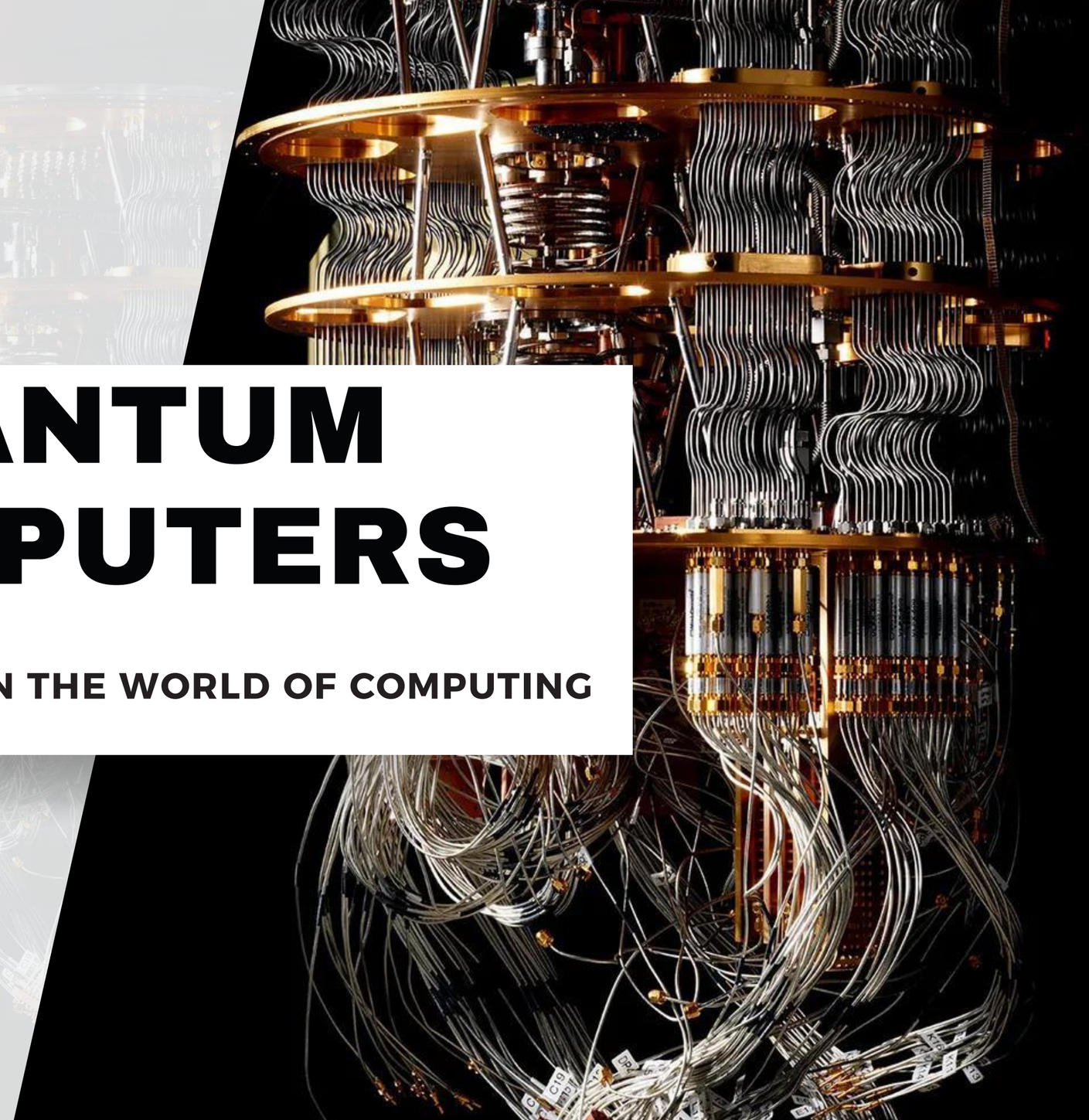
QUANTUM COMPUTERS

THE REVOLUTION IN THE WORLD OF COMPUTING



QUANTUM COMPUTERS?

Machines that use quantum physics to store data and execute computations offering a potential advantage in term of speed and performance over even the most powerful supercomputers.

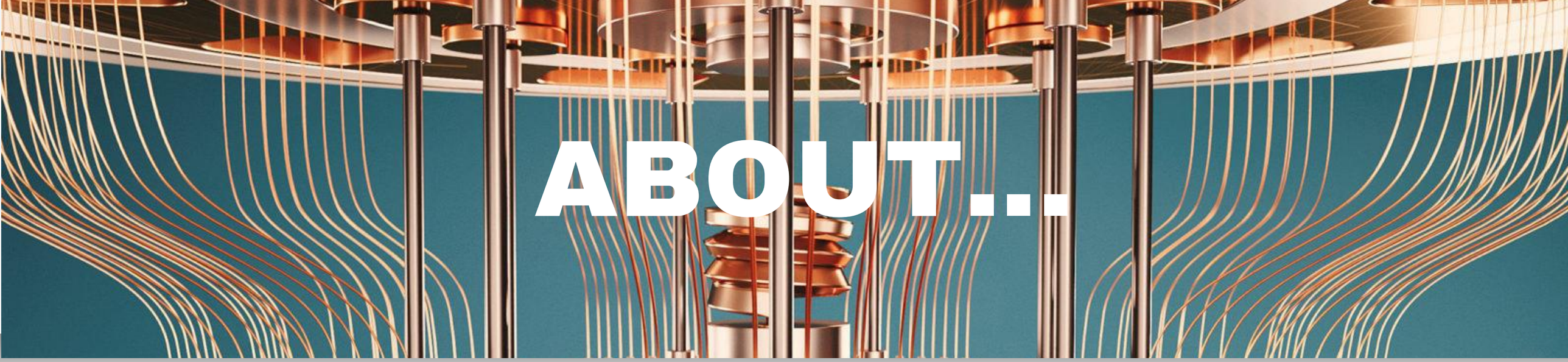
Superposition

Qubits can be in multiple states at the same time, allowing for parallel processing of information. They can represent both 0 and 1 simultaneously.

Qubits are the fundamental units of information in quantum computing.

Entanglement

Qubits can be entangled, Meaning that the state of one qubit is dependent on the state of another, allowing for synchronized operations.



ABOUT..

- potential to outperform classical computers in specific algorithms
- enables simultaneous processing of multiple calculations, offering possibility to speedup for certain tasks
- because of qubit’s sensitivity, it requires a good isolated place with extremely low temperature in order to reduce external and thermal noise
- used in different fields like cryptography; simulating the properties of materials; solving differential equations; optimizing machine learning...

Classical computers face limitations in solving certain problems in terms of speed, such as factoring large numbers, simulating quantum systems or working with large databases.

Speed

By using superposition and entanglement of qubits, quantum computing allows parallel execution of operations, significantly accelerating the resolution of problems.

Limitations of classical systems in representing information become challenging as the demand for handling big amounts of data grows.

Information

Adding one qubit to an entangled quantum system doubles the information that can be represented which is the result of the qubit's possibility to exist in multiple states simultaneously.

Traditional cryptographic protocols, widely used for securing communication, face a significant threat from new technologies that can b break these algorithms.

Security

Quantum computers can generate truly random keys that help provide protection against various threats

**opinions are divided whether quantum computers are good or bad for the environment so it will not be discussed*

WHAT ARE THE PROBLEMS?

Quantum computers are able to brute force their way to break current cryptographic algorithms at a very high speed that can allow an attacker to easily access and exploit any data.

Ethical issues can also be discuss the development of quantum computers, due to its speed and efficiency could threaten the protection of data privacy as well as the confidential information.

In order to preserve the quantum states, quantum computers require error correction procedures that are far more complex than traditional ones. This issue remains a significant problem and lack in quantum computing.

CONCLUSION

Quantum computing is still an underdeveloped field. It is just at the beginning its research and we don't know how evolution will unfold and what quantum computers will be able to do in the future.

Since it is not sufficiently researched and not yet applicable in many fields, we can conclude that quantum computers do not contribute directly to any sector, But with great speed and capabilities, they can better analyze data and do calculations that can improve developping help for each of the 4 scenarios.