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SELF-CONSISTENT CALCULATION WITH ADAPTIVE BOUNDARY CONDITION OF ELECTRON STATES IN SILICON *n*-MOS NANOSTRUCTURES

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ABSTRACT
We develop a computational procedure to calculate the properties of electron states in a Si *n*-MOS inversion layer by discretizing and iteratively solving the differential Schrödinger and Poisson equations using centered finite differences. In this selfconsistent calculation, we apply an adaptive boundary condition to the wave function and confining potential at the bulk side of the nanostructure; and incorporate Fermi-Dirac distribution for the ionized acceptor density in the inversion and depletion layers. This requires relatively simpler inputs and we are able to determine the various parameters of the electron state subbands. We compared our results with those published in the literature applying self-consistent Schrödinger-Poisson calculation on similar Si *n*-MOS nanostructures.

Keywords: MOS inversion layer; nanostructure; self-consistent calculation; Schrödinger-Poisson; electron state

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