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Solution for cooling of portcards for CMS Tracker Phase 2

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The faster data taking and the electronics of the overall modules that will be installed in the tracker of the CMS experiment (Phase-2 for HL-LHC) will bring to a significant increase of the dissipated power. The portcards are the electronic components devoted to the data management of the inner tracker modules. The DC-DC converter, the LpGBT processor and the VTRx (optical fiber) constitute the main components of the portcards, with a global power generated of about 2.4 Watt. A total number of 136 portcards will serve the modules for the next IT barrel pixel and they will be positioned in a very narrow space, where a significant convection of the air cannot be granted, therefore, different cooling solutions have been developed to assure reasonable temperature of the electronics. The work will show the process for the definition of an active cooling solution profiting of the cooling system already in place for the modules. Both CFD and experimental studies on a demo portcard will be the starting point to go towards the mechanical prototype for holding and cooling the portcards, studied with the thermal tests in a dedicated setup.

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