

*Department of Mathematical and  
Computer Sciences*

A Semiclassical Transport Model for Thin Quantum Barriers

Shi Jin, University of Wisconsin-Madison  
Friday, November 13th, 3:00 p.m. Chauvenet Hall 143

Abstract:

We present a time-dependent semiclassical transport model for mixed state scattering with thin quantum barriers. The idea is to solve a stationary Schrodinger equation in the thin quantum barrier to obtain the scattering coefficients, and then use them to supply the interface condition that connects the two classical domain. We then build in the interface to the numerical flux, in the spirit of the Hamiltonian-preserving scheme introduced by Jin and Wen for a classical barrier. The overall cost is basically the same as solving a classical barrier. We construct a numerical method based on this semiclassical approach, and verify the validity of the model using various numerical examples.

Bio: Dr. Shi Jin is currently the Chair and a full professor in Department of Mathematics, University of Wisconsin at Madison. Dr. Jin received his B.S degree from Peking university, China in 1983. He received his Ph.D. degree from University of Arizona in 1991. He was a postdoc in Courant Institute, New York University from 1991 to 1993. Dr. Jin was an Assistant Professor (1993-1998), Associate Professor (1998-2000) in Georgia Institute of Technology, and full professor (2000-present) in University of Wisconsin at Madison.

Among Dr. Jin's awards are: Sigma Xi Young Faculty Award from Georgia Tech 1997; Feng Kang Prize for Scientific Computing from Chinese Academy of Sciences in 2001; Changjiang Visiting Chair Professor in Tsinghua University, China 2001--2006; Distinguished Overseas Young Scientist Award from National Science Foundation of China, 2002-2005; Van Vleck Distinguished Research Prize, University of Wisconsin-Madison, 2007-2011; Morningside Silver Medal of Mathematics, Fourth International Congress of Chinese Mathematicians, Dec. 2007; Copernicus Visiting Scientist from University of Ferrara, Italy, June 2010.

Dr. Jin is on the Editorial Boards of several prestigious Journals including: Communications in Mathematical Sciences since 2002 (Founding Editor); SIAM J. Applied Mathematics since 2005; SIAM J. Scientific Computing, 2001--2006 etc.

Please join us for Coffee and Cookies at 2:45 p.m. in CH143