Sound & bright

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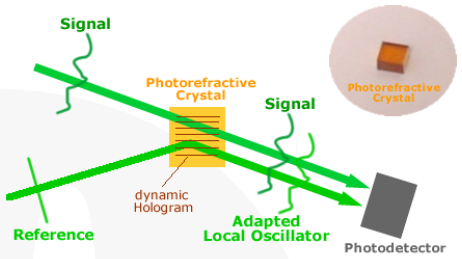
Ultra High Frequency Laser Receiver

Laser Ultrasonics

Technology

The **Ultra high Frequency** 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-controlled process

Features

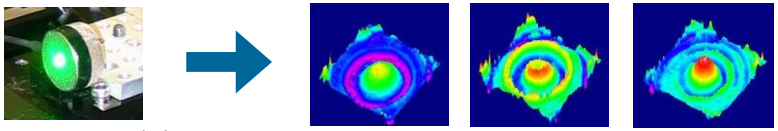
-> No high frequency limit
-> Large étendue interferometer
-> High sensitivity on all surface types and materials
-> Continuous detection laser

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 alone, without the generation laser, to listen to acoustic emission 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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Sound and Bright
717 N.Highland Ave, Ste 18
Los Angeles, CA 90038, USA
info@soundnbright.com
+1 (323) 606 9038