Modeling the Transport of Charge Carriers in the Active Devices MESFET Based of GaInP by the Monte Carlo Method

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Abstract : The progress of industry integrated circuits in recent years has been pushed by continuous miniaturization of transistors. With the reduction of dimensions of components at 0.1 micron and below, new physical effects come into play as the standard simulators of two dimensions (2D) do not consider. In fact the third dimension comes into play because the transverse and longitudinal dimensions of the components are of the same order of magnitude. To describe the operation of such components with greater fidelity, we must refine simulation tools and adapted to take into account these phenomena. After an analytical study of the static characteristics of the component, according to the different operating modes, a numerical simulation is performed of field-effect transistor with submicron gate MESFET GaInP. The influence of the dimensions of the gate length is studied. The results are used to determine the optimal geometric and physical parameters of the component for their specific applications and uses.