The background is a dark blue field with glowing cyan and white digital patterns. Two large, stylized keys, resembling quantum keys, are positioned diagonally, facing each other. They are filled with a dense pattern of binary code. Radiating lines of light emanate from the point where the keys would meet. Scattered throughout the background are various digital motifs: binary strings (e.g., '101001010100101', '110010011100', '1011010101011', '010010001010010', '110010001010001010001', '00111001010011100', '11110100010011100', '10011'), circuit traces, and hexagonal grid patterns.

Quantum Cryptography

Esra Eryılmaz

171044046



Content

- What is cryptography?
- What is quantum cryptography?
- History
- Quantum cryptography explanation.
- Conclusion
- Bibliography

What is cryptography?



Cryptography is the art of devising codes and ciphers.



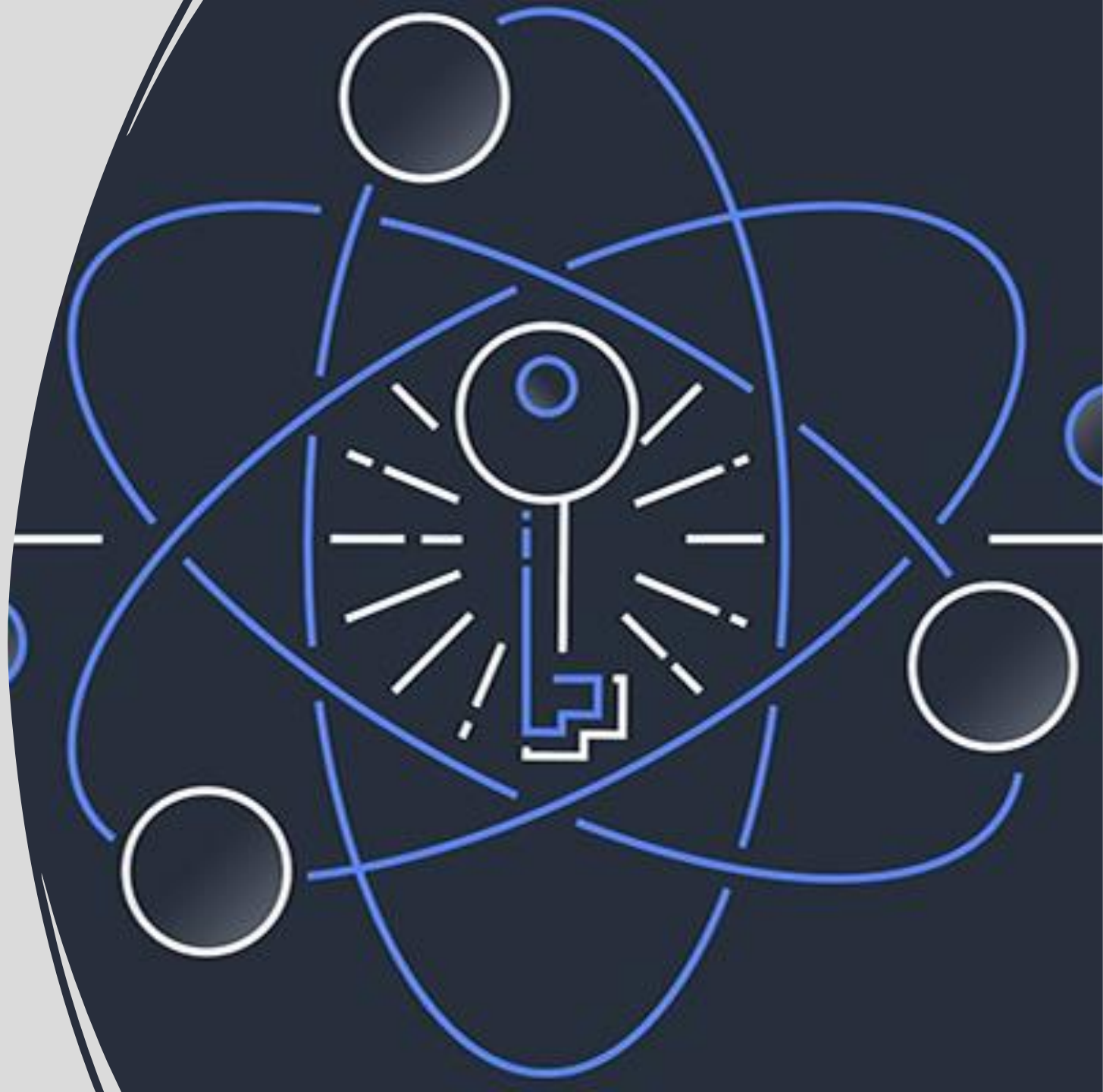
Crypto analysis is the art of breaking them.



Cryptology is the combination of the two i.e Cryptography and Crypto analysis.

What is quantum cryptography?

- Quantum cryptography is a science that applies quantum mechanics principles to data encryption and data transmission so that data cannot be accessed by hackers – even by those malicious actors that have quantum computing of their own.



History

- Quantum cryptography attributes its beginning by the work of Stephen Wiesner and Gilles Brassard. In the early 1970s, Wiesner, then at Columbia University in New York, introduced the concept of quantum conjugate coding. His seminal paper titled "Conjugate Coding" was rejected by the IEEE, but was eventually published in 1983 in SIGACT News.
- In this paper he showed how to store or transmit two messages by encoding them in two "conjugate observables", such as linear and circular polarization of photons, so that either, but not both, of which may be received and decoded.

QUANTUM CRYPTOGRAPHY EXPLAINED

ALICE

BOB

Diagonal Polarizers

Horizontal-Vertical Polarizers



Photon
Source

Photon Detectors

X Diagonal Beamsplitter



Horizontal-Vertical
Beamsplitter

Alice's Bit Sequence 1 0 1 1 0 0 1 1 0 0 1 1 1 0



Bob's Detection

1 0 0 1 0 0 1 1 0 0 0 1 0 0 Bob's Measurements

Sifted Key 1 **–** **–** **1** **0** **0** **–** **1** **0** **0** **–** **1** **–** **0** **Sifted Key**

Conclusion

- Quantum cryptography promises to revolutionize secure communication by providing security based on the fundamental laws of physics, instead of the current state of mathematical algorithms or computing technology.
- The devices for implementing such methods exist and the performance of demonstration systems is being continuously improved.
- Within the next few years, if not months, such systems could start encrypting some of the most valuable secrets of government and industry.



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