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Burn-in testing of the ATLAS Tile-calorimeter Phase-II low-voltage power supply transformer-coupled buck converters

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The start of the operation of the High Luminosity LHC (HL-LHC) is planned for the year 2029. The associated increase in luminosity provides an opportunity for further scientific discoveries as well as many technical challenges. The HL-LHC environment has necessitated the Phase-II upgrade of the ATLAS hadronic Tile-Calorimeter. The upgrade will take place during the long shutdown from December 2025 up until the beginning of 2029. It will encompass the replacement of both on- and off-detector electronics. The on-detector readout electronics of the Tilecal are powered by Low-Voltage Power Supplies (LVPS) which contain transformer-coupled buck converters known as Bricks. These Bricks function to step-down bulk power received from off-detector to the power required by the local circuitry. A Brick failure will result in the front-end electronics to which it supplies power being offline for a commensurate time. Therefore, the reliability of the LVPS Bricks is of the utmost importance. To ensure the reliable operation of the Bricks once on-detector a quality control procedure will be implemented which includes Burn-in testing. Burn-in testing is a form of accelerated aging of electronic components which functions to improve the reliability of the Bricks once on-detector. The Burn-in procedure results in components that would fail prematurely within TileCal failing within the Burn-in station, thereby allowing for their replacement. The development of the Burn-in station as well as the Burn-in procedure that it employs will be explored with the presentation culminating in the Burn-in results of the latest LVPS prototypes produced.

Apply to be considered for a student ; award (Yes / No)?

Yes

Level for award;(Hons, MSc, PhD, N/A)?

PhD

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