

Laserové centrum HiLASE Vás zve na seminář

Volume Holographic Elements for Spectroscopy and High-Power Laser Applications

Leonid Glebov^{1,2}

¹⁾*CREOL, The College of Optics and Photonics, University of Central Florida, USA*

²⁾*OptiGrate Corp., Oviedo, Florida, USA*

This presentation summarizes the results of volume holographic elements development for spectroscopy and high power laser applications that were performed by research teams Photoinduced Processing Laboratory at CREOL/UCF and OptiGrate. The main types of holographic optical elements recorded in photo-thermo-refractive (PTR) glass are described: reflecting and transmitting volume Bragg gratings (VBGs), longitudinal and transverse chirped Bragg gratings (CBGs), tunable and achromatic holographic phase masks (HPMs), and distributed Bragg reflector (DBR) and distributed feedback (DFB) monolithic solid state lasers. No optical bleaching of holograms in PTR glass was detected for any type of CW or pulsed laser radiation. The main effects caused by high power CW radiation are shift of Bragg wavelength and induced lensing caused by thermal expansion of PTR glass resulted from absorption of laser radiation. The methods of heat management enabling operations at multikilowatt CW regimes are described. Bulk laser damage by pulsed laser radiation is caused by absorbing micro-inclusions that are byproducts of PTR glass fabrication and self-focusing. Nonlinear refractive index for PTR glass is the same as for fused silica. Exposure of PTR holographic optical elements to extremely high power femtosecond pulses results in self-phase modulation and supercontinuum generation. Examples of the use of PTR holographic optical elements in high power laser systems are presented. Limitations of the use of PTR holographic optical elements in high power pulsed laser systems are given.

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v přednáškové místnosti laserového centra HiLASE

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