

# Master Thesis

## Enhanced Physical Layer Security Using Full-Duplex Transceivers

### Research field

Emerging technologies in wireless communication

### Keywords

Full-Duplex, Secrecy rate, Wiretap channel

### Description

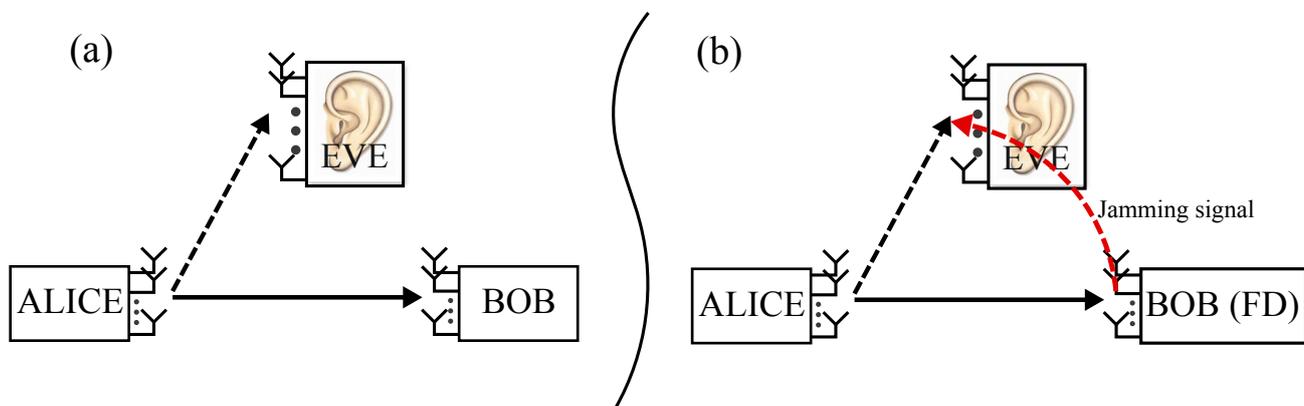


Figure 1: Impact of full-duplex capability in enhancing the physical-layer information security.

Assume a typical wiretap channel: Alice is talking to Bob, while Eve is trying to intercept their conversation, without permission, Fig. (a). The goal is to adopt a communication methodology, which makes it difficult for Eve to listen to Alice, and hence increase the information security. One option is to use the so-called full-duplex (FD) transceivers. A Full-duplex transceiver is characterized by the capability to receive and transmit at the same time and frequency. As an example scenario, if Bob is a FD node, it can transmit a jamming signal while receiving the signal from Alice, and degrade Eve's capability to decode the signal, Fig. (b). In this thesis, we aim at investigating how, and how much a full-duplex (FD) operation of the involved nodes impact the resulting secrecy in the defined wiretap channel.

### Goal

- Study the basic concepts and available methodologies regarding the secrecy rate enhancements (literature study)
- Distinguish the promising use cases for a FD extension,
- Extend the available designs for the FD-specific scenario and evaluate the resulting performance.

### Requirements

- Knowledge of optimization and wireless communication system modeling
- MATLAB programming skills

### Contact

- Omid Taghizadeh, Room: 24C408, Email: taghizadeh@ti.rwth-aachen.de