

The Muon Portal Project: design and construction of a scanning portal based on muon tomography

P.La Rocca for the Muon Portal Collaboration

Cosmic ray tomography is a technique which exploits the scattering of cosmic muons to perform non-destructive inspection of high-Z materials without the use of artificial radiation. A muon tomography detection system can be used as portal monitor at border crossing points for detecting illegal targeted objects.

The Muon Portal Project is a joint initiative between Italian research and industrial partners, aimed at the construction of a real size detector prototype ($6 \times 3 \times 7 \text{ m}^3$) for the inspection of cargo containers by the muon scattering technique. The detector consists of four XY tracking planes, two placed above and two below the container to be inspected. The planes are made of plastic scintillator strips with embedded WLS fibres, which transport the light to custom-designed silicon photomultipliers. A dedicated electronics combine signals from different strips to reduce the overall number of channels, without loss of information. Detailed GEANT4 simulations have been carried out under different scenarios to investigate the response of the apparatus.

After a research and development phase, which led to the choice and test of the individual components, the construction and installation of the detection modules is almost completed. This talk will describe the present status of the Project, focusing on the design and construction phase, as well as on the preliminary results obtained with the first detection planes.

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