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AC-coupled LGAD development by IHEP for future lepton collider

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The Flavor physics program is one of the important topics for future lepton collider projects. In order to explore the full potential of the flavor physics program, a time-of-flight detector is needed to perform particle identification at an energy range from 1GeV to 5GeV.

We propose a time-of-flight detector based on AC-coupled LGAD technology, which has high timing resolution and spatial resolution. It can serve as a time-of-flight detector and outer layer of the tracking detector.

The Institute of High Energy Physics Chinese Academy of Science (IHEP) developed a prototype of AC-coupled LGAD detector. According to the laser test results, it can reach 5-10 microns spatial resolution using 2*2 AC pads array design with a millimeter level pitch. The spatial resolution and charge sharing effect have been studied with different n+ doping.

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