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Charge sharing in pixelated semiconductor sensors

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The charge sharing between neighboring pixels in pixelated sensors can be used to measure particle or x-ray coordinates with accuracy better than the pixel pitch. The accurate model of the charge distribution shape is essential to achieve ultimate coordinate accuracy. The charge sharing is caused by charge carriers diffusion on the path from the generation point to pixels. This paper is focused on the diffusion of the initially compact charge cloud in the field free region. The diffusion equation solutions are obtained using separation of variable and Fourier synthesis method for different initial conditions and resulting charge distributions are integrated over pixel areas. The look up table containing pre-calculated values for pixel charge fractions is proposed to speed up numerical calculations.

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