

Simulating Solid State Detectors Using Garfield++

Thursday, June 20, 2024 3:20 PM (20 minutes)

In-depth simulations of the response of modern particle detectors are crucial for understanding their underlying workings and optimizing their performance. Garfield++ is an open-source Monte Carlo toolkit designed for detailed simulations of detectors based on ionization measurements in gases and semiconductors.

This presentation will provide a comprehensive overview of how Garfield++ works and its application in simulating semiconductor devices, from the primary ionization pattern to signal induction on the readout electrodes. Examples will cover scenarios with and without internal multiplication (both at finite gain and in breakdown mode), highlighting key technologies such as Low-Gain Avalanche Detectors (LGADs), Silicon Photomultipliers (SiPMs), and 3D diamond sensors. Particular emphasis will be placed on signal formation in the presence of resistive elements, employing the time-dependent weighting potential within the framework of the extended form of the Ramo-Shockley theorem for conductive media.

Type of presentation (in-person/online)

in-person presentation

Type of presentation (scientific results or project proposal)

Presentation on scientific results

Primary authors: JANSSENS, Djunes; SCHINDLER, Heinrich (CERN)

Presenter: JANSSENS, Djunes

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