

PHYS-758

Advanced Course on Quantum Communication

Galland Christophe, Invited lecturers (see below)

Cursus	Sem.	Type
Physics		Opt.

Contact language	English
Credits	2
Session	
Exam	Oral presentation
Workload	60h
Hours	42
Lecture	28
Project	14
Number of positions	40

Frequency

Only this year

Summary

The aim of this doctoral course by Nicolas Sangouard is to lay the theoretical groundwork that is needed for students to understand how to take advantage of quantum effects for communication technologies and contribute to on-going efforts in this field.

Content

Being one of the four pillars of the 1 billion euros flagship on quantum technologies and a provider of applications exploited by startup companies, quantum communication is one of the cornerstones of quantum technologies. The aim of this doctoral course by Nicolas Sangouard is to lay the theoretical groundwork that is needed for students to understand how to take advantage of quantum effects for communication technologies and eventually to contribute to on-going efforts in this field.

This advanced course in quantum communication for Ph.D. students will start with a reminder on quantum theory and an introduction to entropic notions, and then show how to generate and quantify randomness from a quantum source. The lecturer will then present ways to protect data transfers against eavesdropping, what are the quantum threat to classical cryptographic schemes, and how to derive security proofs for quantum-safe cryptography protocols, concluding that the security proofs in the quantum case are unique. Finally, current prospects to build global quantum networks to secure communications between any two points on the earth's surface will be discussed.

Note

Nicolas Sangouard: Physique Théorique au CEA Saclay (91191 Gif-sur-Yvette Cedex)
Host: Ch. Galland