

Intensity Redistribution System for Clarifi™

We have created a wavefront intensity redistribution system that uses one AgilOptics Multi™ deformable mirror and our wavefront aberrations removal product, Clarifi™. The two components work together to redistribute a Gaussian wavefront and remove lower order Zernike aberrations. Preliminary tests show effective and useful results. Major factors limiting the system are optical path length and mirror frequency response. Deformable mirror membranes are limited to a maximum throw of 10µm. This throw limitation dictates optical path length with the focusing ability of the mirror. Secondly, the mirror responds well to a drive frequency of 1000Hz or less. Drive frequencies greater than 1000Hz do not allow the mirror sufficient relax time. A major advantage of IRC is the real-time execution of wavefront distribution and correction. Unwanted aberrations in the wavefront that may arise over the course of operation are also reconditioned in real time. Our system is significantly less complicated in design and concept of operation when compared to its passive element system counterparts.

The intensity profile of a laser is changed with an AgilOptics Multi™ DM. The redistributed laser is then run into a Clarifi™ system, where the beam is conditioned by removing low order Zernike term aberrations. Below are preliminary tests that show before and after irradiance images of a beam, which was not conditioned with the Clarifi™ system.

Gaussian to Flattop and Annulus

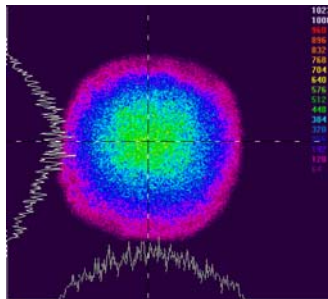


Figure 1: A HeNe laser produces a Gaussian like beam. This is the beam incident on an Intellite Multi™ DM.

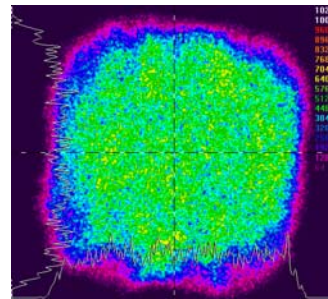


Figure 2: Intensity profile has been changed to resemble a flattop. Note: The wavefront has not been modified by Clarifi™.

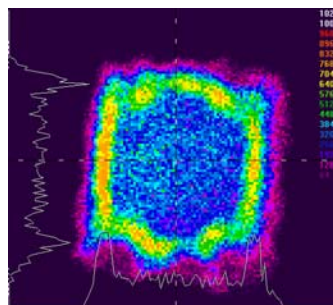


Figure 3: Intensity profile has been changed to resemble an annulus.