MARTIN MOHLENKAMP
Department of Mathematics
Ohio University

If the Multiparticle Schrödinger Equation Were Easy to Solve, then Chemistry Would Be Too Boring to Support Life.

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ABSTRACT

The multiparticle Schrödinger equation is the basic governing equation in quantum mechanics. Many person-centuries and cpu-millennia have been spent constructing approximate solutions to it. We should be glad it is so hard to solve because its subtle behavior allows the rich Chemistry upon which life depends.

I will describe the multiparticle Schrödinger equation and explain (some of) the reasons it is difficult to solve: high-dimensionality, antisymmetry, scaling to large systems, inter-particle cusps, singular potentials and nuclear cusps, odd function spaces, etc. I will also describe our efforts to overcome these difficulties.

Organizers:
Lek-Heng Lim, Department of Statistics, lekheng@galton.uchicago.edu,
Ridgway Scott, Departments of Computer Science and Mathematics, ridg@cs.uchicago.edu,
Jonathan Weare, Department of Statistics and The James Franck Institute, weare@uchicago.edu.

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