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Monolithic pixel detectors in HEP experiments

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Monolithic pixel detectors have been studied for many years for their potential to combine the possibility to build a very low mass detector with very high granularity pixel resolution in high volume 8" CMOS productions. Different technical solutions have been studied and were implemented in tracking detectors. The application has been limited however to low radiation environments. Prominent examples of the use of monolithic pixel detectors in HEP experiments are the STAR Heavy Flavour Tracker and the BELLE II pixel detector. The use of smaller technology nodes with higher numbers of metal layers, special high resistivity starting wafers and new design approaches are presently under intense study with the aim to use monolithic pixel detectors in more stringent environments. The decision to use monolithic pixel detectors for the upgrade of the ALICE Inner Tracking System is a first example of these new developments. This presentation will provide an overview of different technologies used in past and present experiments and will give an outlook on current developments in the field of monolithic pixel detectors.

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