

**Department of Mathematical Sciences
Colloquium**

Dr. Goong Chen

Department of Mathematics, Texas A&M University

**THE DIMENSIONAL SCALING METHOD
IN CHEMICAL PHYSICS**

The dimensional scaling (D-scaling) method is an effective asymptotic method in chemical physics, where one uses the spatial dimension D as a parameter by embedding the Schrödinger equation with a Coulomb potential into a general D -dimensional space and by letting D tend to infinity. For the hydrogen atom, by the proper scaling of D of Dudley Herschbach (Nobel laureate in chemistry 1986), one can obtain the exact value of the ground state. As D tend to infinity, one obtains a singularly perturbed differential equation which shows the condensation phenomenon that the wave functions condense into a classical particle at the unit Bohr radius.

Recently, the speaker and his collaborators have analysed the D-scaling technique and the corresponding theory of calculus of variations in order to put D-scaling on a solid mathematical foundation. The rigorous mathematical procedures will be outlined, and some recent progress will be surveyed.

**Friday, September 24, 2010 at 3 pm in Bell Hall 143
The University of Texas at El Paso**

Refreshments will be served in front of the colloquium room,
15 minutes before the start of the colloquium.