

10th Winter School on Quantum Cybersecurity

PRELIMINARY PROGRAM

“The Coming-of-Age of Quantum Cybersecurity”



20-26 January 2018
Les Diablerets - Switzerland

Dear Madam, dear Sir

This year we celebrate the 10th anniversary of our now-famous Winter School. The theme this year is: “The Coming-of-Age of Quantum Cybersecurity”. 2017 has seen a tremendous increase in the interest for quantum solutions to counteract the forthcoming threat of the quantum computer.

To celebrate our 10th anniversary, we are extremely happy to welcome many international experts among which are three honoured guests: Charles Bennett and Gilles Brassard, the early pioneers of quantum cryptography and teleportation (BB84 protocol) and Artur Ekert, the inventor of entanglement based quantum cryptography (E91 protocol).

Following our tradition, the 2018 event will again feature a two-track program. The two-day Executive Track will provide a high level overview of quantum threats and cyber security. The in-depth Technology Track, which will last 6 days, will go into technical details. Now is the time to learn about both in the relaxed, healthy and stimulating environment of the Les Diablerets winter resort in the Swiss Alps.

- > **The Executive Track**, given over the first two days, is aimed at our colleagues in cyber security; for example CISOs, security experts, or engineers, who wish to gain a high level of proficiency in emerging quantum technologies. It will introduce quantum cryptography, quantum-safe security, and quantum computers in a way accessible to all. The goal is to provide tools for a better assessment of the risks and opportunities brought about by these new quantum technologies.
- > **The Technology Track**, includes the previous Executive Track, and extends it by four more days. The Technology Track is aimed at a general audience of physicists, engineers and computer scientists with little or no background in quantum communications. They will start with the Executive Track, to give a high level picture, and then go into technical details. In this track, special emphasis will be placed on practical aspects, such as the implementation of quantum key distribution systems and quantum repeaters, as well as concrete steps towards a quantum computer. The emerging applications of these promising technologies will also be discussed.

The goal of this event is to introduce this exciting topic in a relaxed and stimulating atmosphere. It will allow extensive interactions between instructors and participants from a variety of backgrounds. In addition, by including hands-on tutorials, the Winter School will offer to the participants the unique opportunity to learn, to see and even operate a real quantum cryptography system and single-photon detectors.

In order to maximize interaction with instructors and to allow intensive hands-on tutorials, the number of participants is limited. Applications will be accepted on a first-come first-served basis.

Dates: Executive Track: Saturday January 20th to Monday January 22nd, 2018
(Arrival on Saturday afternoon and departure on Monday after the courses)
Technology Track: Saturday January 20th to Friday January 26th, 2018
(Arrival on Saturday afternoon and departure on Friday noon)
It is possible to extend your stay in Les Diablerets ski resort before or after the Winter School (contact us).

Location: Les Diablerets ski resort in the Swiss Alps
(More information available on: <https://www.villars-diablerets.ch/en/Z1631/les-diablerets>)

Accommodation: Hotel Les Sources: www.hotel-les-sources.ch

Instructors: Members of the ID Quantique R&D team

Speakers: See pages 6 to 7 of this announcement

- Price:** Executive track (2 days): € 2'000 per participant
Technology track (6 days): € 4'000 per participant
(Early booking discount: 20% until October 31st, see below)
- The price includes:
- Board and accommodation (2/6 nights, single room in a *** hotel)
 - Course participation
 - Teaching materials
 - Recreational activities (as described in the program)
- Note:** Travel to and from Les Diablerets not included.
- Certificate:** Granted upon completion of the Winter School
- Insurance:** Health and accident insurance is the responsibility of the participant.
- Accompanying person:** Possibility to come with an accompanying person.
Price: € 1'500 per person, which includes:
Accommodation in a double room, breakfast, lunch and dinner, and recreational activities.
Note: Travel to and from Les Diablerets not included.
- Application:** Before December 15th, 2018
- Important note:** The number of participants is limited. Applications will be accepted on a first come first served basis. Do not delay!
- Early booking:** For booking **and payment** before October 31st 2017, special prices of:
€ 1600 per participant to the Executive track,
€ 3200 per participant to the Technology track, and
€ 1200 per accompanying person.
Act quickly to take advantage of this **20% discount**

Come and join us in Les Diablerets next winter! This Winter School is a unique opportunity to learn about state-of-the-art practical quantum communications and to gain hands-on experience. The program will also allow participants to network and socialize, while discovering winter sports such as downhill skiing, sledging or curling in a beautiful Swiss Alps winter landscape.

Yours faithfully,



Grégoire Ribordy
Founder & CEO of ID Quantique

PRELIMINARY PROGRAM (subject to change)

DAY	SATURDAY 20 th JANUARY	
From 14:00	Arrival of the participants	
17:00 - 18:00	Introduction Presentation of the program	
18:00 - 20:00	Dinner	
20:00 - 22:00	Recreational Activity Curling	

LEGEND
Lectures
Hands-on Sessions
Recreational Activities
Meals
Various

DAY	SUNDAY 21 st JANUARY		MONDAY 22 nd JANUARY	
TIME	Executive/Technology Tracks		Executive Track	Technology Track
07:15 - 08:00	Breakfast		Breakfast	
08:00 - 10:00	Introduction The context of quantum security M. Mosca		British Telecom: Real applications of Quantum Cryptography QKD in Telecom Networks A. Lord	
10:00 - 12:00	Quantum Computer Status and progress A. Ekert		Gemalto Cybersecurity Today J. Hart	
12:00 - 14:00	Lunch		Lunch	
14:00 - 16:00	D-Wave: The first Quantum Computer TBC		End of Executive Track	Recreational Activity Skiing
16:00 - 18:00	Quantum Communications How do they enhance security? G. Ribordy			
18:00 - 20:00	Dinner & Recreational Activity 10 th Anniversary Celebration		Dinner	
20:00 - 22:00			After dinner talk History of BB84 C. Bennett & G. Brassard	

TECHNOLOGY TRACK

TIME	TUESDAY 23 th JANUARY	WEDNESDAY 24 th JANUARY	THURSDAY 25 th JANUARY	FRIDAY 26 th JANUARY
07:15 - 08:00	Breakfast	Breakfast	Breakfast	Breakfast
08:00 - 10:00	QKD: Session 1 IDQ R&D Team	Quantum Hacking V. Makarov	Theory of Quantum Computing S. Popescu	Wrap up session and discussions IDQ Team
10:00 - 12:00	QKD: Session 2 IDQ R&D Team	Hands-On Session 2	Latest developments in Quantum Cryptography N. Gisin	
12:00 - 14:00	Recreational Activity Glacier 3000	Lunch	Lunch	Lunch (optional)
14:00 - 16:00		Hands-On Session 3	CV-QKD R. Alléaume	
16:00 - 18:00	Real applications of QKD Long term confidentiality J. Buchmann	Security Proofs of QKD R. Renner	Cryptography in a quantum world G. Brassard	End of program
18:00 - 20:00	Dinner	Dinner & Recreational Activity Evening Sledge	Dinner & Recreational Activity Swiss Party	
20:00 - 22:00	Hands-On Session 1			

End of the school: Friday 26th January 2018 around 11 AM

Notes:

- For hands-on tutorials, participants will work in groups. Each group will take part in the following tutorials:
 - o Hands-On 1 – Network security;
 - o Hands-On 2 – Practical QKD;
 - o Hands-On 3 – Single photon detector calibration;
 - o Hands-On 4 – Photon-pair generation.
- The courses will not focus solely on ID Quantique's products, but will use them for illustrative purposes.
- All presentations are in English.

CONFIRMED SPEAKERS (as of September 2017)



Prof. Romain Alléaume
Telecom ParisTech (France)



Dr. Charles Bennett
IBM Research



Prof. Gilles Brassard FRS, O.C.
Canada Research Chair in Quantum Information Science,
University of Montreal, Canada



Prof. Johannes Buchmann
Technical University of Darmstadt (DE)



Prof. Artur Ekert
University of Oxford (UK) and Center for Quantum
Technologies (Singapore)



Prof. Nicolas Gisin
University of Geneva (Switzerland)



Jason Hart
CTO Data Protection at Gemalto



Dr. Andrew Lord

Head of Optical Research at British Telecom



Prof. Vadim Makarov

Institute for Quantum Computing (Waterloo, Canada)



Prof. Michele Mosca

Institute of Quantum Computing (Waterloo, Canada)



Prof. Sandu Popescu

University of Bristol (UK)



Prof. Renato Renner

Swiss Federal Institute of Technology (Switzerland)



Dr. Grégoire Ribordy

CEO of ID Quantique



Dr. Colin Williams

Director of Business Development at D-Wave
TBC

Join us at Les Diablerets! (www.diablerets.ch)



Enjoy the pure mountain air in a charming family resort at the foot of a magnificent glacier.
 Les Diablerets is an unspoiled country village set amid spectacular Alpine scenery. Majestic summits, pristine forests...
 Les Diablerets has done such a good job of meeting the needs of tourism that visitors feel right at home!

In winter, the mountain offers you all the pleasures of skiing, snow and meeting family or friends: Alpine skiing and snowboarding, but also cross-country skiing, snowshoes or hikes, day or night sledge runs, ice-skating or curling, swimming-pool and other sports or fun activities. In summer, the numerous beautiful landscapes of our valley guarantee you will enjoy sun and pure air. Hikes, mountain biking, Via Ferrata, husky rides and snow bus on the glacier as well as fun sports guarantee you well-being, fun and a unique experience. The Alpine Coaster, on the glacier, with its ten curves, six waves, three jumps, two bridges and a 520-degree loop await those who dare.



More instruction on how to come will be given closer to the arrival date