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Innovative silicon timing sensors for the future ALICE 3 experiment

The ALICE Collaboration has proposed a next-generation heavy-ion experiment to be installed at the LHC Interaction Point 2 during the LHC Long Shutdown 4, in preparation for Run 5 (2035) and 6. ALICE3 will be equipped by a set of new detectors devoted to the identification of charged particles: a Time-Of-Flight (TOF) system, a RICH detector, a muon identifier (MID) and an electromagnetic calorimeter (ECal). The TOF detector consists of two barrels and two forward disks which cover a total surface of 45 squared-meters. It is based on novel silicon sensors which will need to reach the required time resolution of 20 ps. In this poster, the R&D behind the three promising sensor technologies that are being considered for the construction of the ALICE 3 –TOF will be presented: innovative Low Gain Avalanche Detectors (LGADs) integrated in the design of fully depleted 110 nm MAPS (as in the INFN ARCADIA project), the novel concept of thin double LGADs and silicon photomultipliers (SiPMs), with the latter only for the outermost layer of the TOF detector.

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