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## High resolution timing applications from the LGAD side

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In a simplified view, the temporal resolution in LGAD can be considered the sum of two components: the jitter, linked to the electronics noise, and the Landau noise, related to non-uniform ionization. This contribution reviews how signal formation, charge drifts, and gain saturation determine the value of the Landau noise and impact the achievable time resolution. Implementing the above mechanisms in a simulation program allows the creation of libraries of signals that can be used to improve and validate front-end architectures and compare different designs. The talk will also review the front-end requirements of Resistive Silicon Detector (AC-and DC-coupled), detectors that require concurrent measurements of the ToA and amplitude, and the combination of signals from several electrodes.

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