



◆ HOLOGRAPHIC MODULE *HOLO*

Holographic module for nondestructive monitoring of semiconductors. HOLO is novel contactless and versatile device attachable to any pulsed laser source for investigation of nonlinear optical and photoelectric phenomena in semiconductors. HOLO device is based on the four-wave mixing technique.

The areas of application extend from determination of parameters on as-grown bulk crystals or heterostructure to evaluation of technology processing in micro or optoelectronics as doping, co-doping, allowing, ion implant, annealing, surface passivation, etc.

SPECIFICATIONS

Input beam (pump)	355 or 266 nm
Input beam (probe)	532 nm
Maximum pump beam input energy	1 mJ
Maximum probe beam input energy	1 mJ
Probe beam delay range	1000 ps
Delay stage accuracy	1 step 2.5 μ m
Delay stage scanning step	1 ps
Dynamic grating period range	3 – 20 μ m (355 nm pump beam) 2 – 15 μ m (266 nm pump beam)
Sample positioning stage accuracy	50 μ m
Sample size	max 4 inch in diameter

*Please feel free to contact EK SMA
for your application details.*

◆ NANOSECOND LUMINESCENCE SPECTROMETER

MEASUREMENT OPTIONS

- Registration of luminescence spectra
- Registration of excitation spectra
- Measurements of luminescence time response parameters.

Spectrometer consists of nanosecond Nd:YAG laser and optical parametric oscillator (OPO) combined in single optical parametric system, monochromator, Data acquisition unit (DAQ), Digitizer, optics for excitation beam guiding and luminescence signal collecting, optical signal detectors.

SPECIFICATIONS

Tuning range of excitation wavelength	420 – 680 & 740 – 2300 nm (plus 210–420 nm with optional OPO second harmonic generator)
Operating wavelength of luminescence	300 – 1700 nm
Excitation energy	up to 20 mJ (at OPO tuning curve max)
Excitation pulse duration	3 – 6 ns
Registration system time response	10 ns – 10 ms
Excitation pulse repetition rate	10 Hz

All system components are computer controlled.

◆ SECOND HARMONIC GENERATION SPECTROMETER

Second harmonic generation (SHG) is effective tool for surface probing. The monolayer adsorption could be detected by SHG. With different input/output beam polarizations SHG could yield information on the average orientation of molecular adsorbates. The surface symmetry measurements could be performed by rotation of the sample about the surface normal. With tunable lasers, SHG can yield surface-specific monolayer spectroscopy. SHG option could be as an extension of Sum Frequency Generation (SFG) spectrometer.

SPECIFICATIONS

SH excitation wavelength	1064 nm 532 nm
SH excitation pulse duration	20 – 30 ps
Resonant SH excitation wavelength	420 – 2300 nm

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◆ PICOSECOND TIME-RESOLVED SPECTROMETER

For picosecond excitation of the sample we offer several options:

- lamp pumped Nd:YLF laser harmonics (523 nm, 349 nm, 262 nm) or output of optical parametric generator (210 – 2300 nm), pumped by this laser, with pulse duration of 8 ps and pulse repetition rate of 10 – 20 Hz
- lamp pumped Nd:YAG laser harmonics (532 nm, 355 nm, 266 nm) or output of optical parametric generator (210 – 2300 nm), pumped by this laser, with pulse duration of 20 ps and pulse repetition rate of 10 – 20 Hz
- diode pumped Nd:YAG laser harmonics (532 nm, 355 nm, 266 nm) with pulse duration of 80 ps and pulse repetition rate of 1kHz.

Streak camera or fast photomultiplier with digital oscilloscope could be used for registration of the time-resolved picosecond luminescence.

The measurements of time resolved absorption could be arranged in pump-probe scheme. Output of optical parametric generator or laser excited Xe luminescence could be used as pump beam. The relaxation kinetics could be obtained from single pulse by the streak camera or acquired by scanning the delay between pump and probe pulses with motorized delay line.

SPECIFICATIONS

1. Streak camera option

This solution enables the single shot measurement of time and spectrally resolved spectra.

Temporal resolution	30 ps
Spectral resolution	0.1 nm
Spectral range	400 – 960 nm

2. Fast photomultiplier option

This solution enables the single shot measurement of a time resolved trace at a specific wavelength.

Temporal resolution	200 – 300 ps
Spectral resolution	0.1 nm
Spectral range	400 – 960 nm

◆ DIFFERENTIAL ABSORPTION LIDAR *AMBER 5*

APPLICATION AREAS

- 3D monitoring of air pollution: such as Sulphur Dioxide (SO₂), Nitrogen Dioxide (NO₂), and Ozone (O₃) in the troposphere
- Monitoring of Benzene (C₆H₆), Toluene (C₇H₈). In this case interference (overlapping) of absorption bands with other substance in the air should be properly taken into the account
- Measuring relative changes in spatial and temporal distribution of the aerosols.

SPECIFICATIONS

Spatial resolution of sampling (100 Msamples/sek)	1.5 m
Detection limit (with spatial resolution of several hundred meters), not worse as:	
for SO ₂ concentration	10 mg/m ³
for NO ₂ concentration	30 mg/m ³
for ozone concentration	15 mg/m ³
Maximal range	~ 4 km
Sampling and acquisition time in single direction	1 min
Sampling direction:	
azimuth angle*	0° – 270°
zenith angle*	0° – 180°

* full hemisphere, division to zenith and azimuth scanning angles is arbitrary.