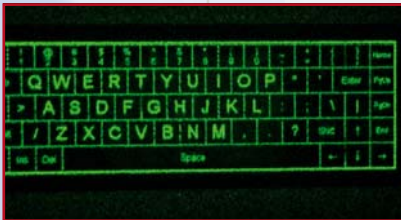


# PLUTO

## >> New PLUTO-NIR-2 Modulator



### PLUTO - Phase Only Spatial Light Modulator Series

The PLUTO phase modulator models are based on reflective LCOS microdisplays with 1920 x 1080 pixel resolution. The PLUTO devices are packaged in a very small housing to ensure an easy integration into optical setups and applications. The PLUTO phase modulator series now includes 4 versions, optimized for the visible, the near infrared around 1064 nm, a version optimized for typical telecommunication wavelengths around 1550 nm and a new version for a broad wavelength band centered at 850nm.

### New PLUTO-NIR-2 Version

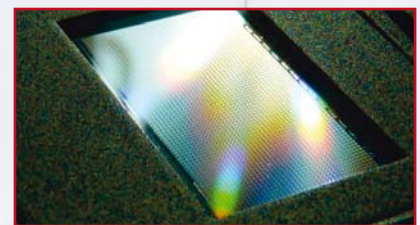
HOLOEYE developed a new version of its HD phase only display that assures good working conditions in the near infrared around 850 nm and in the lower visible. The PLUTO-NIR-2 shows optimized performance especially in the 750 - 950 nm area. Efficiency was optimized and disturbing interferences were reduced. This wavelength range is of great interest in the field of fs-Laser applications as well as biophotonics. The new display version will enhance performance for such applications.



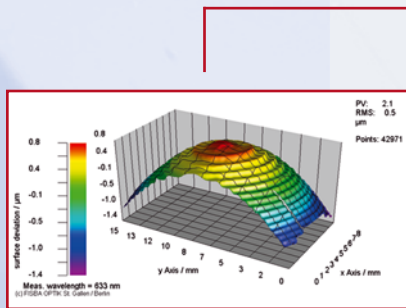
### PLUTO - Optimized for Different Wavelengths Bands

HOLOEYE provides 4 versions of the PLUTO modulator:

- **PLUTO-VIS:** This version is optimized for the visible because of a broadband AR (anti reflection) coating for this spectral range.
- **PLUTO-NIR:** This version is optimized for the near infrared around 1064 nm because of an AR coating for 1064 nm and a thicker LC layer.
- **PLUTO-NIR-2:** This version is usable for a broad wavelength band around 850 nm and in the lower visible.
- **PLUTO-TELCO:** This version is optimized for common telecommunication wavelengths ranges around 1550 nm.



**Pioneers in Photonic Technology**



### Applications

- + Phase Shift Applications
- + Holographic Applications
- + Lithography
- + Optical Metrology - Interferometry
- + Optical Networking Applications
- + Holographic Security Systems
- + Wave Front Correction
- + Interferometry
- + Optical Tweezers
- + Pulse Shaping

### PLUTO – Comprehensive software package to tailor the device performance

The PLUTO devices are highly programmable and come with a driver software to control all settings and relevant image parameters. The software provides a very easy gamma control to configure the modulator for different applications which is a comfortable tool to tailor the performance of the device to the desired result. Besides geometry and gamma corrections different sequences can also be addressed to the drive board. In addition, tailored SLM application software allows easy generation of diverse dynamic optical functions like gratings, lenses, axicons and apertures, as well as the calculation of diffractive optical elements (DOE) based on user defined images.

### New Software Features

The PLUTO Spatial Light Modulator kits are now delivered with an extended software package. A software for real-time live hologram calculation which is processed directly at an NVIDIA™ graphics card GPU is now included. This can be a helpful tool for optical tweezer or holographic projection applications.

A LabView SubVi for enhanced addressing of optical functions was also added which can be implemented in a user defined LabView program for e.g. closed loop applications.

In addition some new configuration files for stabilized addressing and more accurate adaptation of the SLM for various applications were added.

### PLUTO-NIR-2 Broad Wavelength Operation

Even though the PLUTO-NIR-2 is optimized for a broad wavelength range centered at 850 nm, also operation at 405 nm with exceptional high phase shift is possible. This could be interesting for e.g. maskless lithography, aberration correction and beam shaping applications.

The adaptation of the high phase shift to a linear  $2\pi$  phase response at 256 phase levels can be done by straight forward gamma correction using the supplied calibration software.

$\lambda$	Average Reflectivity	Maximum Phase Shift	Addressable Phase Levels
405nm	59 %	$7.7\pi$	256
543nm	58 %	$4.9\pi$	
633nm	60 %	$3.7\pi$	
850nm	62 %	$2.7\pi$	
1064nm	63 %	$2.0\pi$	

Display Type	Resolution	Pixel Pitch	Fill Factor	Addressing	Frame Rate	Signal Format
Reflective LCoS	1920 x 1080 Pixel	8.0 $\mu\text{m}$	87 %	8 Bit	60 Hz	DVI - HDTV Res.



**Pioneers in Photonic Technology**

**HOLOEYE Photonics AG**  
 Albert-Einstein-Str. 14  
 12489 Berlin, Germany  
 Phone +49 (0)30 63 92 36 60  
 Fax +49 (0)30 63 92 36 62  
 contact@holoeye.com  
 www.holoeye.com