Molecular-based cryptography

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DNA data storage compels us to rethink the very notion of information and to transpose all the techniques developed in the digital world to a molecular scale.

We will present a recent work that establishes a new tool for encrypting communications on a planetary scale—where digital cryptography is typically limited by the weaknesses of computational security , and where quantum information sharing remains constrained by technical barriers that have persisted despite 40 years of research efforts [1, 2].

We propose a molecular solution that combines expertise from molecular biology, cryptography, and cybersecurity, offering a new paradigm for secure information exchange.

References

[1] F. Xu, *et al.*, “Secure quantum key distribution with realistic devices,” Rev. Mod.Phys., vol. 92, p. 025002, May 2020

[2] Y. Li, *et al.*, “Microsatellite-based real-time quantum key distribution,” Nature, vol. 640, pp. 47–54, Apr 2025