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Development of a large-area, light-weight module using the MALTA monolithic pixel detector

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The MALTA pixel chip is a 2 cm x 2 cm large monolithic sensor developed in the 180 nm TowerJazz imaging process. The chip contains four CMOS transceiver blocks at its sides which allow chip-to-chip data transfer. The power pads are located mainly the side edges on the chip which allows for chip-to-chip power transmission. The MALTA chip has been used to study module assembly techniques using different interconnection techniques to transmit data and power from chip to chip and to minimise the overall material budget. Several 2-chip and 4-chip modules have been assembled using standard wire bonding, ACF and laser reflow interconnection techniques. This presentation will summarise the experience with the different interconnection techniques and performance tests of MALTA modules with 2 and 4 chips tested in a cosmic muon telescope. It will also show first results on the effect of serial power tests on chip performance as well as the impact of the different interconnection techniques and the results of mechanical tests. Finally, a conceptual study for a flex based ultra-light weight monolithic pixel module based on the MALTA chip with minimum interconnections is presented.

Collaboration

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