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Study of neutron-induced background hits in the CMS endcap muon system, and implications for the HL-LHC

Among the many challenges to be brought by the high luminosities of the HL-LHC is the impact of increased hit rates in the cathode strip chambers of the CMS endcap muon system. These chambers are used for all levels of trigger as well as offline reconstruction. Neutrons (both fast and thermal) induce background hits via nuclear interactions and capture, followed by gamma emission and (mainly) Compton scatter off electrons that subsequently ionize the chamber gas. This poster will describe recent efforts to improve the understanding of such neutron-induced background through detailed comparison of CMS pp collision data, GEANT4 simulation, and the response of CMS detectors placed in the CERN high-intensity gamma irradiation facility, GIF++. Projections for the effect of such neutron-induced background hits on trigger and reconstruction at the HL-LHC will be described.

Experimental Collaboration

CMS

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