

# SUGIURA LAB.

## Signal Processing and Networking Technologies

Center for Socio-Global Informatics



Wireless Communication Networks

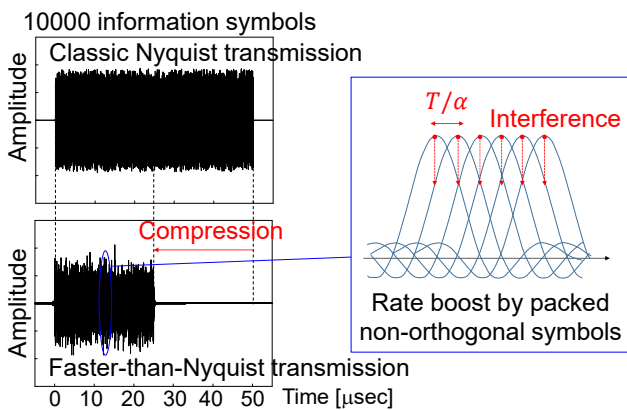
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### Advanced Wireless Communication Networks

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.

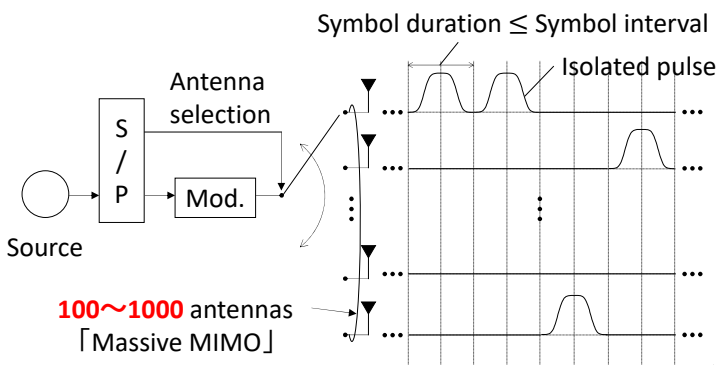
#### Faster-than-Nyquist Signaling



**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.

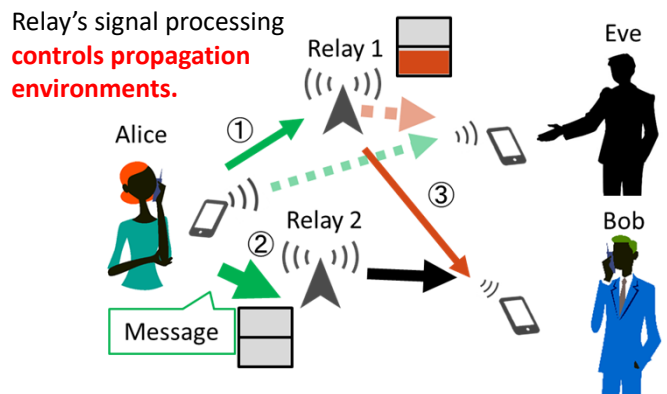
#### Massive MIMO Transmissions



**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.

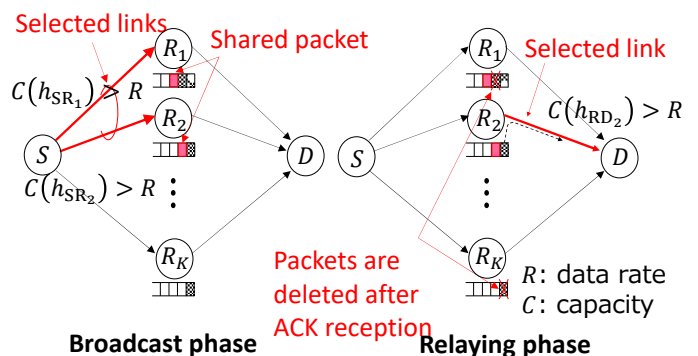
#### Physical Layer Security



**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.