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The development of high precision, fast-timing 3D silicon sensors with a focus on the high luminosity upgrades of the ATLAS detector

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High luminosity upgrades will be performed on all experiments at CERN's Large Hadron Collider. The increased number of events will provide a larger statistic, giving a consequent better probability of discovering new phenomena. Not only will this cause an increase in radiation damage to the detector systems, but this will give an increased event overlap. As a result, radiation-tolerant detectors with a fast response time are being researched and developed in several detector development groups. 3D silicon sensors have shown to be one of the most radiation hard silicon sensors technologies. In 3Ds the inter-electrode distance is decoupled from, and can be made much shorter than, the substrate thickness. The proximity of the electrodes to the point of charge carrier formation allows for a fast signal response, reduced trapping probabilities, and suppresses effects caused by radiation damage. The poster will present results on 3D sensor timing properties and discuss them in perspective to luminosity upgrade applications.

Collaboration

ATLAS

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