



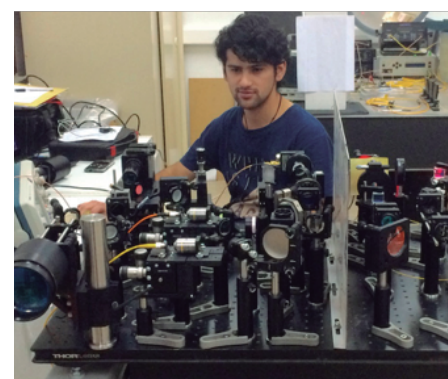
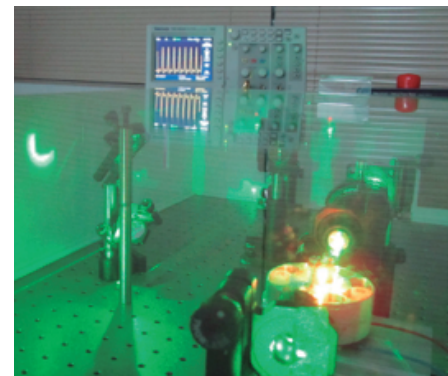
Area of Impact: Materials for New Technologies
Specialty: Materials for New Technologies

Since the beginning of mankind the light has been source of fascination and curiosity. Galileo with his telescopes studied the light from distant planets and stars, changing our compression of the universe. Einstein's work lead to the modern Laser, which is today a basic tool in Sciences, Medicine, and Engineering. Dirac discovered the quantum world within the light, source of the most advanced current and future technologies.

The Millennium Institute for Research in Optics (MIRO) is dedicated to the study of fundamental questions such as: What is light? What are the properties of light? Can we control these properties? How does light interact with matter? Can we control this interaction? Can be the light the base of new applications and technologies?

Applications of our research cover a wide range of subjects. Single photons can be employed to realize quantum key distribution for secure communications and to fundamental test of the quantum theory. Generation of twisted beams of light help to implement distortion-free open-path optical communications. New source of light make possible accurate measurements beyond the standard limit.

A network of laboratories endowed with state of the art equipment carries out challenging experiments, supporting and promoting generations of new young scientists at the frontier of the knowledge. Results of our research activities are published in the best scientific journals.

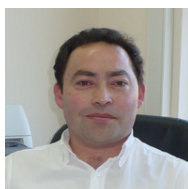


MAIN ACHIEVEMENTS

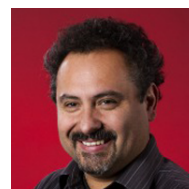
- First experimental realization of a quantum cryptography protocol in dimension 16.
- Distribution at a distance (3.6 km) of quantum entanglement of the energy/time type of two photons in an installed fiber-optic network.
- Discovery of a new form of light localization, this is, absolutely scatter-free propagation in waveguides, and their experimental demonstration.
- Device-independent certification of non-projective measurements.
- Experimental realization of Optomechanical oscillators.

CONTACT INFORMATION

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RESEARCHERS

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RESEARCH TOPICS

- Quantum Light.
- Optical Communications.
- New Light Sources.
- Optical Networks and Pattern Formation.

NOTED OUTREACH ACTIVITIES

- **Photons to School:** interactive portable laboratory to demonstrate properties of light such as interference, diffraction and polarization. The laboratory can also show the wave-particle duality, characteristic of quantum systems, by means of a Quantum Erasing experiment. Activity aimed at high school students from 8th to 12th grade and general audiences (*).
- **Games of Light:** activity aimed at basic school students, based on the construction of simple optical experimental setups with household items (*).
- **Interventions of urban space:** mail goal is to improve the awareness of the impact of Optics and Science in the modern everyday life as well as the contribution of the Instituto (2018) (*) Continuation of previous activities.



PRODUCTIVITY PUBLICATIONS

Millennium Institute recently awarded,
no publication have been reported.



ACTIVE MILLENNIUM INSTITUTE From 28/12/2017 to 28/12/2027

The Millennium Institutes have a duration of 10 years,
subject to an evaluation halfway through the period.



PRESENCIA REGIÓN METROPOLITANA REGIÓN DEL BIOBÍO



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