Simultaneous particles influence on the LAGO's WaterCherenkov Detectors signals

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What has been done here?

We use ARTI, the simulation framework of LAGO, that integrates CORSIKA, GEANT4, GDAS and MAGNETOCOSMIC to estimate the flux of secondaries that reach two extreme LAGO sites, we re-analyze this flux searching for simultaneous particles reaching the detectors.

How was it done?

We perform a spatial analysis of CORSIKA's simulated air showers in the field of view of two typical WCD in extreme sites of the LAGO network and in time windows of the electronic acquisition system.

Why was it done?

For study the impact on the WCD's calibration and the role of these simultaneous particles in discriminating primaries.

What have we learn?

Multiparticles that reach the detector can give us information about the flux of primaries between 10 GeV and 1 TeV. For this we identify primaries that generate multiparticles.

Multiparticles flux can extend the spectrum that impacts the detectors and has an influence on their calibration.

More detailed studies must be done in order to fully understand the relation between primaries and multiparticles in different altitude conditions.

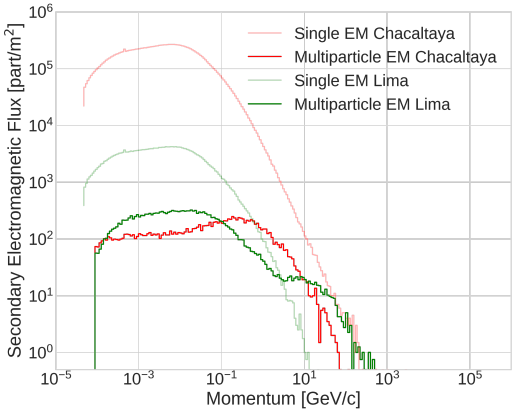

Figure 2: Electromagnetic component of secondary cosmic ray spectrum calculated by ARTI for the Chacaltaya and Lima sites. It is also showed the spectra of multiparticles that reach the detection area.

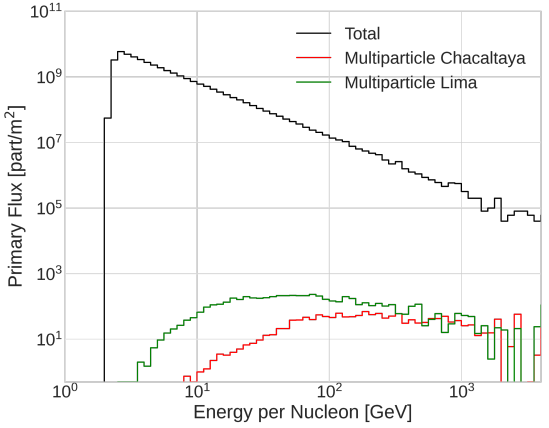

Figure 4:Energy spectrum per nucleon of primary cosmic rays that reach the top of the atmosphere,calculated in the ARTI framework and same spectrum for the primaries that generate multiparticles on detection surface.