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Time dependent weighting fields for signals in silicon sensors

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The classic Ramo-Shockley theorem applies to detectors with perfectly conducting electrodes and perfectly insulating materials surrounding these electrodes.
In silicon sensors this condition is not necessarily fulfilled. Junctions between different doping layers result in regions of finite conductivity. Radiation damage can lead to large regions of finite conductivity in a sensor that have an effect on the signals.
An extension of the Ramo-Shockley theorem therefore has to be used, which allows the calculation of weighting fields for a detector medium that has a finite conductivity (volume resistivity). The talk will discuss these extended theorems in a form that is well adapted for use with TCAD device simulation programs. As an example, a partially depleted silicon sensor is discussed.

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