

Depolarization compensator

COMPENSATES DEPOLARIZATION IN THE GAIN MEDIUM

ADVANTAGES VS. ALTERNATIVES

- No absorption
- Very low scattering
- Custom and continuous point-by-point patterns
- Maximum power extraction possibility without additional beam quality degradation
- Flexibility to compensate different amounts of depolarization by stacking more than one element
- Saves space, is easy to handle
- Significantly lower price



Depolarization in the gain medium

Thermal effects in a high-power laser's gain medium create predictable axially symmetric temperature gradients.

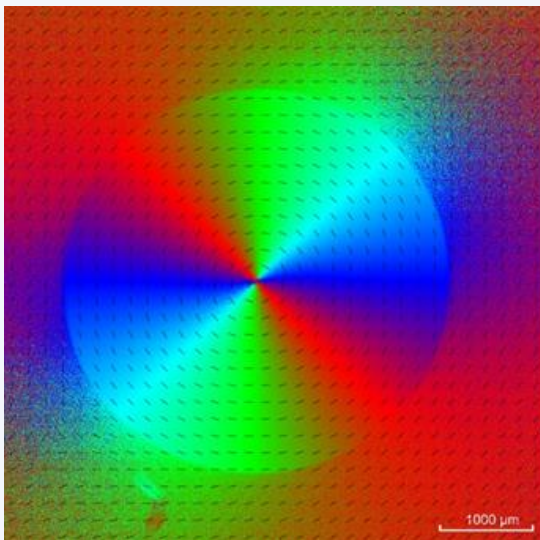
Temperature gradients generate mechanical stresses in pumped crystal, which lead to induced birefringence.

Generated optical anisotropy causes significant power losses if a laser system contains polarization-sensitive elements (e. g. Brewster plates, Faraday rotators).¹

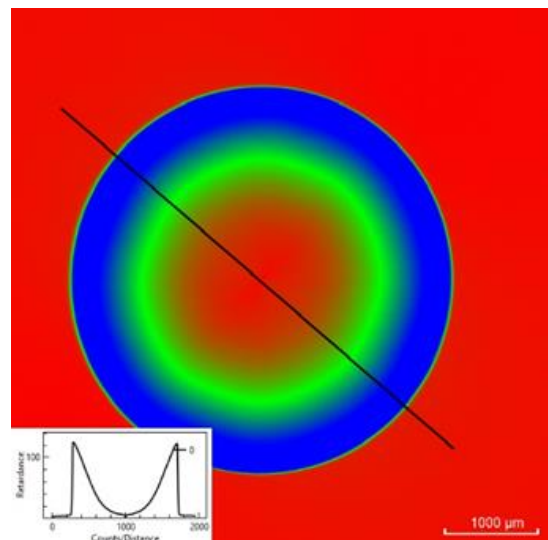
WOP solution – depolarization compensator

Workshop of Photonics | WOP, in a joint effort with Ekspla Ltd., based on Ekspla Ltd invention EP3712664 (A1)², developed and verified a solution to solve the depolarization issue - an optical element that compensates distortion of original polarization in the gain medium.

Due to the unique properties of precisely point-by-point inscribed nano-gratings, the depolarization compensator is flexible and versatile, and it can be widely adjusted according to customer needs.



Two-dimensional distribution map of orientation of fast and slow axes.



Retardance profile.

¹ Veselis, L., Burokas, R., Ulčinas, O., Gertus, T., Michailovas, K., & Michailovas, A. (2021). Depolarization compensation with a spatially variable wave plate in a 116 W, 441 fs, 1 MHz Yb: YAG double-pass laser amplifier. *Applied Optics*, 60(24), 7164-7171.

² Michailovas Andrejus, Depolarization Compensator, EP3712664 (A1), 2019 03 20