

## Optically Addressed Spatial Light Modulator - NIR

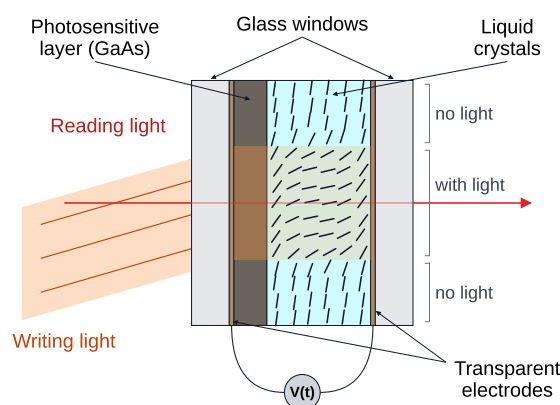
### FEATURES

Liquid-crystal *Optically Addressed Spatial Light Modulator* with a continuous photosensitive substrate in place of pixels.

- Photosensitive substrate in the NIR (writing light)
- Reading light above 950 nm: transmission or reflection mode
- Reading light below 950 nm: reflection mode
- Spatial resolution 80  $\mu\text{m}$
- Phase or amplitude modulation
- Response time 15 ms
- Clear aperture 20 mm

### DESCRIPTION

The OASLM-NIR, also called a Light-Valve (LV), is a spatial light modulator made with a photoconductive layer of semi-insulating GaAs instead of pixels.

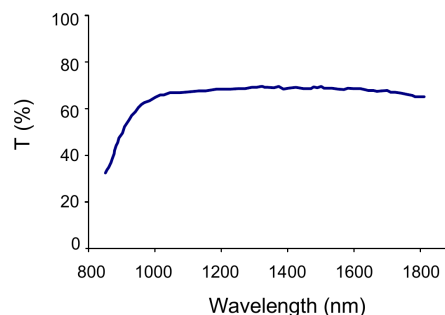


The addressing (writing) is made optically by shining the GaAs side with light in the near infrared; the sensitivity range is 800 – 1550 nm. “NIR” refers to this writing wavelength: the reading light to be modulated can be different.

Reading beams above 950 nm can be used in transmission or in reflection. Below 950 nm, where GaAs is opaque, the device works in reflection only.

Without writing light the LC molecules stay close to the plane of the plates; where the writing light falls they turn towards the beam axis. The refractive index seen by the reading light therefore follows the intensity profile of the addressing light.

Spectral transmission is shown from 850 to 1850 nm; light is linearly polarized along the LC director.



The device can modulate the reading light in phase, or in intensity if placed between crossed polarizers. The OASLM-NIR also provides a Kerr-like optical response with a tunable nonlinear coefficient.

The OASLM-NIR is mounted in a compact aluminum housing, with an SMA connector for electrical driving.

### APPLICATIONS

- Wavelength conversion
- Adaptive holography and interferometry
- Nonlinear optics
- Optical wave-mixing
- Laser beam shaping
- SWIR and LWIR imaging

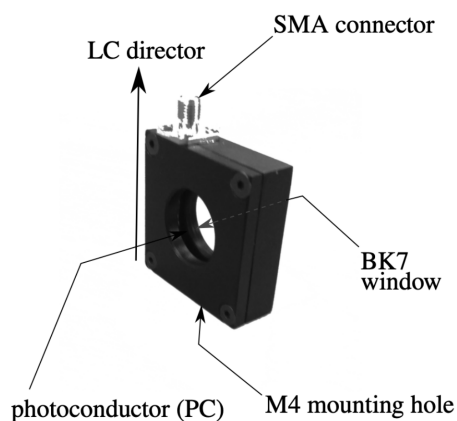
### Examples

- Wavelength conversion
- Opto-acoustic sensing
- Beam cleanup
- Vibrometry



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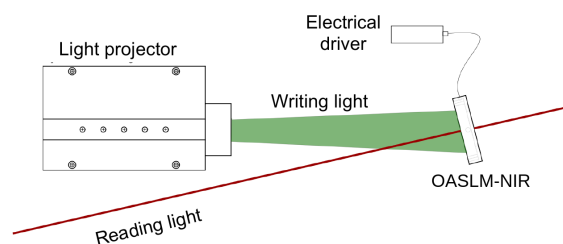
### VIEWS



### DEVELOPMENT KIT

A development kit includes the OASLM-NIR, its electrical driver and its specifically designed light projector.

Software for controlling the driver and for generating the optical masks is provided with the kit.



### CHARACTERISTICS

| Item                                                         | OASLM-NIR                           |
|--------------------------------------------------------------|-------------------------------------|
| Operating mode, reading light > 950 nm                       | Transmission or reflection          |
| Operating mode, reading light < 950 nm                       | Reflection                          |
| Power consumption (V = 20 Vrms, f = 1 kHz)                   | < 80 mW                             |
| AR coating                                                   | NIR (or custom wavelength)          |
| Optical transmission ( $\lambda = 1030$ nm)                  | > 65 %                              |
| Transverse spatial resolution                                | 80 $\mu$ m                          |
| Clear aperture                                               | 20 mm                               |
| LC refractive index ( $\lambda = 632$ nm)                    | 1.74 – 1.52 (T = 20 °C)             |
| LC thickness                                                 | 9 $\pm$ 0.05 $\mu$ m                |
| Photoconductive layer refractive index ( $\lambda = 632$ nm) | 3.86                                |
| Weight                                                       | 70 g                                |
| Dimensions                                                   | 40 mm $\times$ 40 mm $\times$ 20 mm |

### RECOMMENDED OPERATING CONDITIONS

|                                  | Minimum | Typical    | Maximum | Units              |
|----------------------------------|---------|------------|---------|--------------------|
| Supply AC* voltage               | 7       | 20         | 28      | Vrms               |
| Driving voltage frequency        | 30      | 1k         | 10k     | Hz                 |
| Driving voltage waveform         |         | Sinusoidal |         |                    |
| Writing light optical wavelength | 800     |            | 1550    | nm                 |
| Writing light intensity          | 0.2     |            | 3.5     | mW/cm <sup>2</sup> |
| Working temperature              | 4       |            | 80      | °C                 |

\* The optimized response of the device is obtained for an applied AC voltage with no DC component. An electrostatic or DC voltage applied for several hours could permanently damage the device.