

The University of Texas at San Antonio

UTSA Physics and Astronomy



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GlobalFoundries Malta NY

Friday, November 9th, 2018

FLN 2.02.06

3:00 PM

Electron Holography of Semiconductor Devices

The dream of “seeing” individual atoms has haunted researchers for centuries. While the light optics had prohibitively large wave length the electron microscopy suffered from imperfect lenses. In 1948 Denis Gabor has invented electron holography as the method to record both the amplitude and the phase of the object wave. Besides improvement of attainable resolution electron holography has offered a unique method to investigate electromagnetic fields in the objects with the sub nanometer resolution.

In this presentation we will review the history and principles of electron holography. We will focus on applications in semiconductors and show how electron holography can probe the dopant potential in 2-D in deep submicron devices. The examples will demonstrate how the method can be used for the quantitative analysis of the dopant diffusion, process control, and evaluation of the novel dopant activation processes.

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