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P1.59: Setups for eliminating static charge of the ATLAS18 strip sensors

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Construction of the new all-silicon Inner Tracker (ITk), developed by the ATLAS collaboration to be able to track charged particles produced at the High-Luminosity LHC, started in 2020 and is expected to continue till 2028. The ITk detector will include 22,000 highly segmented and radiation hard silicon strip sensors (ATLAS18). Mechanical and electrical characteristics of produced sensors are measured upon delivery for acceptance at several institutes participating in a complex testing program (the Quality Control (QC)). During the QC production testing of the ATLAS18 strip sensors, an increased number of sensors that failed the electrical tests was observed. Moreover, a high surface electrostatic charge reaching a level of several hundreds of volts was measured on a large number of sensors and on the plastic sheets. Accumulated data indicates a clear correlation between observed electrical failures and the sensor charge up. To mitigate the above described issues, the QC testing sites significantly modified the sensor handling procedures and introduce sensor recovery techniques based on irradiation of the sensor surface with UV light or application of intensive flows of ionizing gas. In this presentation, we will describe the setups implemented by various QC testing sites to treat silicon strip sensors affected by static charge, and evaluate the effectiveness of these setups in terms of improvement of the sensor performance.

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