Quantum Monte Carlo, Solving the Schrödinger Equation by Chance.

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The stochastic solution of the Schrödinger equation provides an alternative to the algebraic approach. Especially short-range correlations corresponding to the behavior of the wavefunction near the electron cusp can be treated properly by means of r_{12} dependent correlation factors. The antisymmetry of the wavefunction enforces the only severe approximation which is based on the nodal structure. While quantum Monte Carlo became an established method in condensed matter and nuclear physics its role in quantum chemistry is still vague. We want to discuss a variety of applications for atoms, molecules and clusters focusing on the peculiar features of this method. A comparison with other *ab initio* methods revealed a remarkably good agreement with CCSD calculations. Besides the energy it is routinely possible to calculate expectation values of local operators, including such cases like local charge fluctuations which are otherwise difficult to evaluate.