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The mystery of "Cold Noise" in the ATLAS ITk strip detector

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In preparation for the High Luminosity LHC, the ATLAS Experiment is constructing a new Inner Tracker (ITk) composed of silicon pixel and silicon strip detectors. After multiple years of prototyping, the ITk strips project entered the pre-production phase in late-2021. However, in early 2022, clusters of strips exceeding the noise specification were observed when operating modules at cold temperatures. This observation of "Cold Noise" interrupted pre-production and initiated an extensive investigation into the cause and potential mitigation strategies. This talk will summarize our current understanding of the Cold Noise mechanism, highlighting the most insightful studies from this year-long investigation.

Early Career

Yes

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