

12th Beam Telescopes and Test Beams Workshop



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First test beam insights for ATLAS ITk strip modules with Cold Noise

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In order to cope with the occupancy and radiation doses expected at the High-Luminosity LHC, the ATLAS experiment will replace its Inner Detector with an all-silicon Inner Tracker (ITk), containing pixel and strip subsystems. The strip subsystem will be built from modules, consisting of one or two n⁺-in-p silicon sensors, one or two PCB hybrids containing the front-end electronics, and one powerboard with high voltage, low voltage, and monitoring electronics. The sensors in the central region of the detector will use a simple rectangular geometry, while those in the forward region will use a radial geometry with built-in stereo angle.

To have more comprehensive studies on the module behaviours and to validate the expected performance of the ITk strip detector and, a series of testbeam campaigns has been performed over several years at the DESY-II and CERN SPS testbeam facilities. This contribution focuses on the first test beam results for the short strip module with the issue called COLD NOISE. The module under test is irradiated at $1.1 \times 10^{15} n_{eq}/cm^2$. These results help us understand how much cold noise must be reduced to have proper tracking at end of lifetime.

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