



Contribution ID: 19

Type: Plenary talk

Muography with Micromegas detectors : Main features and results and future prospects in geophysics with new concept telescopes.

Thursday 9 June 2022 09:30 (20 minutes)

Muography applications have been broadened in the last years thanks to the advances on particle detectors used to perform the measurements. Among the different technologies, the Irfu group is using multiplexed Micromegas detectors since almost ten years. Telescopes based on this technology have showed their capabilities and performance in such a different applications as archaeology, civil engineering or nuclear safety. They are capable of providing real-time muography images with an angular resolution of the order of few milliradians while keeping their autonomy and long-term stability.

However, in order to increase the range of applications, the group is developing a new detector concept based on a compact Time Projection Chamber readout by a 2D multiplexed micromegas: the D3DT detector. This instrument will allow the 3D reconstruction of muon tracks with a single instrument with an acceptance of almost 2π in solid angle. The whole detector has an external diameter of about 20 cm. Due to its compactness this instrument can be installed in quite tight places, like boreholes. This makes D3DT especially interesting for geophysical applications like reservoirs localization or overburden characterization for shallow depth installations. The potential of this TPC has been evaluated for these applications by Monte Carlo simulations. Besides, different laboratory prototypes have been developed paying special attention to the Micromegas characterization. Tests with these prototypes have also allowed to define and evaluate data analysis tools for track reconstruction.

In this presentation a general summary of the muography activities carried out by Irfu will be presented paying special attention to the development and potential applications of D3DT, including the most relevant results obtained from the above-mentioned simulations and prototypes.

Authors: Mr LEFEVRE, Baptiste (Université Paris-Saclay (FR)); ATTIE, David (CEA/DSM/DAPNIA/SPP); GOMEZ MALUENDA, Hector (Université Paris-Saclay (FR)); MANDJAVIDZE, Irakli (Université Paris-Saclay (FR)); LEHURAUX, Marion (Université Paris-Saclay (FR)); Mr PHILIPPE, Mas (Université Paris-Saclay (FR)); PROCUREUR, Sebastien (Université Paris-Saclay (FR))

Presenter: GOMEZ MALUENDA, Hector (Université Paris-Saclay (FR))

Session Classification: #4 Session (G. Micolau / K. Coulié)

Track Classification: Geological reservoirs