Could the theories with hidden variables be employed for creation of a quantum computer? A particular scheme of quasiclassical model quantum computer structure is describe.

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In quantum theories with hidden variables the wavefunction \( \Psi = \Psi (u_i) \) being the functions of hidden variables. Let us consider the following mental experiment. Let us connect two classical computers by the quantum cell, the latter being the embodiment of the EPR experiment \( \mathbb{I} \). For this purpose, let us consider the fission of a zero-spin particle into two particles with non–zero spins. Wavefunction of these are \( \Psi_A = \Psi (q_{kA}, S_A, u_i) \) and \( \Psi_B = \Psi (q_{kB}, S_B, u_i) \), \( q_i \) being the coordinate, \( S_A, S_B \) — the spins of \( A \) and \( B \), \( u_i \) — hidden variables. Having processed the information at computers \( A \) and \( B \), we shall obtain at the third classical computer the interference pattern of \( \Psi_A \) and \( \Psi_B \) mapped by \( \Psi_{AB} = \Psi (q_{kA}, q_{kB}, S_A, S_B, u_i) \). Employing this interference, the quantum computer would enable processing of information of useful signal with sub–noise level. To implement this scheme, two–photon radiation can be employed; instead of the latter, multi–photon radiation could be used.

A modern classical computer comprises semiconductor classic bits with two Boolean states “0” and “1”; these could be, for example, two distinct values of electric current or potential at a given bit. In a quantum computer, the basis is a qubit (quantum bit), the wavefunction of which for the basis states \(|0\rangle\) and \(|1\rangle\) is a superposition \( |\Psi\rangle = \alpha |0\rangle + \beta |1\rangle \), \( \alpha \) and \( \beta \) being the complex amplitudes of state (with \( |\alpha|^2 + |\beta|^2 = 1 \)) with probabilities \( P(0) = |\alpha|^2, P(1) = |\beta|^2 \). With rotation of the state vector \(|\Psi\rangle\) in Hilbert two–dimensional state space, amplitudes \( \alpha \) and \( \beta \) vary. If there exists a register comprising \( \lambda \) qubits, then in quantum calculation the unitary operation of all \( 2^\lambda \) amplitudes is performed. With this, all qubit must be correlated.

A quantum computer on correlated photons could be arranged as follows. The qubit of such a quantum computer must be correlated photons. It
should be noted that in case of multiple reflections of a photon, its amplitude is reduced, its magnitude being dependent on reflection coefficient. Correlated photons could be arranged according to the EPR experiment scheme, in which usually two correlated photons are produced. Prior to input information into the quantum computer, all qubit of the register must be initialized, i.e. brought to the main basis states $|0_1\rangle$, $|0_2\rangle$, ..., $|0_\lambda\rangle$. This could be easily done by an information-input polarizer.

The scheme of correlated-photon quantum computer shall have the form:

$$
\nu_1 \rightarrow P'_1 \rightarrow |0_1\rangle \rightarrow P''_1 \rightarrow U_1 \rightarrow |\Psi_1\rangle \rightarrow P'''_1 \rightarrow D_1
$$

$$
\nu_2 \rightarrow P'_2 \rightarrow |0_2\rangle \rightarrow P''_2 \rightarrow U_2 \rightarrow |\Psi_2\rangle \rightarrow P'''_2 \rightarrow D_2
$$

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the gravity theory the deviation equation does only make sense for two objects, and it is senseless to consider a single object. Therefore, the gravity background complements the quantum-mechanical description and plays the role of hidden variables. On the other hand, the von Neumann theorem on impossibility of hidden variables introduction into quantum mechanics is not applicable for pairwise commuting quantities (Gudder's theorem [2]). Introduction of hidden variables in the space with pairwise commuting operators is appropriate.

The solution of the above equation has the form \( \ell^1 = \ell_0 \exp \left( k^a x_a + i \omega t \right) \), where \( a = 1, 2, 3 \). Here we assume the gravity background to have a random nature and should be described, similarly to quantum-mechanical quantities, with variates. Each gravity field or wave with the index \( i \) and Riemann tensor \( R(i) \) should be matched by a quantity \( \ell(i) \) square of which is the probability of the particle being located in the given point. It should be noted that the definition of \( \ell(i) \) is similar to the definition of a quantum-mechanical wavefunction \( \Psi(i) \). Therefore, taking into account the gravity background, i.e., the background of gravity field and waves, the particles take on wave properties described by \( \ell(i) \).

We will only consider in the present study the gravity fields and waves which are so small that alter the variables of micro objects \( \Delta x \) and \( \Delta p \) beyond the Heisenberg inequality \( \Delta x \cdot \Delta p \geq \hbar \). Strong fields are adequately enough described by the classical gravity theory, so we do not consider these in the present study. Let us emphasize that the assumption on existence of such a negligibly small background is quite natural. With this, we assume the gravity background to be isotropically distributed over the space.

There exist certain technical difficulties now in implementation of a quantum computer. So let us construct a quasi-classical model of such a quantum computer scheme, employing the valid classical radio-engineering model [3] of the ESR experiment. It is provided by sending two observers electromagnetic pulses with the same stochastic phase. In this model of the quantum computer, employed are continuous excitation voltage, parametric generators in the number equal to the number of qubits, digital time-delay lines, multipliers of logical signals and low-pass filters. Provided here is two-validness of the function \( \text{sign}\{x\} \), as quantum-mechanical spin. To implement the described procedure, let us modulate the phase of the carrier monochromatic oscillation \( X(t) \) with the frequency \( \omega_0 \) by a random process \( \phi(t) \), \( X(t) = \cos[\omega_0 t + \phi(t)] \) (we assume the correlation time for the process \( \phi(t) \) to be much higher than the period of oscillations). Further, we
introduce into the oscillation $X(t)$ the controlled phase shift $\alpha$ and mix it with the "homodyne" oscillation $\cos(\omega_0 t)$ possessing the stable phase. The obtained superposition $Z(t) = \cos[\omega_0 t + \phi(t) + \alpha] + \cos(\omega_0 t)$ is then rectified. At the output of the square-law detector {after having filtered out the high-frequency component with the frequency of $2\omega_0$, we shall get the low-frequency signal $Z(t) \approx 2 + 2 \cos[\phi(t) + \alpha]$. This results in $\lambda$ correlated cells modulated with the same random process $\phi(t)$, which in our case simulates the hidden variables.

In conclusion, such a quantum computer will be efficient for a special class of problems; with this, it would require the respective software.

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