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Transient Simulations: Weighting Potentials through Technology Computer-Aided Design

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The principle of signal formation in every ionization detector can be understood using the Shockley-Ramo Theorem. This simple but useful theorem states that the induced current in an electrode is proportional to the movements of the charges along the direction of a field called the Weighting Field. As such, this special field, or its potential called Weighting Potential are required to calculate the response of a sensor.

In order to obtain these fields, Technology Computer-Aided Design (TCAD) simulations were used. By applying a voltage to an electrode of interest, while all others are kept grounded, and repeating this process by increasing the voltage by a small amount, the electrostatic potential of both configurations is obtained. With a simple calculation of these potentials, we can compute the weighting potential. And finally, by importing this potential into the Allpix Squared framework and using the TransientPropagation module, the signal induced in a sensor can be obtained.

In this contribution, the process and calculations to obtain the Weighting potential as well as the signals obtained in simulations will be presented.

Will the talk be given in person or remotely?

In person

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