1048-65-382   **Wei Cai*** (`wcai@uncc.edu`), Department of Mathematics, University of North Carolina at Charlotte, 9201 University City Boulevard, Charlotte, NC 28223. *Adaptive Cell-average Spectral Element Methods for transient Wigner Equations in quantum transport.*

In this talk, we will introduce a new numerical method for solving time dependent Wigner equations with application to quantum transport. This method takes advantage of equivalent representations for the Wigner distribution function in the k-space between cell-averages (local electron density) and point values in the Chebyshev polynomial spaces. Coupled with conventional collocation method in the x-space, the resulting conservative algorithm provides a highly accurate method for the Wigner equations, and adaptivity in both x and k spaces are achieved within the spectral element framework to address the high dimensional Wigner distributions. Numerical results of quantum transport in resonant tunneling diode are included. (Received February 11, 2009)