

Abstract Submitted
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Development of Novel Methods for Monitoring Aging of the ATLAS TRT Straws ROHIT DAS, North Carolina School of Science and Mathematics, MIAOYUAN LIU, Duke University — Straw wire aging damages long-term performance of the Transition Radiation Tracker (TRT), a gaseous straw detector in CERN's Large Hadron Collider (LHC). Formation of silicon-hydrocarbon deposits on the wires causes an aging effect that results in a drop in gas gain. Such polymerizing impurities can permanently alter the detector's geometry and electric field conditions, limiting both its accuracy and lifespan. Before LHC Run II in 2015, during which the LHC will ramp-up to 13 TeV, we seek to create and implement a tool that we can use to better understand the aging effect's consequences for detector performance. By measuring the reduction in gain of the TRT barrel and end-caps during Run I (2010-2012 at 7 TeV), we observe a clear and rising degradation effect present in all sectors of the TRT that may be a result of LHC run conditions. However, no obvious aging was observed in data with stable run conditions. Further studies are needed to isolate the effects caused solely by aging from observed degradation caused by these additional factors. Isolation and monitoring of aging will assist in more effectively understanding its effects on all gaseous straw detectors, commonly used for particle detection in several high energy physics experiments.

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