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Production and Integration Testing of Finger Low Voltage Power Supply Boards

The Phase-II upgrade of the ATLAS Tile Calorimeter (TileCal) for the High-Luminosity Large Hadron Collider (HL-LHC) includes the Low Voltage Box (LVBOX), which provides reliable low voltage power distribution to the front-end electronics while meeting stringent radiation and performance requirements. The production of the finger Low Voltage Power Supply Boards (fLVPSB), manufactured and tested in several places, including South Africa. A comprehensive quality assurance program, including electrical performance metrics, burn-in, and functional testing, was implemented to ensure compliance with ATLAS specifications. Assembly of the LVBOX was completed at CERN, integrating eight and six power fLVPS for the long and extended barrel configurations, respectively. The fully assembled systems were subjected to functional and overnight stability tests to demonstrate reliable operation under nominal conditions. The results demonstrate stable operation, high efficiency, and reliable performance, confirming the system's suitability for HL-LHC conditions. This contribution highlights the contributions towards the ATLAS Phase-II upgrade and the expertise developed in the production and qualification of detector power systems for large-scale particle physics experiments.

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