Review of: "Correlated noise enhances coherence and fidelity in coupled qubits"

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Similar to waves in classical physics, superposition states that you can add two or more quantum states and the result will be another valid quantum state. Conversely, you can also represent each quantum state as the sum of two or more distinct states. This superposition of quantum units gives quantum computers their inherent parallelism, allowing them to process millions of operations simultaneously.

Quantum entanglement occurs when two systems are so closely linked that knowledge of one gives you immediate knowledge of the other, no matter how far apart they are from each other. Processors can draw conclusions about one molecule by measuring another molecule. For example, it could determine that if one quantum unit spins in the upward direction, the other spins in the downward direction anyway, and vice versa. Quantum entanglement allows quantum computers to solve complex problems faster. When measuring a quantum state, the wave function collapses and the state is measured as either zero or one. In this known or specific case, the quantum unit works like a classical unit. Entanglement is the ability of quantum units to associate their state with other quantum units.

Decoherence is the loss of a quantum state in a quantum unit. Environmental factors, such as radiation, can cause the quantum state of quantum modules to decay. A major engineering challenge in creating a quantum computer is designing various features that attempt to delay state decoherence, such as building specialized structures that shield quantum units from external fields.

Quantum annealing uses a physical process to place the qubits of a quantum system at an absolute minimum energy. From there, the device gradually changes the system configuration so that the power environment reflects the problem to be solved. The advantage offered by quantum annealers is that the number of qubits can be much larger than those available in any gate-based system. However, its use is limited to specific cases only.

Our addition to this wonderful work that deserves publication from our point of view Considering that to build these computers, multiple qubits would need to be linked together through a property called quantum entanglement. But the problem is that these entangled qubits exist in a fragile state, so they must be far away from any noise that may reach them from the surrounding environment, because the mere collision of a single photon with the qubit will be sufficient to break the quantum coherence of the entire system, which in turn leads to the destruction of entanglement and the erasure of its properties. Quantum of the system. Imagine that it would be very difficult to perform quantum processing in a very tight (and very cold) laboratory environment, let alone in our brains, which represent a warm and humid environment in which it is impossible to maintain coherence for long periods.