

Simulations of Ultra-Scaled Electronic Devices with a Novel Flexible Nano-TCAD Nano-Electronic Simulator Software (NESS) environment

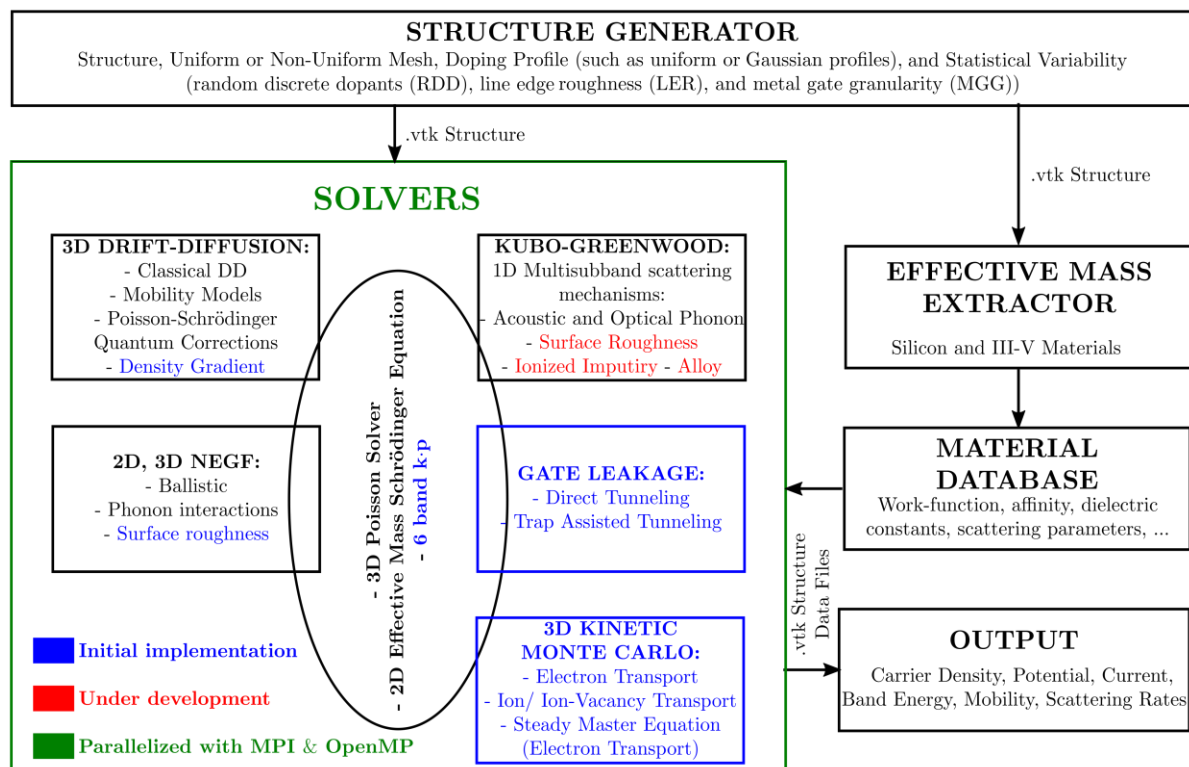
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Simulation of conventional and emerging electronic devices using Technology Computer Aided Design (TCAD) tools has been an essential part of the semiconductor industry as well as academic research. Computational efficiency and accuracy of the numerical modelling are the key criteria on which quality and utility of a TCAD tool is ascertained. Further, the ability of the tool to incorporate different modelling paradigms and to be applicable to a wide range of device architectures and operating conditions is essential.

In this talk, I will provide an overview of the new device simulator NESS (Nano-Electronic Software Simulator) developed at Device Modelling Group at University of Glasgow. NESS is a fast, modular software with its own structure and mesh generators, and contains different modules for classical, semi-classical, and quantum transport solvers, mobility calculation, kinetic Monte-Carlo etc. NESS can simulate numerous device architectures such as nanowire and bulk transistors, tunnelling field effect transistors (TFET) and resonant tunnelling diodes. Moreover, NESS accounts for various sources of statistical variability in nano-size electronic devices and it can perform statistical simulations for thousands microscopically different devices.



Flowchart of NESS computational framework presenting its modular structure.