Light Modulators

based on liquid crystals or integrated-optical waveguides

Light Modulation in the Visible and Near-Infrared Spectral Range

The light modulators developed and manufactured by Jenoptik are utilized for modulation of amplitude, phase, polarization and spectrum as well as for pulse shaping, pulse rate reduction and fast switching of light from laser sources of diverse powers.

The modulators based on on liquid crystal cells or fiber-coupled integrated optics are characterized by short switching times and a wide operating wavelength range in the visible (VIS) and near-infrared (NIR) spectrum.

Customer-specific requirements and modifications for particular applications can be realized by our R&D lab.

Benefit from Jenoptik's Know-How in the fields of VIS/NIR Light Modulation

- High resolution spatial liquid crystal light modulators with 320 or 640 separately controllable strips for modulation of phase, amplitude or polarization state
- compact fiber-coupled phase and amplitude modulators in waveguide design providing a high frequency range and high contrast ratio

Optoelectronic Systems

Light Modulators
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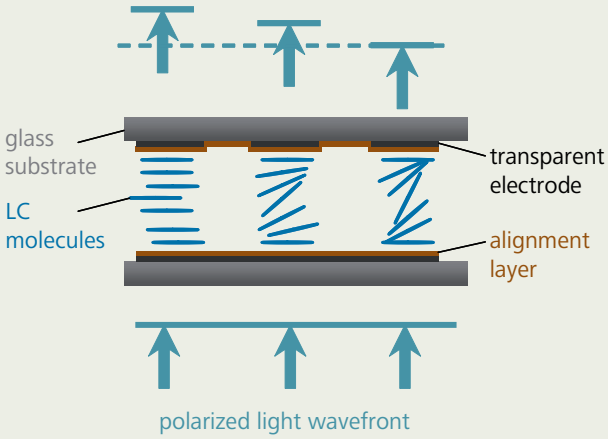
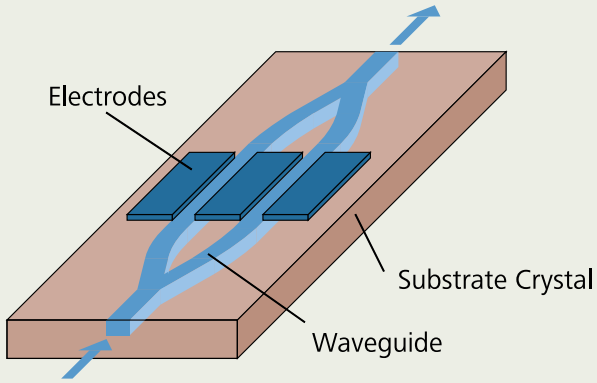
Specifications



Phase modulation with liquid crystals



Schematic layout of an integrated-optical amplitude modulator

Liquid Crystal Spatial Light Modulators

The liquid crystal spatial light modulators SLM-S modulate light in the wavelength range from 430 nm to 1600 nm and are particularly suited for modulation of femtosecond laser pulses, e.g. in a Chirped Pulse Amplification (CPA) System. Based on electrically controlling of the optical properties of a nematic liquid crystal array, a transmitted light wave's phase, amplitude or polarization state is modulated. Each of the 320 or 640 single strips can be separately controlled with a resolution of 12 bit. The large active area of the liquid crystal array allows for modulation even of high power lasers.

The modulators are available as single- or dual-mask SLM-S. Simultaneous modulation of phase and amplitude can be achieved by aligning a dual-mask modula-tor in a 4f-arrangement.

An extensive LabView instruction set, C-libraries for common operating systems and standard interfaces guarantee easy and comfortable installation and operation. Removable mirrors for reflective mode operation and anti-reflective coatings for customer-specific wavelength ranges or special requirements are available as an option.

Features & Benefits

- Large active area, suitable for high power lasers
- 12 bit resolution of modulation voltage
- Integrated ADC port, e.g. for feedback pulse optimization
- High resolution laser modulation in phase and/or amplitude
- Pulse shaping of high power and ultrashort pulse lasers

Fiber-Coupled Integrated-Optical Modulators

The integrated-optical modulators are compact fiber-coupled, electro-optical modulators based on Lithium Niobate Crystals. They can be configured for phase or amplitude modulation.

The modulated light is guided by a waveguide structure. The fast electro-optical response allows for modulation frequencies as high as the Gigahertz range. Available modulators can handle wavelengths in the visible and the near-infrared spectral range from 532 nm up to 1600 nm.

Standard-designed modulators use polarization-maintaining single mode fibers to couple the light in and out. They may also be configured with fiber systems or connectors of different types.

Each modulator may be fitted with an analog amplifier or a control & driver unit on special request.

Among the modulators' application areas are digital modulation, analog modulation with high dynamic, short laser pulse generation in the sub-nanosecond regime, fast display technologies, laser scanning microscopy, sideband generation or interferometric metrology.

Features & Benefits

- Application in the VIS or NIR spectral range
- High modulation frequency
- Single mode fiber coupling
- Low modulation voltage

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