Abstracts

Modeling of MODFET's

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Accurate modeling of MODFET's and of certain novel structures recently proposed requires that a number of physical phenomena occurring in these devices be considered. Among these, some specific electron dynamic properties of the two-dimensional gas, the influence of deep levels of the doped AIGaAs layers, and the influence of the source parasitic access impedance are reviewed and discussed. The presently available models can roughly be sorted into three classes: the particle or Monte Carlo models, the two-dimensional solving methods of semiconductor equations, and the simpler one-dimensional or analytical models. After a brief review of the physical bases on which the models rely, their main capabilities and ranges of applicability are compared and discussed. Some conclusions are drawn as to the effort which must be developed in the near future in order to improve MODFET modeling. It is recommended that simulations of new devices such as SISFET's, multichannel structures, and pseudomorphic AlGaAs/InGaAs transistors be undertaken.

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