

SUGIURA LAB.

Wireless Technologies for Exploiting Resources to the Limit



Department of Informatics and Electronics

Department of Information and Communication Engineering,
Graduate School of Information Science and Technology

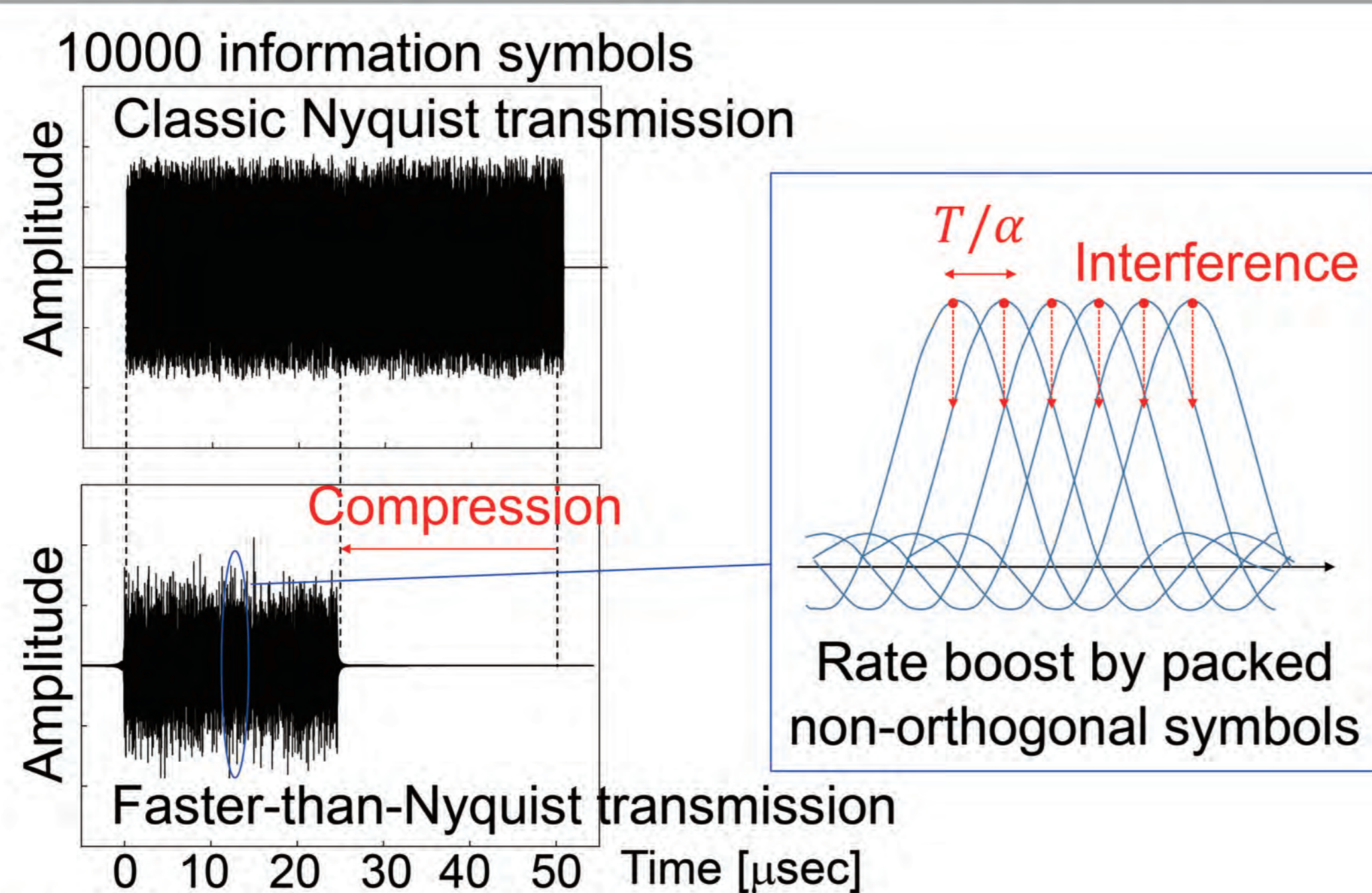
Wireless Communication Engineering

<http://sgurlab.iis.u-tokyo.ac.jp/en/>

Advanced Signal Processing & Networking Technologies for Next-Generation Wireless Communications

Our research group focuses our attention on exploring key technologies of next-generation wireless communication networks, such as 5G and IoT. More specifically, our research interests include, but are not limited to: transmission technology, digital signal processing, network protocols, information theoretic security, cooperative communications, and wireless sensor networks.

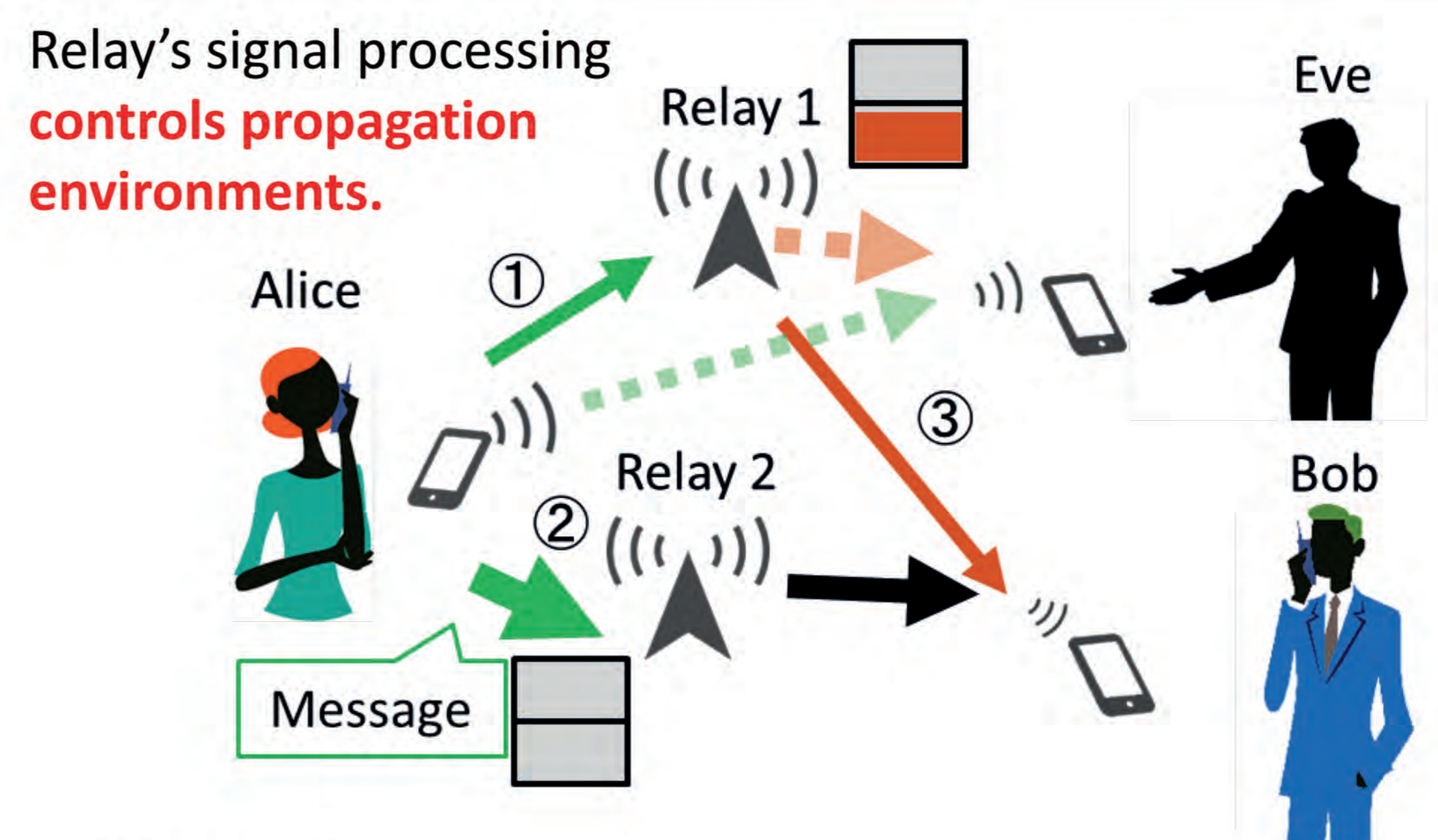
Faster-than-Nyquist Signaling



High Capacity

This scheme packs more symbols than those limited by the Nyquist criterion, hence increasing a transmission rate without affected by any rate loss of practical pulse shaping.

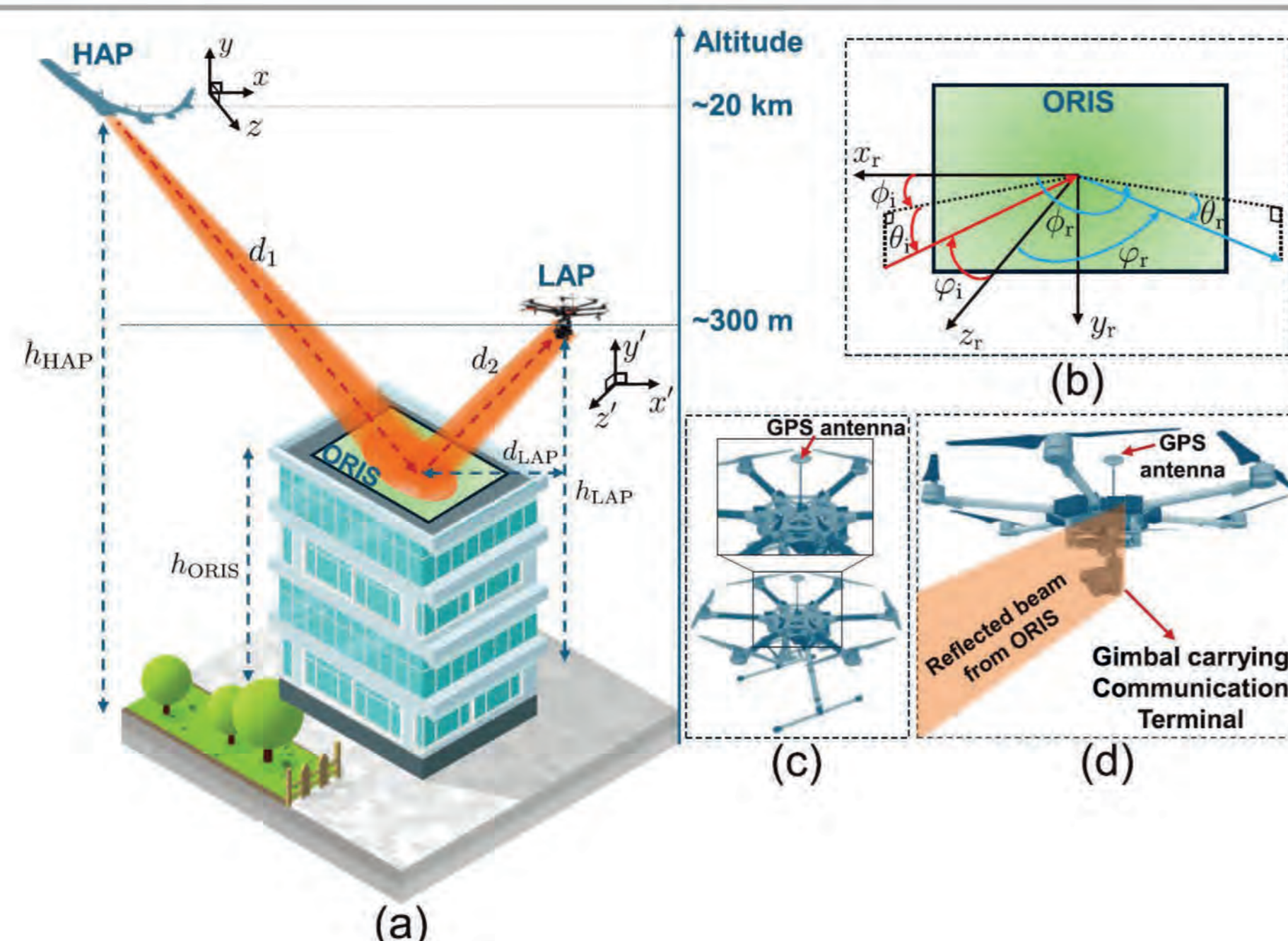
Physical Layer Security



High Security

Physical layer security has the potential of attaining information-theoretically secure communications, without relying on encryption. This may be suitable for IoT networks.

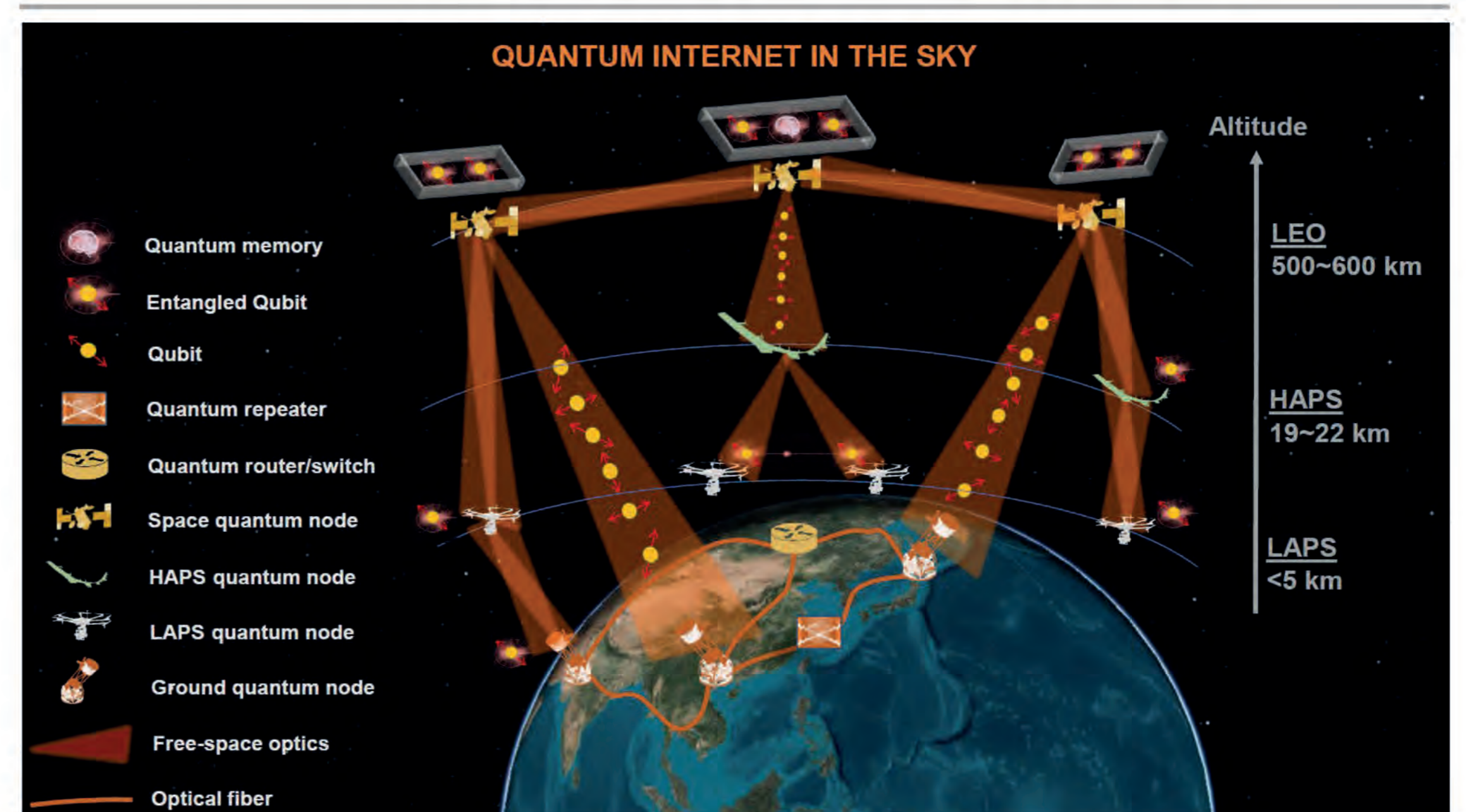
Wide-Area Connectivity via HAPs and Drones



High Rate & High Energy Efficiency

By precisely adjusting “optical reflectors”, the challenges like drone instability and fog are overcome while realizing reliable, high-speed wireless connectivity.

Quantum Internet in the Sky



High Coverage & Quantum-Resistant Security

By leveraging the quantum features of photons, we aim to forge ultra-secure connections between any two points on Earth, where LEO satellites serve as quantum routers.