

# SUGIURA LAB.

## Next-Generation Wireless Communication



Department of Informatics and Electronics

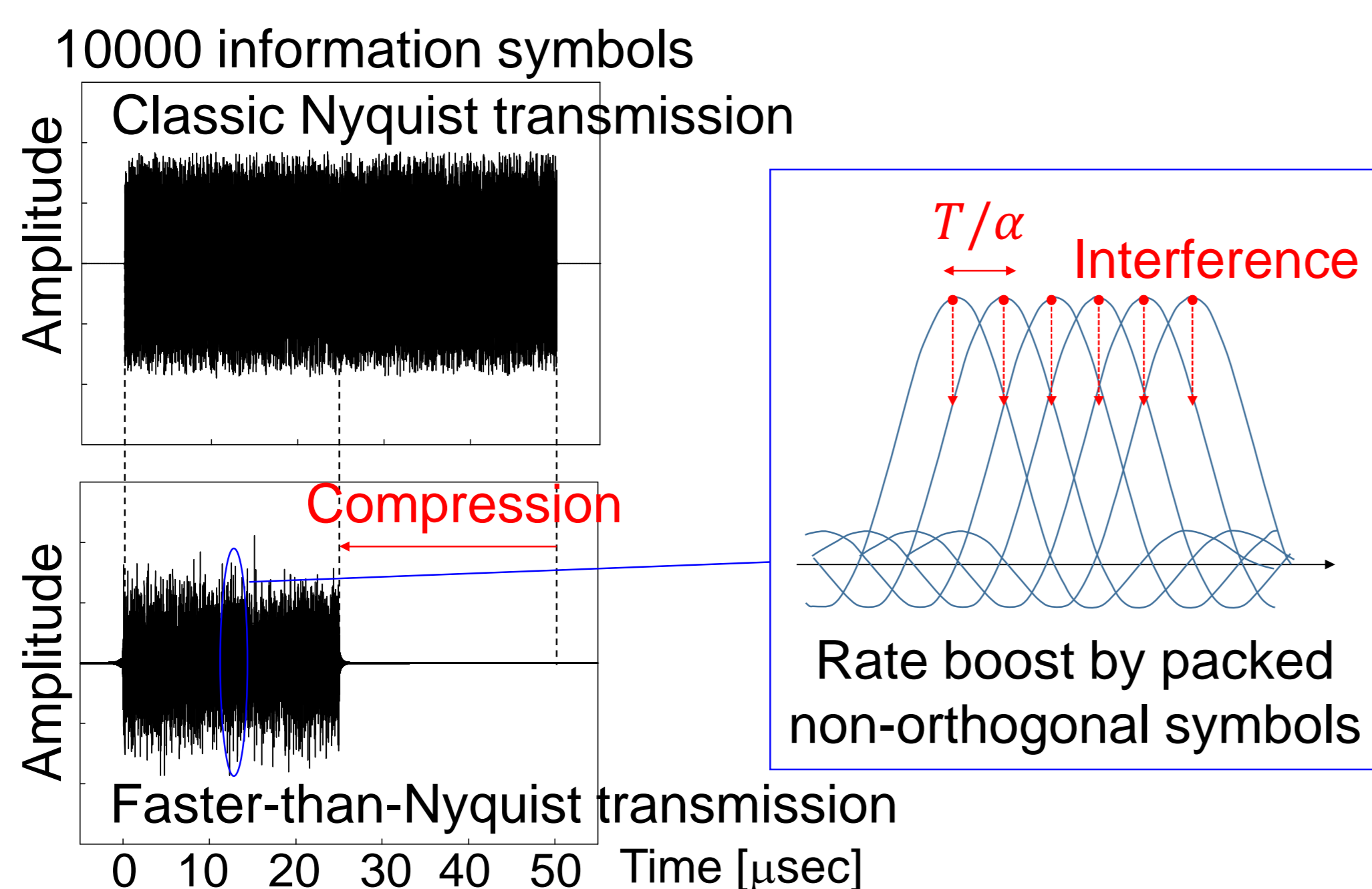
Department of Information and Communication Engineering, Graduate School of Information Science and Technology  
Wireless Communication Network

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

### Advanced Wireless Communication Networks

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.

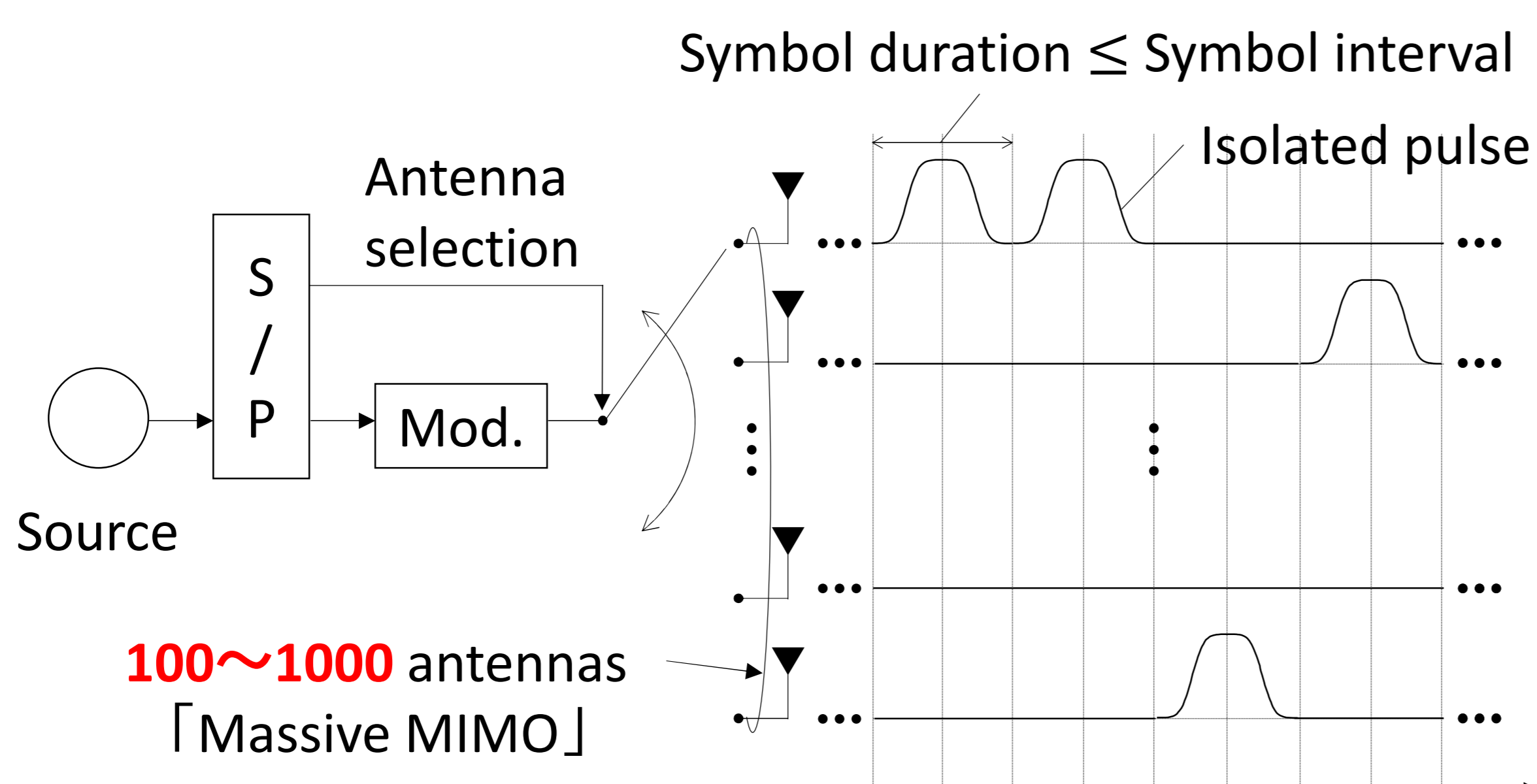
#### Faster-than-Nyquist Signaling



##### 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.

#### Massive MIMO Transmissions

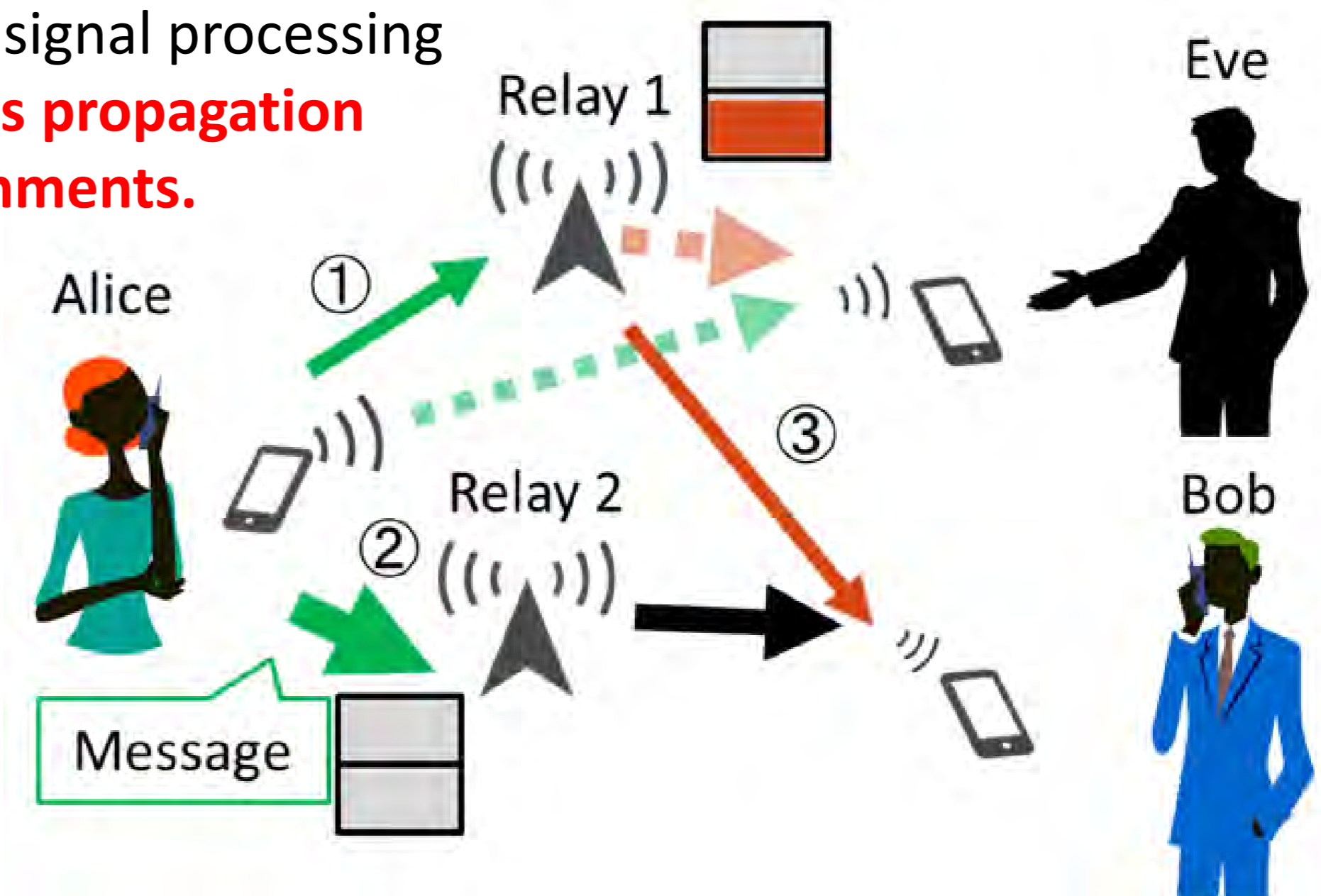


##### High Rate & High Energy Efficiency

Source bits are allocated onto large-scale antenna elements. This scheme operates in a single-RF transmitter structure, hence attaining high capacity and energy efficiency.

#### Physical Layer Security

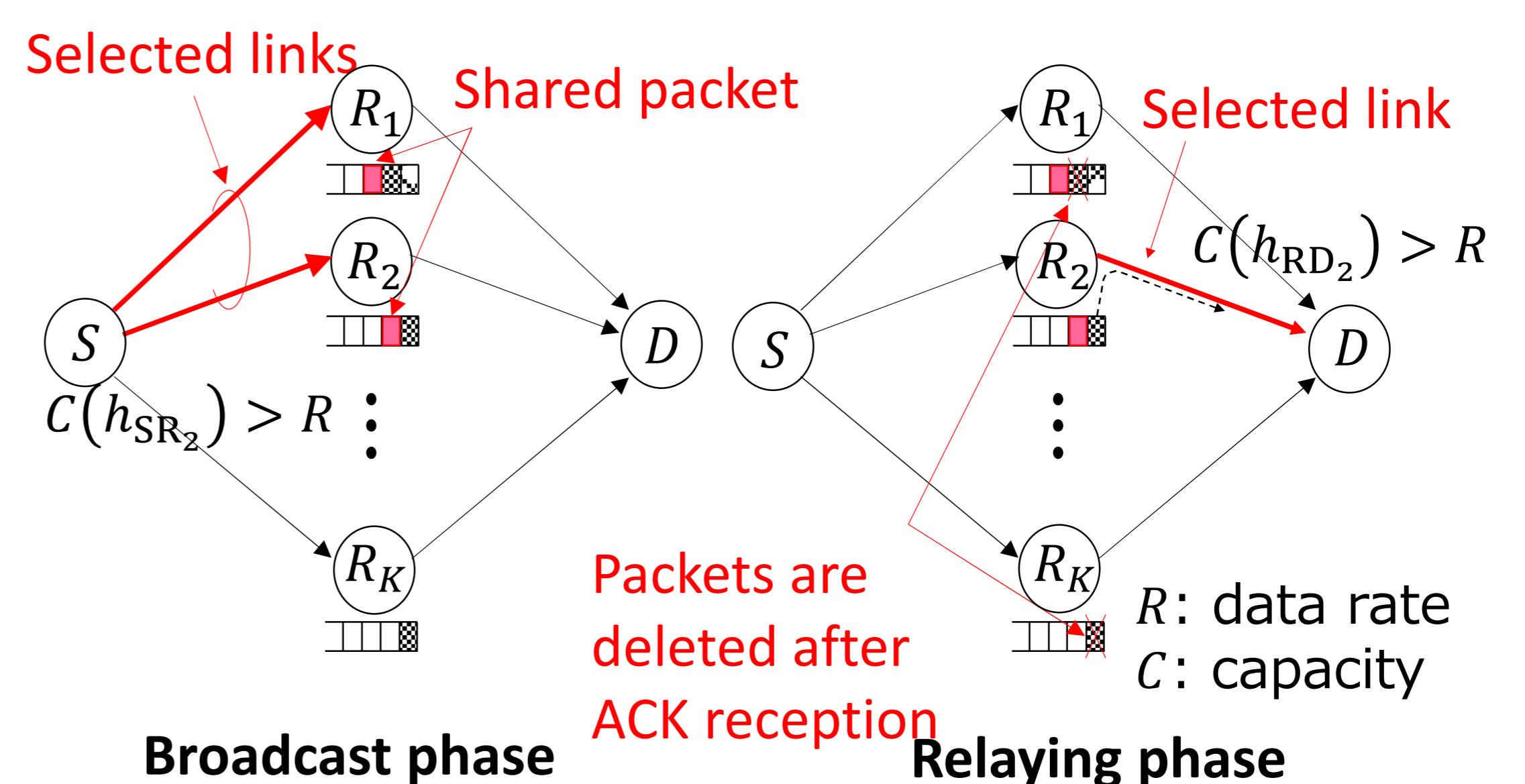
Relay's signal processing controls propagation environments.



##### 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.

#### Delay Tolerant Networks



##### High Reliability

Exploiting data buffers at relay nodes in cooperative communications allow us to attain an improved reliability, owing to the explicit benefits of flexible link selection.

