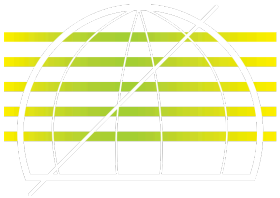

RPC 2022

Contribution ID: **35** Type: **Oral**

A Large-Area RPC Detector for Muon Tomography

Tuesday, 27 September 2022 17:40 (25 minutes)

A cosmic ray telescope equipped with four RPCs of almost 2 m² per plane was constructed at LIP Coimbra in partnership with the Hydronav company (Spain). In view of a possible application for muon scattering tomography, the telescope was tested during several days with high-atomic-number materials, such as tungsten and lead, located at the center of the telescope with two RPCs on each side. Designed to work outside the traditional lab environment, the telescope was afterward operated in an industrial environment. Some features of the specific design include for instance: (1) each detector plane and the respective instrumentation is confined in an aluminum enclosure requiring for operation only three connections to the outside: gas, power and communication, making the maintenance and possible replacements easier; (2) the glass stack of each RPC is encapsulated in a tight polypropylene plastic box, which has excellent water vapor blocking properties as well as good impermeability to atmospheric gases, allowing its operation in stable conditions with a gas flux around 1 cm³/min/m².
With an intrinsic efficiency of 98% and spatial resolution around 1cm, the response of the detector operated at low gas flow regime is shown in this communication. Additionally, preliminary results of the muon tomography performed with high-Z shielding will also be presented.

Primary author: DE CARVALHO SARAIVA, Joao Pedro (LIP - Laboratorio de Instrumentação e Física Experimental de Partículas (PT))

Co-authors: Mr ALEMPARTE, Carlos (Hidronav Technologies SL); Mr BELVER, Daniel (Hidronav Technologies SL); Dr BLANCO, Alberto (LIP Coimbra); Mr CALLÓN, Juan (Hidronav Technologies SL); Mr COLLAZO, Jose (Hidronav Technologies SL); Mr IGLESIAS, Alfredo (Hidronav Technologies SL); Mr LOPES, Luís (LIP Coimbra)

Presenter: DE CARVALHO SARAIVA, Joao Pedro (LIP - Laboratorio de Instrumentação e Física Experimental de Partículas (PT))

Session Classification: New detector applications