# Monte Carlo-based Scanning Electron Microscope Imaging Simulation and Related Studies

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**EXTENDED ABSTRACT:** The parallel simulation technique of scanning electron microscope imaging based on Monte Carlo, electron tracking algorithm and geometric space construction is of great value in studying the properties of complex-shaped solids and semiconductor detection, which helps to improve the design of scanning electron microscope and understand the material material and structure corresponding to its imaging, and helps to improve the accuracy of semiconductor detection. Li Huimin started the numerical simulation of scanning electron microscope imaging with complex aggregate structure around 2003, and realized the massively parallelization, etc., which laid the foundation for the related research afterwards. This paper reviews the background and history of this research and the subsequent expansion of semiconductor linewidth detection based on this research.



**Figure 1**. Schematic diagram of the trajectory of an electron in a solid containing a hollow sphere.

**Keywords:** Scanning Electron Microscopy; Monte Carlo; Parallel Computing; Simulation

## REFERENCES

[1] M. P. Brown and K. Austin, *Appl. Phys. Letter*, **85(1)**, (2004) 2503-2504

## BIOGRAPHY

Li Huimin has completed his PhD at the age of 28 years from University of Science and Technology of China(USTC). He is the Via-director of Supercomputing Center of USTC. Together with his mentor Prof. Ze-jun Ding, he pioneered the Monte Carlo algorithm based scanning electron imaging simulation, which laid the foundation for the subsequent international ISO standard Microbeam analysis - Scanning electron microscopy - Method for The algorithm underlying the evaluation of critica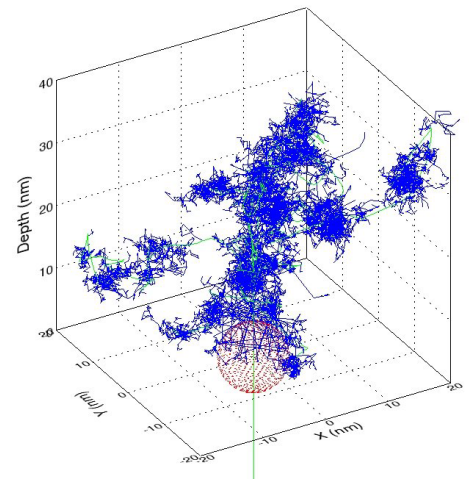l dimensions by CD-SEM (ISO 21466), among others.