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# EFFICIENT IMPLEMENTATION OF THE WIGNER-POISSON FORMULATION FOR MODELING A RESONANT TUNNELING DIODE

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Using the Wigner-Poisson equations to model the behavior of a resonant tunneling diode, we have developed a more efficient algorithm that is capable of simulating a larger variety of device structures than was previously available. Several improvements have been made to increase accuracy and reduce computation time, including the use of fourth-order numerical methods, the use of non-uniform grids, and the incorporation of analytical rather than numerical solution techniques. These improvements allowed the number of processors to be reduced from 20 to one without impacting run times.

Using our new code, we were able to show that using longer device lengths reduces the numerical inconsistencies present when modeling shorter devices. We also studied the impact of the correlation length parameter in producing solutions that correspond with those typically expected from experimental measurement.