NANOPHOTONICS TECHNOLOGY CENTER

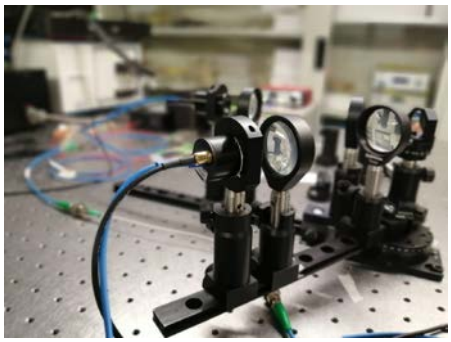
Description of the group

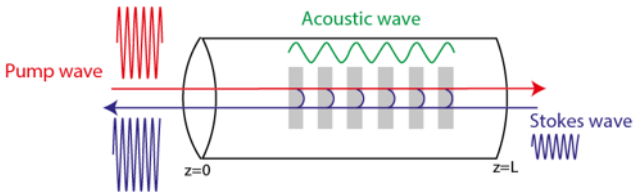
The "THz Photonics and Optical Signal Processing" group is one of the seven research groups within the Nanophotonics Technology Center of the Universitat Politècnica de València. This group is led by Prof. Borja Vidal and made up of four PhD students and several undergraduates.

The group works in two areas: THz Photonics and nonlinear optical signal processing.

In the field of **THz Photonics** we are interested in the development of new applications for THz waves. Using photoconductive antennas and fiber based systems we develop hardware and software to tackle challenges in noncontact quality control and industrial monitoring. THz sensing can provide information that cannot be extracted using waves in other spectral bands which is very valuable to enhance industrial processes.

In the area of **nonlinear optical signal processing** we work in the use of nonlinear effects in optical fiber to develop new functionalities aimed at applications in optical networks and microwave photonics. In particular, we have a long experience in the use of **stimulated Brillouin scattering** for signal processing. The group has recently pioneered the use of this inelastic scattering for efficient light-by-light control.





Selected publications

1. M.A. Báez-Chorro, M. Usó-Izquierdo, B. Vidal, "Accurate Beam Profile Characterization in THz Transmission Imaging Systems", *IEEE Transaction on Terahertz Science and Technology*, 2021.
2. D. Samaniego, G. Zoireff, B. Vidal, "Brillouin-induced Dynamic Arbitrary Birefringence", *Journal of Lightwave Technology*, vol. 39, no.7, April 2021.
3. G. Zoireff, D. Samaniego, B. Vidal, "Dynamic Filtering of Microwave Signals through Brillouin-based Polarization-sensitive Balanced Detection", *IEEE Journal of Selected Topics in Quantum Electronics*, May 2021
4. D. Samaniego, B. Vidal, "Brillouin wavelength-selective all-optical polarization conversion", *Photonics Research*, vol. 8, no. 4, pp. 440-447, March 2020.

5. M.A. Báez-Chorro, B. Vidal, “Single trace terahertz spectroscopic ellipsometry”, *Optics Express*, vol. 27, no. 24, pp. 35468-35474, 2019.
6. M.P.M. Colleoni, M.A. Báez-Chorro, B. Vidal, “Quantitative Characterization of Defects with Fixed-Delay THz Sensors”, *IEEE Sensors Letters*, vol. 3, no. 10, pp. 3501804, October 2019.
7. D. Samaniego, B. Vidal, “Brillouin Microwave Filter with enhanced Skirt Selectivity using a Birefringent Fiber”, *IEEE Photonics Technology Letters*, vol. 31, no.6, pp. 431-434, March 2019.

Recent research projects

1. ULTRAWAVE “Ultra Capacity Wireless Layer beyond 100 GHz based on Millimeter-wave Travelling Wave Tubes” (EU H2020)
2. PEER “Ensanchando los límites del control de calidad con THz” (AEI)

Contact

Borja Vidal
Catedrático de Universidad / Full Professor
Universitat Politècnica de València, Nanophotonics Technology Center (NTC)
Building 8F | 2nd Floor, Camino de Vera, s/n, 46022 Valencia, SPAIN
T +34 657 34 32 51 F +34 96 387 78 27
E bvidal@ntc.upv.es W https://ntc.webs.upv.es/
Google Scholar site