Contribution ID: **197** Type: **Oral**

The MU-RAY Experiment. An Application of SiPM Technology to the Understanding of Volcanic Phenomena.

Tuesday, 22 May 2012 18:05 (20 minutes)

The purpose of the MU-RAY project is to develop an innovative approach to the study of volcanoes and their monitoring based on a particle physics approach. The test site is Vesuvio: one of the higher risk volcanoes in the world. In this context, muon radiography is an innovative method of enormous impact. This is an imaging technique which relies on the measurement, by means of a cosmic ray telescope, of the absorption in the volcano of muons with near-horizontal trajectories, produced by the interactions of cosmic rays with the atmosphere.
Since 2003 this technique has been successfully used on volcanoes in Japan, providing pictures of their vertices with resolutions much better than those obtained with the traditional techniques based on gravimeters. Researchers from Naples and Florence are currently involved in the construction and testing of a prototype telescope based on the use of bars of plastic scintillator with a triangular section whose scintillation light is collected by special fibers (wave length shifters) and transported to SiPM (Silicon photomultipliers). A complete prototype telescope, consisting of three xy scintillation planes and 1 m^2 active area has been assembled and is now under test. Details of the technology used including the Front End electronics will be presented along with first results obtained on the assembled scinitillator planes.

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Session Classification: Applications

Track Classification: S2 - Applications