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Study of RPCs for autonomous stations in cosmic ray research

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The capability of covering very large areas at low cost, besides showing excellent performance in many aspects, motivated the application of RPCs to Nuclear and High-Energy Physics and also to Cosmic Ray research in experiments such as COVER-PLASTEX and ARGO/YBJ.

Such detectors, however, require indoor conditions and support systems. For very high energy cosmic ray research, where shower sampling is mandatory, it would be convenient to develop detectors that could be deployed in small standalone stations, with very sparse opportunities for maintenance, and with good resilience to environmental conditions.

With this aim we developed glass RPCs that are confined to a sealed plastic box housing all high voltage and gas distribution. The detector is impervious to humidity and requires only 1cc/min of gas, equivalent to 1kg/year of R134a. Arbitrary readout electrodes can be applied externally.

Primary author: LOPES, Luis (Laboratório de Instrumentação e Física Experimental de Partículas (LIP))

Co-authors: PEREIRA, Americo (Laboratório de Instrumentação e Física Experimental de Partículas (LIP)); PIMENTA, Mario (Instituto Superior Técnico, Lisboa, Portugal); FONTE, Paulo (Laboratório de Instrumentação e Física Experimental de Partículas (LIP) and Instituto Superior de Engenharia de Coimbra)

Presenter: LOPES, Luis (Laboratório de Instrumentação e Física Experimental de Partículas (LIP))

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