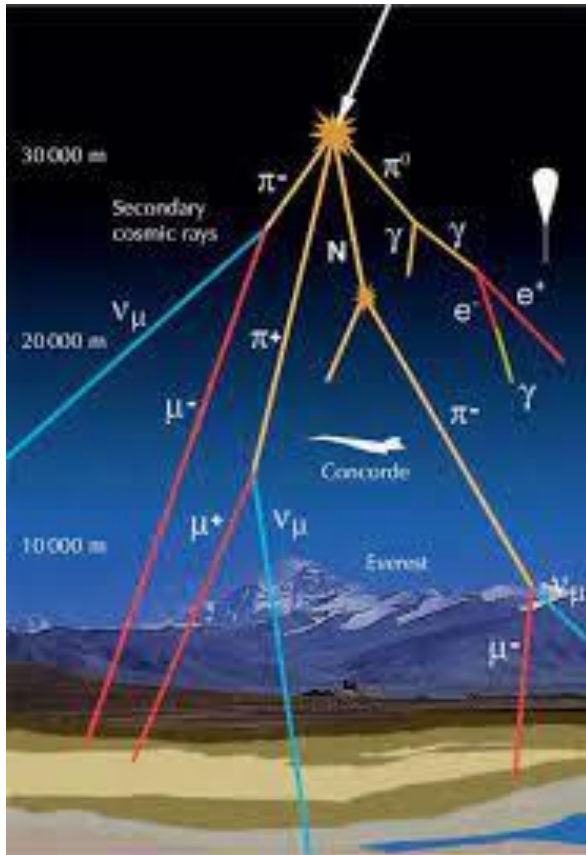
Cariati Scientific High School
November 26, 2024
East West Effect
Prof. Domenico Liguori



In cooperation with
many networks and partners



Cosmic Rays



Cosmic rays are energetic subatomic particles that constantly bombard the Earth's atmosphere from all directions. They are mostly protons coming from different parts of the universe at different energies and interacting with the Earth's atmosphere they produce showers of other particles and radiation. The particles that reach our detectors are mostly muons.

Our detector

As a cosmic ray detector we used the Cosmic Hunter, a CAEN educational instrument based on silicon photomultipliers (SiPM), it consists of a coincidence detector unit together with three 15cm x 15cm scintillating plastic tiles.

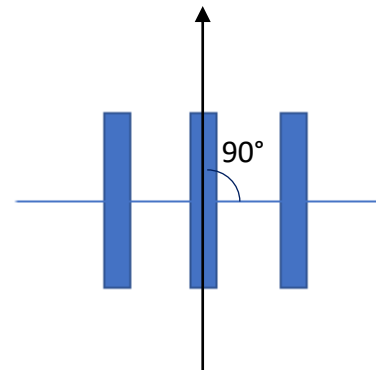
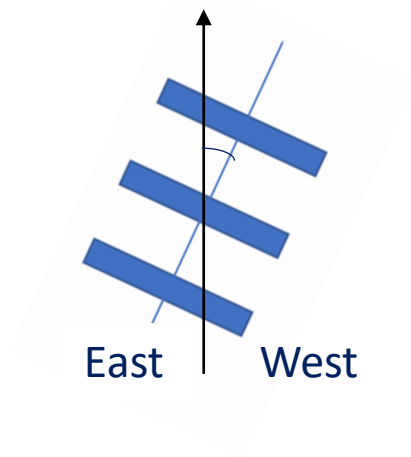


The supplied mechanics allow the orientation of the detector at different angles and an adjustable geometry depending on the distance between the tiles.

In our case the distance between the tiles was 13.5cm and we acquired triple coincidences.

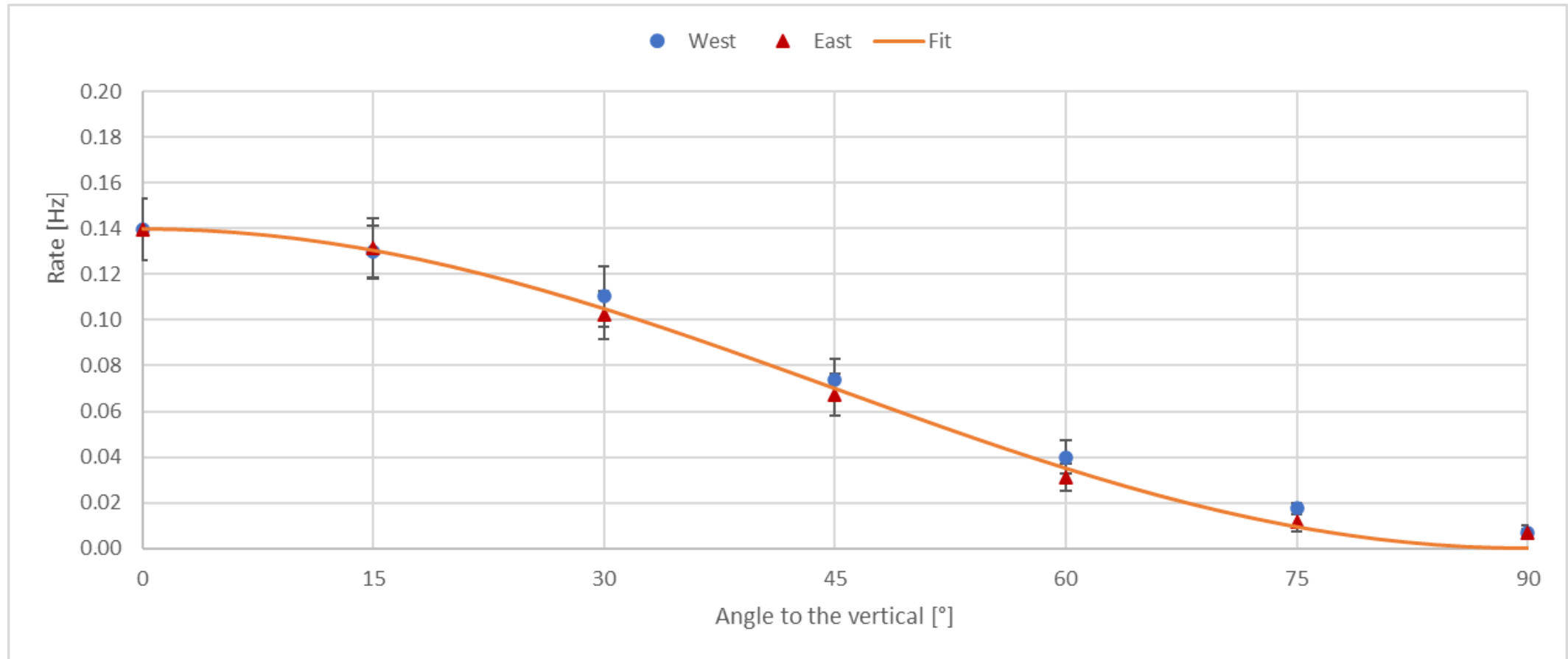
Our measurements

We performed measurements for a full month acquiring cosmic ray counts in triple coincidence every 10 minutes. The detector was oriented in the North-South direction and acquired data at different inclinations from 0° to 90° both towards the East and the West in steps of 15° . Each measurement lasted at least 24 hours.



Our results

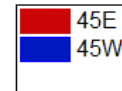
Cosmic ray flux as a function of measurement angle, from East and West



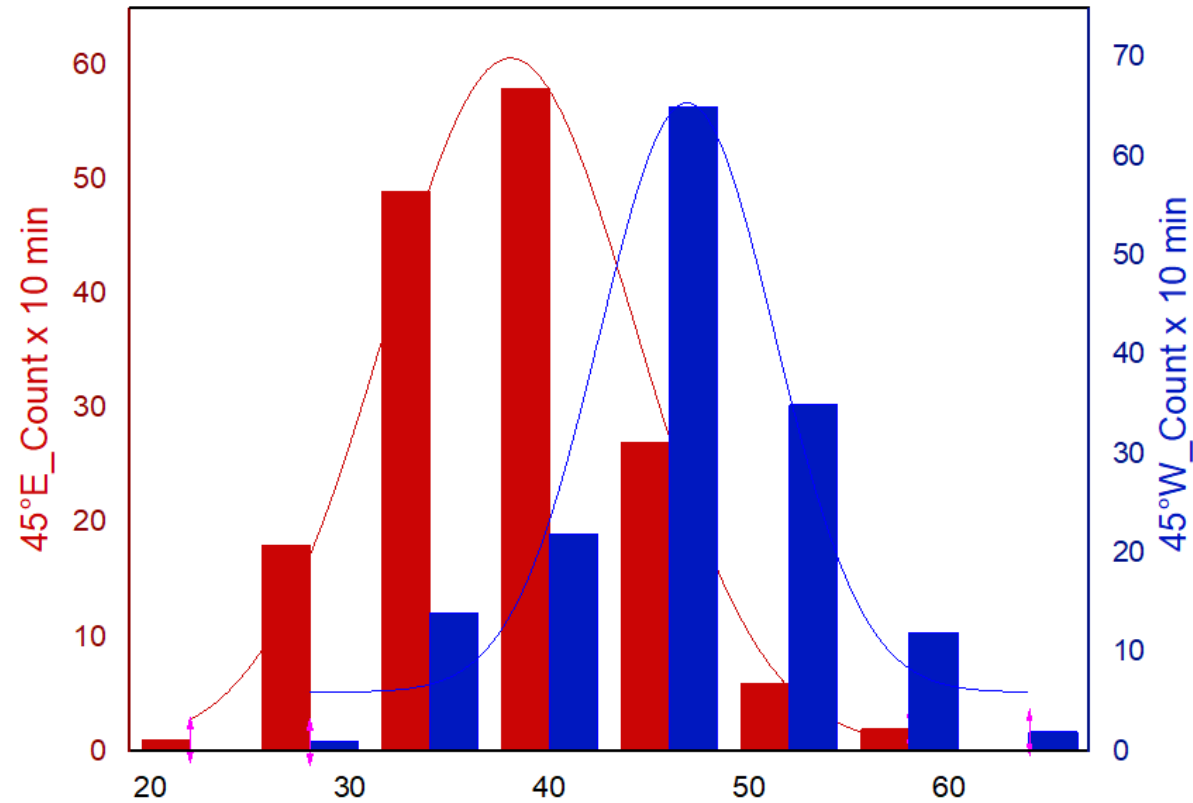
Our results

Evidence of the East-West Effect

Model	Gauss
Equation	$y=y_0 + (A/(w*\sqrt{\pi/2}))*\exp(-2*((x-xc)/w)^2)$
Plot	B
y0	0.55934 ± 1.10673
xc	38.03678 ± 0.14827
w	12.53476 ± 0.43739
A	943.33719 ± 41.42926
Reduced Chi-S	1.86858
R-Square (COD)	0.99822
Adj. R-Square	0.99645



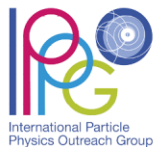
Model	Gauss
Equation	$y=y_0 + (A/(w*\sqrt{\pi/2}))*\exp(-2*((x-xc)/w)^2)$
Plot	D
y0	6.00012 ± 3.37914
xc	46.87055 ± 0.57987
w	8.77937 ± 1.19294
A	653.97466 ± 104.54219
Reduced Chi-Sq	36.59279
R-Square (COD)	0.96367
Adj. R-Square	0.92734



INTERNATIONAL COSMIC DAY

Thank you for your attention

Cariati Scientific High School
November 26, 2024
East West Effect



In cooperation with
many networks and partners

