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Aging studies for the CMS RPC system

Aging effects are studied for the CMS RPC system which can manifest during the HL-LHC running period. A dedicated consolidation program was set up using the CERN Gamma Irradiation Facility ++, where RPC detectors are exposed to a high gamma flux for a long term period equivalent to the HL-LHC operational time. Based on the past operational experience, the high background conditions are estimated and the RPCs are tested under such circumstances. Several parameters are monitored as function of integrated charge and dedicated test beam periods allows to measure the detector efficiency as function of the background rate. In this work, an overview of the measurements which are performed for these studies is given. After having collected a significant amount of the total irradiation, no aging effects nor degradation of the RPC detectors has been observed. These results suggest that the RPC system is capable to handle the HL-LHC conditions.

Experimental Collaboration

CMS

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