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LGAD Based Time-Tracker Development for CEPC

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The AC-coupled Low-Gain Avalanche Detectors (AC-LGAD) are designed as detectors with a 100% fill factor for high precision 4D-tracking. They have been studied and researched by many institutes, including BNL, FBK, and HPK, among others. AC-LGAD can be used for the construction of time-track detectors in collider experiments such as CEPC. The Institute of High Energy Physics (IHEP) has also conducted extensive research on AC-LGAD. The pixel-type AC-LGAD sensors with a pitch of 2000 μm and AC pad of 1000 μm show spatial resolution better than 16 μm. The strip-type AC-LGAD can be 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. Testing results show that the spatial resolution can be lower than 8 μm. Strips with different pad-pitch structures have been fabricated and studied, and the results show that pad-pitch structures also affect the spatial resolution.

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