

## LHCb UT Upgrade: Studies and test for the detector cooling system design

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The upgrade of the LHCb UT silicon tracker implements a sensors read-out with thermal dissipation in the range of 4 kW, operational temperatures lower than  $-5^{\circ}\text{C}$ , low material budget cooling/support structures. The detector supports, a total of 68 vertical staves, have an integrated cooling pipe embedded in conductive foam into the sandwich structure, exploiting CO<sub>2</sub> evaporation in the temperature range of  $-30^{\circ}\text{C}$ . Current design implements a 3 m long Titanium 2 mm I.D. pipe with a vertical snake geometry. The pipe routing is underneath the stave concentrated power sources, the read-out chips, so that dissipated power is efficiently removed. R&D activities and real scale test on prototypes have been done and are in progress to prove and finalize the design concept.

### Summary

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