Contribution ID: **19** Type: **not specified**

Update on the ATLAS ITk Silicon Strip Sensors - Pre-production

Wednesday 22 June 2022 14:10 (20 minutes)

The ATLAS upgrade for HL-LHC includes the installation of an entirely new all-silicon Inner Tracker (ITk). The part of the tracker further away from the IP is instrumented with silicon micro-strip sensors comprising 165m2 of active area in a nearly hermetic way. Multiple sensor shapes are utilized: square sensors in the barrel part and a stereo-annulus sensor design with curved edges to provide continuous coverage of the disc surface in the endcap part of a detector. As a result, there are 8 different strip sensor types in the system. They all feature AC-coupled n+-in-p strips with polysilicon biasing, developed to withstand a total fluence of 1.6⊠1015 neq/cm2 and a total ionizing dose of 66 Mrad. Following many years of R&D and 4 prototype submissions and evaluations, in 2020 the project transitioned into pre-production, where 5% of the total volume was produced in all 8 designs. In this contribution, we will summarize the evaluation program, test results, and experience with the pre-production sensors.

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Session Classification: IRRAD