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## Characterization of AC-LGAD performances for 4D detectors

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The Low-Gain Avalanche Diode (LGAD) silicon detector has already shown excellent timing performances. Since fine pixelization of LGADs is difficult to achieve, the AC-coupled LGAD (AC-LGAD) approach was introduced to provide high spatial resolution. In this type of device, the signal is capacitively induced on fine-pitched electrodes placed over an insulator and is shared among multiple electrodes. LGAD and AC-LGAD prototypes have been designed and fabricated at the Brookhaven National Laboratory and segmented in either pixels, strips, or new topologies. Signal sharing between strips and pixels has been characterized with Transient Current Technique using IR and red lasers. Comparisons will be made with results from test beams at Fermilab, using 120 GeV protons. AC-LGAD devices have been read out by either a fast transimpedance amplifier readout board or a fast-time ASIC and signals generated by betas from  $^{90}\text{Sr}$  decay have been characterized using the two systems.

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