



**Laboratório de Instrumentação e
Física Experimental de Partículas**

LIP Seminar

Thursday, 18 March, 11h30

News on the muon puzzle!

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(LIP)

The Pierre Auger Observatory is the largest particle detector in the world. It was built to detect and study extensive air showers that are initiated by protons or nuclei reaching Earth's atmosphere with energies exceeding 10^{18} eV (ultra-high energy cosmic rays (UHECR)).

The center-of-mass energy of the initial interaction of the CRs in the atmosphere exceeds the energies reached at the LHC by more than an order of magnitude!

One of the key results of Auger is the discovery that these interactions of UHECRs do not behave as expected.

Compared to simulations the measured air showers contain many more muons (so-called muon puzzle).

This discrepancy could be simply due to the uncertainty inherent in the extrapolation from the energy scale of the LHC, where we can measure interactions in detail, to UHECR energies. Or it could be new physics!

In this seminar the recent measurement of the shower-to-shower fluctuations in the muon content will be presented. As these fluctuations are driven by the quantum fluctuations in the first UHE interaction they are sensitive to new physics and the details of hadronic interactions alike and serve to distinguish scenarios for the muon puzzle

Location: Videoconference - Zoom

<https://indico.lip.pt/event/890/>

Connection details

URL: <https://videoconf-colibri.zoom.us/j/85994078281>

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