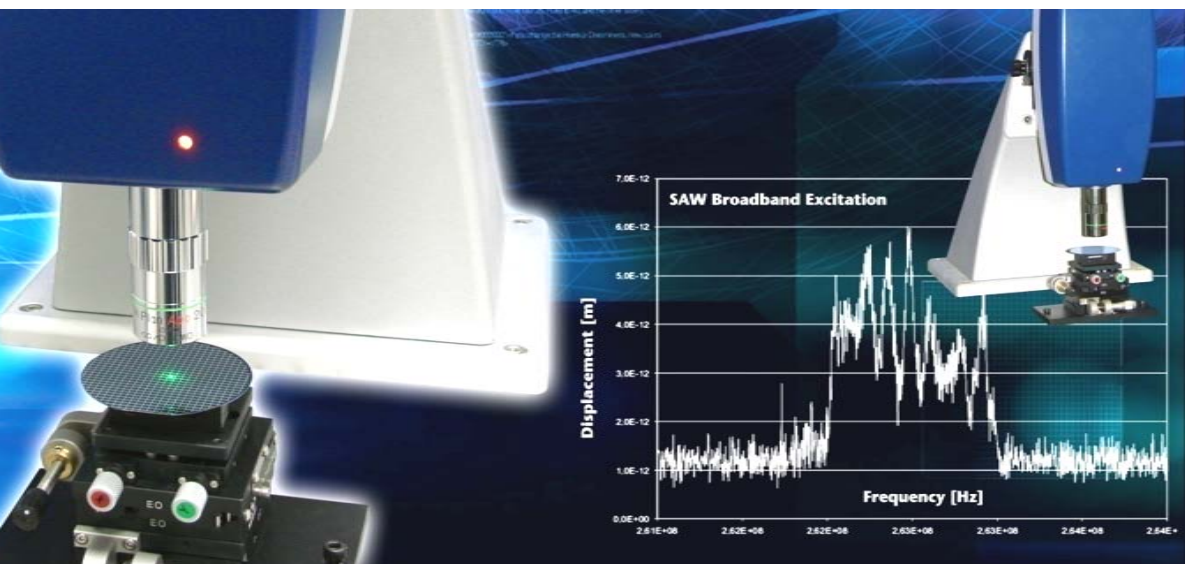


UHF-120 Ultra High Frequency Vibrometer



High Frequency Vibrometers

- OFV-2570
High Frequency Vibrometer
- UHF-120 Ultra High Frequency Vibrometer
- PSV-400-M2-20
High Frequency Scanning Vibrometer
- PSV-400-3D-M
High Frequency 3-D Scanning Vibrometer

A Compact and Non-contact Sensor for Ultra High Frequency Vibration Measurements up to 1200 MHz

Advanced Testing Methods for New UHF Applications

Technology advancements in ultrasonics and in micro- and nanotechnology have given rise to new optical methods to make ultra high frequency (UHF) measurements of mechanical vibration. Laser-based, non-contact optical testing is the best choice.

Polytec's New UHF-120 Vibrometer

Laser-Doppler Vibrometers (LDV) can characterize the out-of-plane vibrations at ultra high frequencies. Polytec's UHF-120 extends the vibration frequency bandwidth up to 1.2 GHz. Complete with a new optical arrangement, the system retains the advantages and features familiar to LDV users.

The System

The UHF-120 Vibrometer consists of a heterodyne interferometer with a controller box. The optical head provides a heterodyne detector signal that is acquired with a fast digital oscilloscope.

The digitized detector signal is transferred to a PC where the heterodyne carrier is demodulated by a new module in Polytec's Vibsoft software. The system has a gate function for reducing light power to minimize the energy transfer from the measurement beam to the measurement spot and for easy alignment of the beam on the specimen. In addition, an integrated camera and an integrated bright-field microscope illumination control the measurement spot positioning.

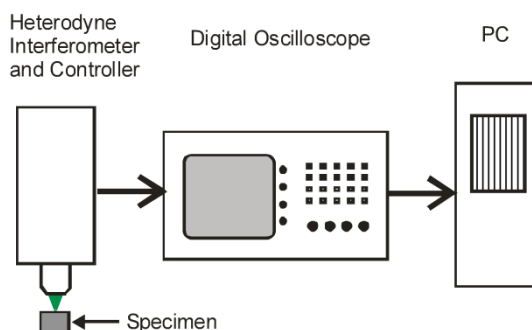
Powerful Analysis Features

The sophisticated optical design of the sensor head enables small measurement spot sizes below 1 μm diameter (with a 100X objective). Therefore, the system can measure tiny specimens and ultra high frequency vibrations with short acoustical wavelengths. Frequency spectra, as well as transient displacement or velocity over time signals, can be measured and analyzed with Polytec's Vibsoft software, making all of its powerful analysis and post processing features available for measurements up to 1200 MHz.

Typical Applications

- RF MEMS
- BAW/SAW filters
- NEMS
- MEMS programmable clock oscillators
- Ultrasonic motors
- Ultrasound imaging
- Laser ultrasonics

A shot-noise limited detector signal and sophisticated digital decoder technology provide the analysis of vibration spectra with picometer resolution for broad bandwidth measurements. The optical sensor can be attached to a probe station and, therefore, vibration analysis at ultra-high frequencies can be performed on wafer level, in the case of MEMS or NEMS devices, for example.



UHF-120 Technical Data

Interferometer Optics

Laser wavelength	532 nm
Output power	<5 mW (Laser class 3R) (with gate function to minimize energy transfer to specimen)

Available Objectives

Manufacturer	Magnification	Working distance in mm	Spot diameter on sample in μm	Field of view for integrated camera H x V in mm^2
Standard	20X	≥ 20	<2.5	$\sim 0.71 \times 0.55$
Optional	2X	34	<21	$\sim 7.10 \times 5.50$
	3.6X	53	<12	$\sim 3.90 \times 3.00$
	5X	≥ 34	<10	$\sim 2.84 \times 2.20$
	10X	≥ 33.5	<4.5	$\sim 1.42 \times 1.10$
	10X	48,9	<4.5	$\sim 1.42 \times 1.10$
	50X	≥ 13	<2	$\sim 0.28 \times 0.22$
	100X	≥ 6	<1	$\sim 0.14 \times 0.11$

Heterodyne Detector Signal

NESD (Noise equivalent surface displacement)*	$<0.6 \cdot 10^{-7} \text{ nm (W/Hz)}^{1/2}$
Carrier frequency	>600 MHz

* Measured on the photo detector

WavePro Oscilloscope

Data memory	2 x 20 MB (for two channels)
Channels	4 (max. 2 can be used at 10 GS/s interlaced)
Max. sample rate	40 GS/s
Vertical resolution	8 bit

Demodulated Displacement Signal (in VibSoft)

Max. vibration frequency	1200 MHz
Amplitude resolution for WavePro-acquisition @ 4.88 kHz RBW	<2 pm
Number of FFT lines	>6 million

For more information, please contact your Polytec application/sales engineer or visit www.polytec.com/uhf.

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