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New Readout Scheme for Large Area Timing & Position RPCs

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RPC detectors were already used in the past to perform the muon scattering tomography of several materials with high atomic number. RPCs are indeed well suited for muographic techniques since they can be built at relatively low cost, covering large areas with high efficiency, spatial and time resolutions. However, the front end electronics has a considerable impact on the detector cost, specially if one wants to scan volumes of several tens of cubic meters such as with the cargo inspection application for homeland security, which corresponds to the instrumentation of more than one hundred square meters of RPCs. Because of this, a new readout technique was developed with the initial premise of keeping the number of electronic channels as low as possible when scaling up the sensitive area. The developed codification significantly reduces the dependency of the number of channels on the detector area, without significant reduction of its performance. Preliminary tests using the new readout with a double timing RPC of 30 cm x 30 cm, equipped with 12 gaps of 300 um, showed a detector spatial resolution better than 1 mm and time resolution below 100 ps, while its efficiency is above 90%. More details about the setup, readout codification as well as preliminary results will be presented in this communication.

Collaboration

Role of Submitter

I am the presenter

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