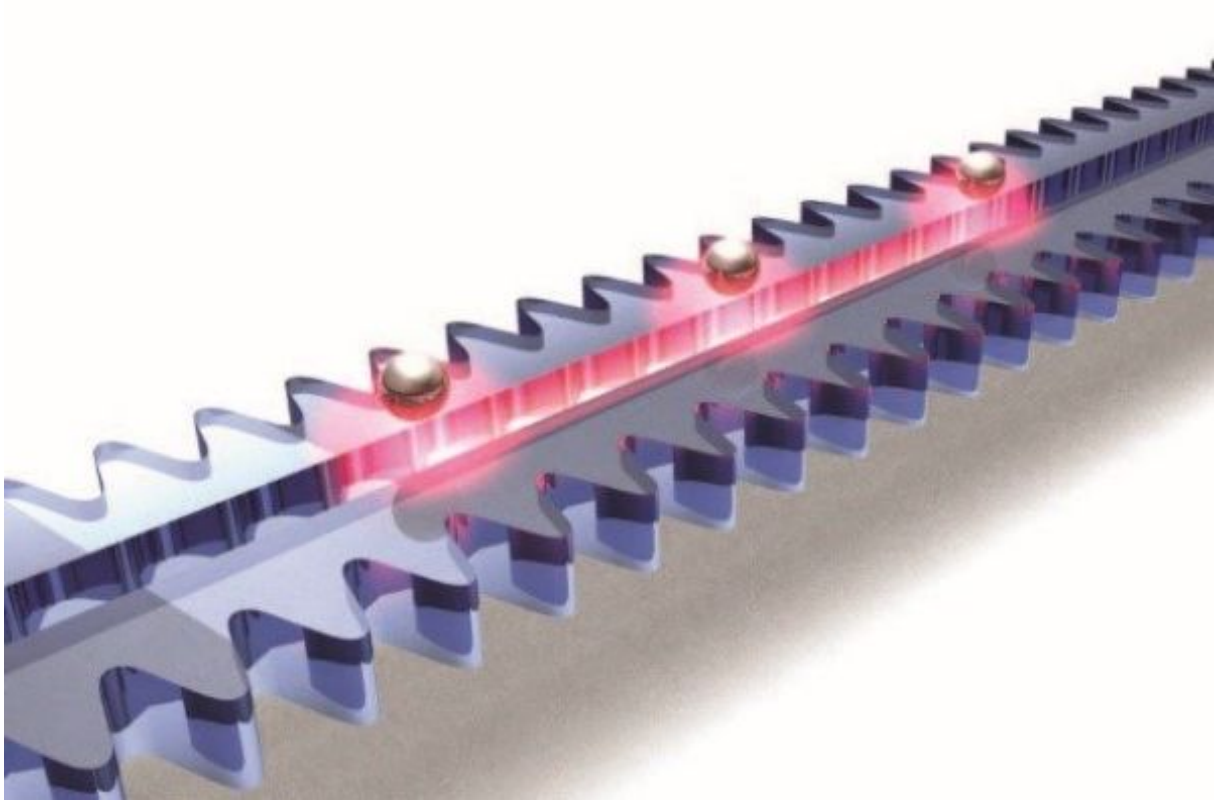

ICFO-WEIZMANN SCHOOL ON THE FRONTIERS OF LIGHT

July 05, 2021 to July 08, 2021
10:00 to 19:00
Online (Veertly) and local HUBS @ ICFO (Barcelona) & Weizmann (Rehovot)

Efficient and coherent interfaces between atoms and light hold the promise to unlock diverse applications in quantum technologies and novel opportunities to explore exotic quantum phenomena. Despite spectacular progress, many of the goals that researchers want to achieve remain elusive. This school will expose young researchers to some of the recent exciting approaches aimed at creating a powerful new generation of atom-light interfaces and the resulting possibilities. The new platforms to be covered include ordered atomic arrays, ensembles of Rydberg atoms, atomic interfaces with nano- and micro-photonic structures, and superconducting circuit QED-based systems.

This **4-day joint school** will be held **in-person at the ICFO and Weizmann hubs**, with lectures at one location simulcast to the other.

Online Plenary Sessions will be open to all interested.

The organizing faculty members are Darrick Chang & Robert Sewell (ICFO), Ofer Firstenberg & Ephraim Shahmoon (Weizmann Institute of Science).

Travel Fellowships are available to outstanding applicants to attend one of the hubs. The deadline for applications is **Friday 28 May 2021.**

Lectures & Topics:

Daniel Barredo, CINN - CSIC & Institut d'Optique - CNRS, Quantum simulation of many-body systems using arrays of individual Rydberg atoms
Mariona Moreno Cardoner, Institute of Cosmos Sciences of the University of Barcelona (ICCUB), Quantum Optics with Atomic Arrays
Emanuele Dalla Torre, Department of Physics and Center for Quantum Entanglement Science and Technology (QUEST), Bar-Ilan, What is the difference between lasing and superradiance (and how do we see it in an experiment)?
Barak Dayan, Weizmann Institute of Science, Optical Cavity-QED: quantum coupling between single photons and single atoms
Ofer Firstenberg, Weizmann Institute of Science, Quantum nonlinear optics in atomic ensembles
Pol Forn-Diaz, Institute for High Energy Physics (IFAE), Ultrastrong light-matter interactions in superconducting circuits
Juanjo Garcia Ripoll, Instituto de Fisica Fundamental, CSIC, Quantum optics with superconducting quantum circuits
Alejandro Gonzalez Tudela, Instituto de Fisica Fundamental-CSIC, Quantum optical phenomena in (topological) photonic crystals
Ido Kaminer, Technion, Does an electron wavefunction collapse when interacting with light?
Alicia Kollar, University of Maryland, Photonic Materials in Superconducting Circuits
Ephraim Shahmoon, Weizmann Institute of Science, Quantum optics of atomic arrays

About:

International Schools on the Frontiers of Light aim at giving talented young researchers and students worldwide a first introduction to a thematic research area and a taste of an international research environment. These schools incorporate a dynamic and social learning environment beyond participating in lectures, including group discussions, direct

interactions with the lecturers, student talks and poster presentations.

ICFO and the Weizmann Institute of Science do not tolerate any type of conduct or behavior considered harassment or bullying and have clear defined policies against harassment.

Participating Institutions:

ICFO - the Institute of Photonic Sciences, is a young research institution that aims to advance the very limits of the science and technology of light, tackling important challenges faced by society at large in all areas of life, including health, energy, information, safety, security and caring for the environment. ICFO is a member of BIST, the Barcelona Institute of Science and Technology. More information about ICFO can be found here.

Weizmann - the Weizmann Institute of Science is one of the world's leading multidisciplinary basic research institutions in the natural and exact sciences. AMOS@Weizmann is a center for quantum physics with atomic, molecular, and optical systems. The center includes 18 research groups and activities ranging across most contemporary topics in AMO physics - from attosecond pulses and intense lasers, through precision spectroscopy of ultracold atoms, molecules or ions, to quantum information and quantum optics. More information about Weizmann and AMOS can be here and here.