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SDI Review Form 1.6

Journal Name:	Physical Science International Journal
Manuscript Number:	**2014_PSIJ_11144**
Title of the Manuscript:	**Computational Solution to Quantum Foundational Problems**
Type of the Article	**Original Research Article**

General guideline for Peer Review process:

This journal's peer review policy states that **NO** manuscript should be rejected only on the basis of '**lack of Novelty**', provided the manuscript is scientifically robust and technically sound.
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PART 1: **Review Comments**

	Reviewer's comment	**Author's comment** *(if agreed with reviewer, correct the manuscript and highlight that part in the manuscript. It is mandatory that authors should write his/her feedback here)*
Compulsory REVISION comments	**1) No description of the functional framework is given: in which spaces does |\psi \rangle live? (likely the trace class of operators on some L^2(X,\mathbf{C}) space, but is X a finite dimensional space? An infinite dimensional one?)**	As it is customary in quantum mechanics, spaces of wave functions are called Hilbert spaces. Unlike the strict mathematical definition (according to which the Hilbert space is defined to be an infinite-dimensional space), in the quantum mathematical formalism any of the vector spaces of wave functions are referred as Hilbert spaces, even finite-dimensional (for example, a two state quantum system – called a *qubit* – described by a unit vector $\|\psi\rangle$ in the Hilbert space $\mathbb{C}^2$, where $\mathbb{C}$ are the complex numbers). The properties of these spaces such as their dimensionality are determined by the physics of the system under consideration so that for some systems, the Hilbert space $\mathcal{H}$ is finite-dimensional, while for others it is infinite-dimensional. The vectors of the space $\mathcal{H}$ are called kets, and they are denoted in the Dirac notation by $\|\psi\rangle$.

	2) Moreover, no definition of "solution" is given. No definition of "to solve" is given. Is it the derivation of a closed analytic formula (hopeless in general)? Is it a numerical approximation? With which precision?	Thank you for drawing my attention to such an important point playing the central role in the paper. I appreciate your valuable comment. I have added the definition of the exact solutions to Schrodinger's equation in the revised version of the paper. Please observe.
	3) When speaking of complexity, one usually considers a class of problems of different "sizes". These two notions have to be made explicit. (The answer will certainly involve the space X of 1).	When speaking of the complexity of solving exactly Schrodinger's equation for an arbitrary physical system, I mean *various* Hamiltonians H of *different* 'sizes', i.e., numbers N of constituent particles. For example, the Hamiltonian H_1 describing a set of N_1 oscillators and the Hamiltonian H_2 of a set of N_2 spins differ in their sizes $N_1 \neq N_2$ as well as in their physical properties. I am thankful for you for this comment. I have added the fragment in the revised version of the paper that is explicitly talking about this. Please observe.
	4) What is the meaning of a "brute force" approach of a problem with an infinite set of candidate solutions?	The runtime complexity of a brute force search is the estimation of the lower bound of this algorithm. Of course, if the system state space had infinite-dimensionality, the use of brute force would have no sense.
<u>Minor</u> REVISION comments		

Optional/General comments	**It is almost impossible to assess the mathematical quality of the manuscript since no precise definition of the concepts of interest is provided.**	I have completely revised chapters 2 and 3 of the paper paying a special attention to the mathematical rigor of definitions and arguments. I hope all this improves the mathematical quality of the revised version and satisfies the reviewer's comments. Thank you for your time and consideration