HAMAMATSU PHOTON IS OUR BUSINESS

Advancing Beam Shaping in the 2 µm Spectral Window

Hamamatsu Photonics has developed a new product that addresses the growing need for precise beam-shaping solutions in the 1850-2050 nm spectral range: the <u>LCOS-SLM X15213-19</u>^[1]. This Liquid Crystal on Silicon Spatial Light Modulator (LCOS-SLM) is engineered to meet the demands of advanced laser applications, offering a new level of control and efficiency.

Optimized for Thulium lasers

The development of the LCOS-SLM X15213-19 was motivated by the increasing use of Thulium fiber lasers, which are valued for their high beam quality and compact design. Operating within the same spectral window, this LCOS-SLM is optimized to interact seamlessly with Thulium lasers, making it highly effective for applications that require precise beam shaping.

Applications in material processing and medical technology

One of the key applications of the LCOS-SLM X15213-19 is in material processing. The ability to actively shape laser beams enhances processing efficiency by enabling simultaneous multi-point operations. This capability can significantly improve throughput in manufacturing processes.

In the field of medical technology, particularly in laser surgery, beam shaping offers substantial benefits. For instance, its application in ophthalmic surgery with lasers operating around 1050 nm has enhanced patient outcomes by improving the precision of laser treatments and reducing operating times. Similarly, Thulium and Holmium lasers, used in other types of surgical procedures, can also benefit from the beam-shaping capabilities of the LCOS-SLM X15223-19L/R.

LCOS-SLM technical overview

HEAD SIDE

The LCOS-SLM X15223-19L/R is built on a sophisticated liquid crystal layer controlled by a 2D array of 1272 x 1024 pixels. Each pixel independently modulates the phase of light reflecting from its position by manipulating the orientation of liquid crystals above it. As a result, complex 3D beam shapes can be formed using digital signals to the LCOS-SLM. The device can be further optimized for a specific spectral window in several ways. For example, high reflectivity coatings are used for the target spectral window to improve light utilization efficiency and to reduce residual heat generated in the LCOS.

The phase retardation induced by liquid crystals for the given spectral window is calibrated for the user's convenience, making it an ideal tool for researchers and engineers working with high-quality laser systems in this domain.

A step forward in beam shaping technology

Hamamatsu's LCOS-SLM X15213-19 represents a significant advancement in beam-shaping technology for the 2 µm spectral region. By providing enhanced control over laser beam profiles, this device opens up new possibilities in both industrial and medical applications.

To learn more about LCOS-SLM: info@hamamatsu.eu

⁽¹⁾ LCOS-SLM (Optical Phase Modulator) X15213-19 | Hamamatsu Photonics, 2024: <u>www.hamamatsu.com/eu/en/product/optical-components/</u> <u>lcos-slm/specific_wavelength_type/X15213-19.html</u>

We also offer a lower-cost OEM version of this LCOS-SLM: the X15223-19. Please contact us for more details.