Quantum computing

A quantum computer is a new kind of device based on the science of quantum physics. It has the ability to impact so many aspects of our lives including our healthcare, security needs, and even our internet.

Quantum physics describes the behavior of atoms and fundamental particles like electrons and photons, so a quantum computer operates by controlling the behavior of these particles but in a way that is completely different from our regular computers. A quantum computer is not just a more powerful version of today’s used computers, it’s something else entirely, based on emerging scientific understanding and uncertainty.

Quantum computers calculations are based on the probability of an object’s state (mixed superposition) that is a quantum bit and is called qubit that is a superposition of 0 and 1 (combination of a little bit 0 and a little bit 1) and that means it could be 60% 0 and 40% 1, or 10 % 1 and 90 %0, instead of the normal bit of just zero or one of the regular computers (on or off).

There is more information in quantum computers that if you have 0 0 1 1 that four bits, there are only four things it can be in a classical computer, but in a quantum computer there’s infinite because it’s any combination of those four things that is called entanglement and it’s very very delicate and because of that quantum computers is much more faster.

Quantum physics has a lot of applications. Firstly, quantum uncertainty could be used to create private keys for encrypting messages sent from one location to another so that hackers couldn’t secretly copy the key perfectly, they would have to break the rules of quantum physics to hack the key. Just imagine the impact quantum encryption could have in the future.

Secondly, quantum technologies could also transform healthcare and medicine. For example, the design and analysis of molecules for drug development that is a challenging problem today, and that’s because exactly describing and calculating all of the quantum properties of all the atoms in the molecule is a computationally difficult task even for supercomputers. But quantum computer can do better because it operates using the same quantum properties as the molecule it is trying to simulate. And that could lead to treatments for diseases like Alzheimer’s, which affects thousands of lives.

Thirdly, the teleportation of information from one location to another without physically transmitting the information, and this could be done because these fluid identities of the quantum particles can get entangled across space and time. In such a way that if you change something about one particle, it can impact the other, and that creates a channel for teleportation. That could be part of a future quantum internet.

Quantum physics is not just a tool to build quantum computers, it’s a way to probe the mysteries of nature and reveal more about the hidden world outside of our experiences.