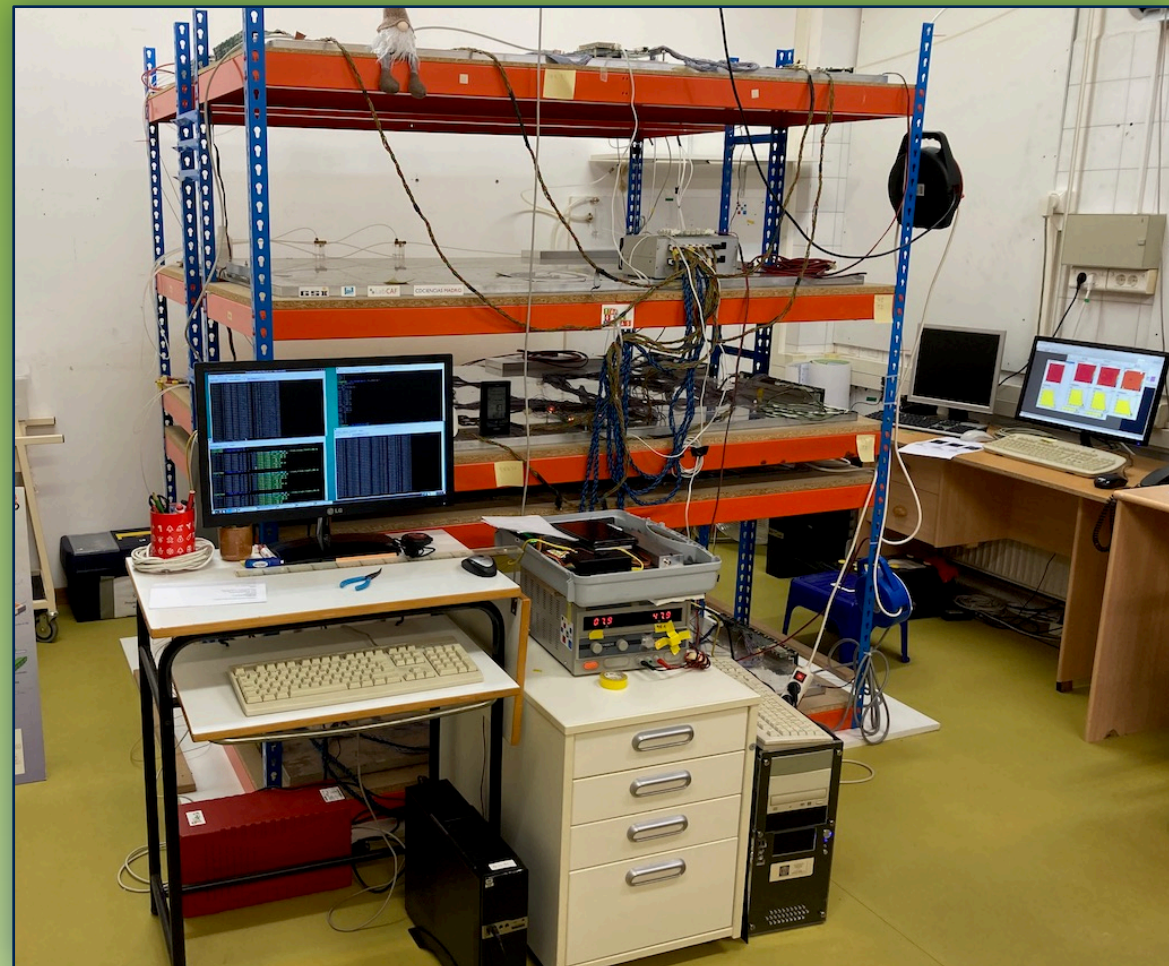


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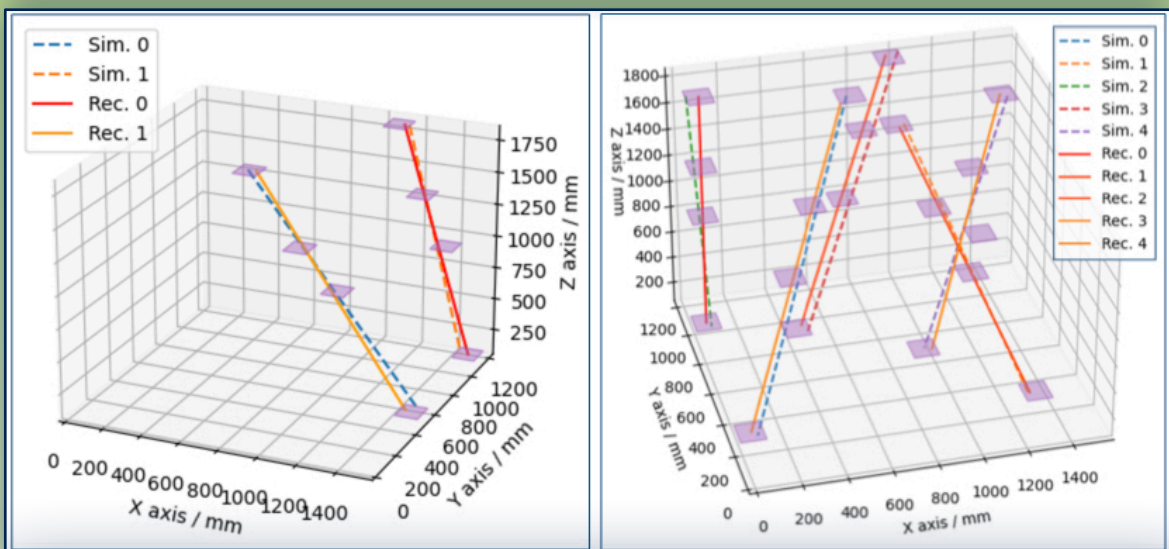
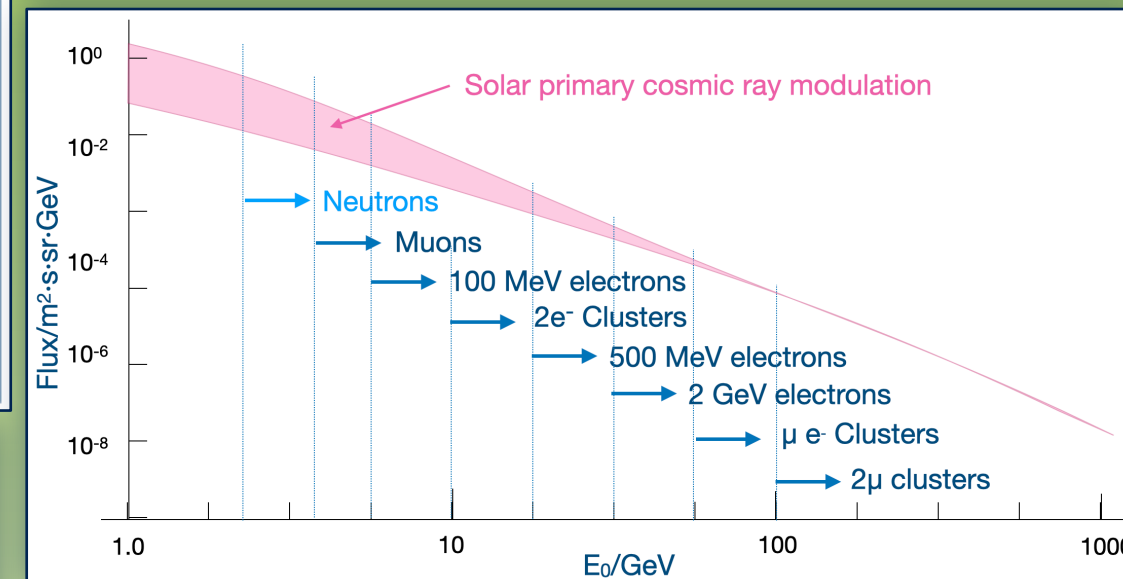
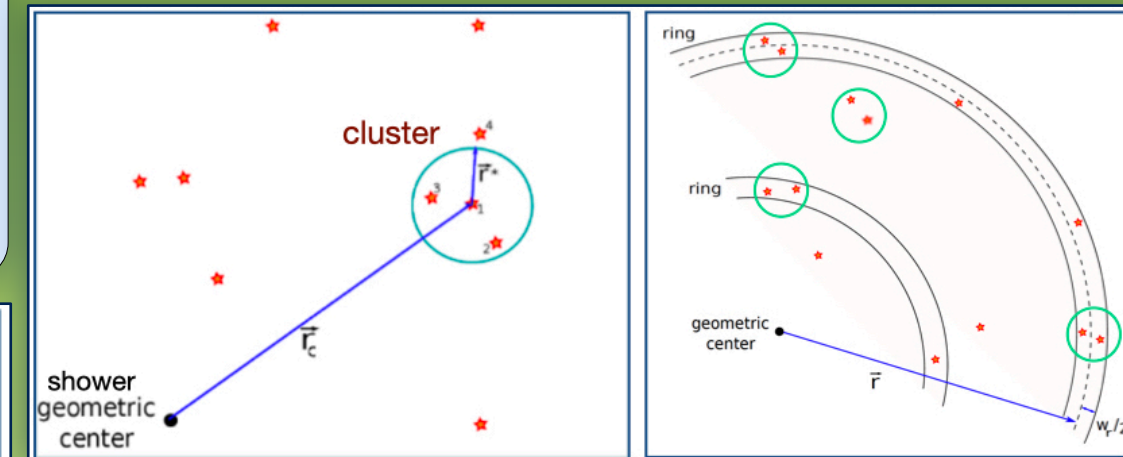
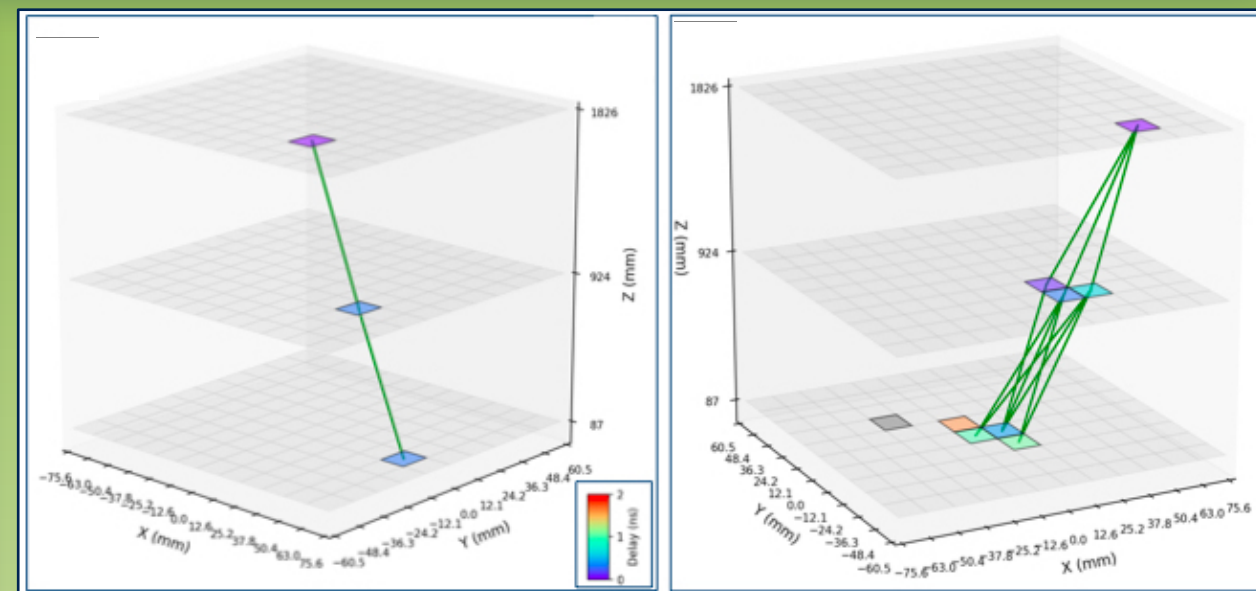
The TRAGALDABAS Cosmic Ray detector at the Univ. of Santiago de Compostela. Status report and first results.

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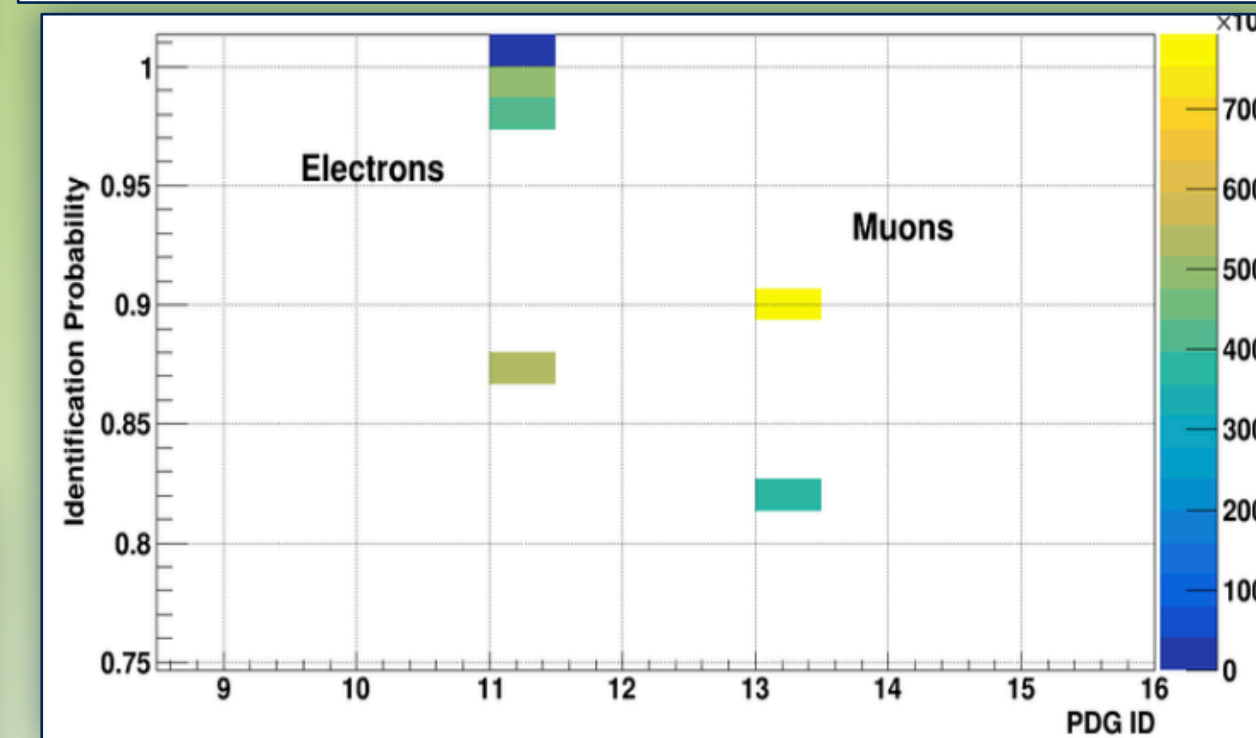
Summary: TRAGALDABAS is a high performance tracking detector of the TRASGO family. It is based on the RPC technology (Resistive Plate Chamber) offering a time resolution of ~ 0.3 ns, and an angular sensitivity between 2° and 3° . The detector is sensitive to either electrons or muons as well as to bundles of both kind of particles. This feature makes them able to estimate the rates of the arrival of primary cosmic rays with different energy thresholds opening new possibilities in the research of cosmic rays.



Detector type	Sensitivity	Acceptance - Multiplicity	Size Granularity Cell size	Angular resolution	Rate/Hz	Atmospheric Corrections	Main sensitivity
Neutron monitors	Neutrons	Very high - 1	20-30 m ² - 10-15 - ~1 m ²	No	100-250	Barometric pressure	- Solar modulation (low threshold)
Muon directional telescopes	Muons	Very high - 1	9-36 m ² - 25 - 289 - 0.3 - 1 m ²	< 10°	1K-2K	Barometric pressure - Temperature profile	-Solar modulation (high threshold) - Loss cones - Magnetic storms forecasting
Trasgos	Muons, electrons, Bundles of both particles	30°-50° - < 10	~ 2 m ² - 30-120 - 0.02-0.06 m ²	0.5°- 6°	~100	Barometric pressure - Temperature profiles for muons & electrons.	- Sensitive to primary cosmic rays of different energies. - Solar modulation - Magnetic storms forecasting - Atmospheric studies



Detector	N. Stations	N. Planes	N. Cells per plane	X,Y,Z Size/cm³	σ_X /mm	σ_Y /mm	σ_T /ns	σ_{Ω}	Location Coordinates
TRAGALDABAS	1	3/4	120	150,120,180	29	28	~0.28	2	S. Compostela (Spain) 42.88°N, 8.56°W
TRISTAN	1	3	30	150,120,60	63	61	~0.4	6	Livingston Island (Antarctica) 62.66°S, 60.39°W
STRATOS	2	4	64	160,120,180	4.3	3.7	~0.3	0.5	Vigo (Spain) ~(42°N, -8.6°W)



PID capability
The upper figure shows a few real events corresponding to a single track and a small electromagnetic shower. The lower figure shows an example of the electron/muon particle identification capability of a TRAGALDABAS with a sample of real single track events.

Cluster analysis
We have analyzed the production of single particles and clusters (upper figure) of particles with simulated events as a function of the energy of primary protons. The estimated threshold energies needed to produce a given particle or bundles of particles reaching a detector of ~ 3 m² at the ground level is shown in the lower figure. A Trasgo detector, laid on ground level, could be sensitive to changes in the rate of arrival of primary cosmic rays up to around 100 GeV.

The TRAGALDABAS detector
The TRAGALDABAS detector is located at the Faculty of Physics of the Univ. of Santiago de Compostela (upper figure)
The TRAGALDABAS detector offers multiparticle tracking. The lower figure shows some examples of the reconstruction of simulated events.

TRAGALDABAS & TRASGO detectors
TRAGALDABAS is the first member of the family of the Trasgo detectors. These have been proposed for complementing neutron monitors and muon telescopes in the regular surveillance of the cosmic ray background. Until now three different Trasgos have been built and installed in different locations. TRAGALDABAS is being used as the first prototype for developing all the necessary calibration, reconstruction and analysis tools

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