



Contribution ID: 199

Type: Oral

Trends and challenges in monolithic CMOS sensor development for high energy physics

Wednesday 19 September 2018 10:45 (45 minutes)

Hybrid pixel detectors are in overwhelming majority in today's high energy physics experiments, but monolithic active pixel sensors (MAPS) in commercial CMOS technologies receive increasing interest due to their lower cost, easier detector assembly, and other advantages like lower material and higher granularity. Used for the first time in the STAR experiment, adopted for the ALICE experiment, they are being considered for the most aggressive applications, like the ATLAS HL-LHC upgrade, FCC and CLIC. This paper tries to give an overview of the improvements and challenges in sensor and front end design, architecture, speed, timing, radiation tolerance and system issues.

Summary

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Session Classification: Invited