

Development of LGAD for ATLAS HGTD and CEPC TOF out-tracker

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Low-Gain Avalanche Detector (LGAD) with time resolution better than 50ps has been chosen as the sensors for HGTD project. The most important requirement of sensors for the project is radiation hardness, the sensor should collect more than 4fC charges and reach less than 50ps timing resolution at voltage (safe voltage for SEB) lower than 550V after irradiation ($2.5 \times 10^{15} \text{ neq/cm}^2$). IHEP has developed the carbon enriched LGAD sensors, which show good radiation hardness. This talk will show the researches of irradiation-resistant LGAD for ATLAS HGTD.

The AC-coupled LGAD (AC-LGAD) is designed as detector with a 100% fill factor for high precision 4D-tracking. AC-LGAD can be used for the construction of time-track detectors in collider experiments such as CEPC. IHEP has also conducted extensive research on AC-LGAD. The strip-type AC-LGAD been fabricated with a lower than 0.2 P n+ layer dose to improve the spatial resolution, and different pad-pitch structures can also be fabricated and studied. This talk will also show the development of AC-LGAD for TOF out-tracker system.

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