

Abstract Submitted
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Aging and Rejuvenation of Drift Tubes Under High Irradiation¹

YUE SHI², MIT — The ATLAS spectrometer of the LHC (CERN) consists of 6×10^5 Monitored Drift Tubes (MDT) in its muon chambers. The performance of detector tubes under high radiation is critical. We measured MDT gain performance such as 1) gain deterioration (aging) with the accumulation of charge and Si deposits on anode wire, and 2) gain dependence on gas tube pressure and high voltage. The pressure and anode voltage behavior is fitted to the Diethorn model, from which the effective field of the start of avalanche is found to be 29500 (± 800) V/cm. The effective potential for one ionization in Ar is found to be 30.0 (± 0.9) V. Using an UV arc lamp source, a tube was aged to $\sim 73\%$ signal height after accumulating 21C/cm of wire charge. The wire surface was scanned with an Scanning Electron Microscope to differentiate aged and non-aged section with respect to substrate content e.g. Si. An aged tube was then reanimated with 1% O₂ in gas and reverse wire potential (sputtering).

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