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Title: Thermal measurements with the SciFi read-out box mockups

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Abstract:

The note describes the experimental characterisation of thermal properties of the SciFi read-out boxes (ROB) performed with full-size mockup replicas of the TDR-style ROBs. The mockups had realistic insulation and liquid cooling structures; they were equipped with dummy SiPM assemblies and external heaters simulating the read-out electronics. Three such modules were connected in series and tested with the coolant temperatures down to -50°C and two different coolants: perfluorohexane C_6F_{14} and perfluoroketone $\text{C}_6\text{F}_{12}\text{O}$ (3MTM Novec 649). The measured heat loads and the temperature profile uniformities were found to be consistent with the SciFi TDR values [1]. Other cooling-related properties, like the coolant pressure drop, thermal contraction of the end pieces, dependencies on the coolant flow regime and the flex cable temperatures are reported and discussed.

Keywords: *detector, tracker, SciFi, SiPM, cooling, thermal, C6F14, Novec*

References:

1. *LHCb Tracker Upgrade Technical Design Report*, Chapter 3. CERN-LHCC-2014-001 ; LHCb-TDR-015 (2014)