

# Winter school on Complex Networks: From Classical to Quantum

**Universitätszentrum Obergurgl, 3.-7. April 2017**

**Objectives:** We intend to bring together Quantum Physics and Classical Networks both in theoretical models and in emerging experimental settings. The goal of this interdisciplinary school is to foster interaction between these communities. The school is aimed at PhD students and Postdocs who work in classical networks, quantum physics, quantum communication and quantum information; theory and experiment. Details can be found at: [quantum-networks.org/obergurgl2017](http://quantum-networks.org/obergurgl2017).

**Lectures** (4 overview courses 3x1h each)

Albert-László Barabási (CEU)	Introduction and overview to network science
Kae Nemoto (NII Tokyo)	Quantum Communication, cryptography, repeaters ...
Yasser Omar (Univ. Lisbon)	Complex Quantum Networks
Jens Eisert (FU Berlin)	Many body systems/error correction/entanglement

**Additional Lectures** (5 lectures 1h, concentrating on one theme)

Baruch Barzel (Bar Ilan)	Classical network dynamics
Hans Briegel (Innsbruck)	Quantum-Agents, self-learning
Marcus Huber (Univ. Vienna)	Entanglement witnesses
Vladimir Buzek (Bratislava)	Open Quantum Systems
Yang-Lu Liu (Harvard)	Control of classical complex networks

**Experimental methods:** (8 talks 45 min, concentrating on one theme)

Michael Trupke (TU-Wien)	Quantum Node (NV centers)
Edward Laird (Oxford)	MW-Optical conversion (Oxford contribution)
Ian Walmsley (Oxford)	Quantum Network Hub – realization
Tracy Northup (Innsbruck)	Ion trap quantum node – cavity-QED
Philip Walther (Univ. Vienna)	Integrated photonics
Arno Rauschenbeutel (TU-Wien)	Nano-photonics
Simon Gröblacher (Delft)	Nano mechanics based MW-optical conversion
Neereja Sundaresan (Princeton)	Networks of superconducting resonators

Participants at the school are encouraged to bring a Poster to discuss their own work. We expect the poster sessions, which will run throughout the week, to be a substantial element of the school.

**Venue:** Obergurgl, located at the end of the Ötztal in Tyrol, is a prominent winter and summer resort. The school will be held at the University Centre Obergurgl, which is associated with the University of Innsbruck.

**Participation fee:** 650€ for Students, 800€ for postdocs and other scientists. The participation fee includes 6 nights accommodation in double rooms (single room add 200€), breakfast and dinner.

**Application:** [quantum-networks.org/obergurgl2017/application](http://quantum-networks.org/obergurgl2017/application).  
The 50 slots will be filled starting February 1<sup>st</sup>.

The organizers

Jörg Schmiedmayer	(VCQ, TU-Wien)
Bill Munro	(NII, Tokyo)
Andrew Briggs	(Oxford)

The school is supported by the John Templeton Foundation grant The Nature of Quantum Networks, the Austrian Science Fund FWF via the SFB-FOQUS and the PhD school CoQuS and the ERC QuantumRelax.