Sound & bright

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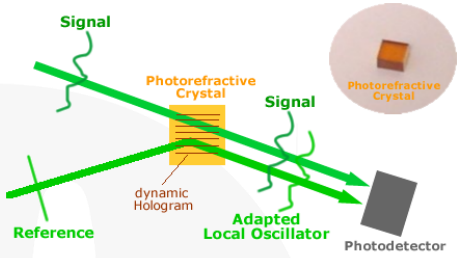
TEMPO 1D

ULTRA-HIGH FREQUENCY RECEIVER

Laser
Ultrasonics

TECHNOLOGY

The **Tempo 1D** receiver is based on photorefractive two-wave mixing. A dynamic hologram resulting from the interferences between the reference beam and the signal beam is recorded in the photorefractive crystal. The diffraction of the reference beam by the dynamic hologram creates a local oscillator adapted to the signal i.e. same wavefront and same direction. Two-wave mixing in a photorefractive material is equivalent to an adaptive beam splitter. The two beams – signal and adapted local oscillator – are in perfect quadrature and are incident on the photodetector that delivers a homodyne signal.



High performances photorefractive crystals are used with reliable properties to insure an optimum two-wave mixing process. A high voltage field is applied on the photorefractive crystal in order to optimize the coupling and maintain the quadrature between the signal and the diffracted reference (adapted local oscillator). Photorefractive two-wave mixing has been extensively studied over the past 40 years and is a well-developed process.

FEATURES

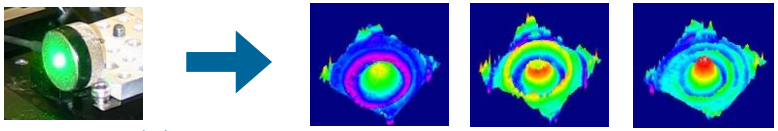
-> No high frequency limit
-> Large étendue interferometer
-> High sensitivity on all surface types and materials
-> Continuous detection laser

EXAMPLES OF APPLICATIONS

Material Characterization

Laser-ultrasonics are used to measure fundamental material properties such as the elastic modulus, shear modulus and Poisson ratio. Those parameters are of great importance for estimation of active stresses and life service

Transducer characterization



1 MHz piezo, 1 inch Φ
1 µs pulse excitation

Sample surface at t_0 | At t_0+1 µs | At t_0+2 µs

Acoustic emission

The laser receiver can also be used independently, without the generation laser, to listen to acoustic emissions occurring when the sample is under stress. Remote detection of acoustic emission can be used for monitoring during manufacturing processes.

SPECIFICATIONS

Technology Two-Wave mixing	Detection Out-Of-Plane	Configuration Free-Space
Internal Laser power Up to 1.5 W @532nm	NESD (out-of-plane motion) 2.10^{-7} nm. $(W/Hz)^{1/2}$	Detection bandwidth Up to 1Ghz
Dimensions 492 x 302 x 114 mm^3	Weight 16kg	Electrical requirements 110V / 220V 50Hz / 60Hz

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