

Quality Assurance and Quality Control of silicon cooling plates with embedded microchannels

The Detector Technologies (DT) group at CERN is actively investigating the potential application of silicon micro-devices in High Energy Physics (HEP) experiments. In particular, an important effort currently focuses on the use of micro-channels etched in single crystal silicon (ScSi) wafers to circulate a cooling fluid for the thermal management of silicon detectors. However, the anisotropic and brittle nature of ScSi makes it very difficult to predict its response to mechanical loads which may lead to catastrophic failure. The DT group is conducting an extensive R&D programme in order to gain a better understanding of the behaviour of ScSi devices subjected to internal pressure. The results of this research will help to optimise the design of future devices and establish suitable quality control procedures for the production of such cooling plates.

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