

OKO[®] Tech introduces 109-ch low-cost piezoelectric deformable mirror.

Delft, The Netherlands, - October 5, 2006 - Flexible Optical B.V. (aka OKO[®] Tech) today announces introduction of a novel low-cost piezoelectric deformable mirror with 109 actuators.

The mirror, shown in Fig. 1, has 53 mm clear aperture. The package is measured 100x100x60 mm and the mirror weight is approximately 650 g. The mirror is driven by three 40-ch HV amplifier units, controlled from a computer USB port via three 40-ch 12-bit USB DAC modules. The mirror is supplied with SDK for Windows. Complete closed-loop adaptive optical systems including the 109ch deformable mirror and FrontSurfer wavefront sensor are also available.

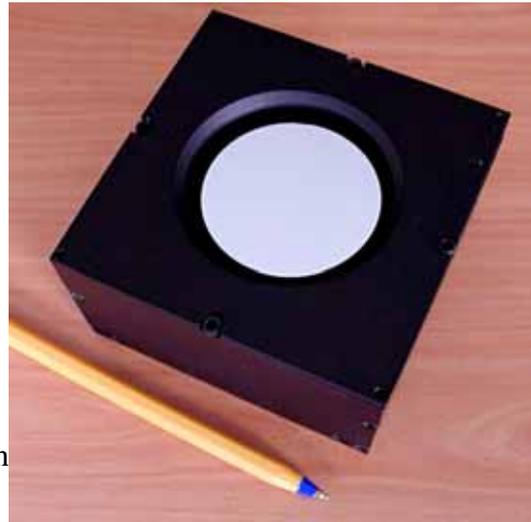


Fig. 1. 109ch 50mm piezoelectric DM

The mirror figure is controlled by 109 piezoelectric actuators positioned in an orthogonal grid with pitch of 4.3 mm. Free actuator stroke is approximately 7 μm , the stroke difference between the neighbor actuators reaches 1.5 μm . Higher inter-actuator stroke is available on special order. The initial mirror figure is slightly spherical with ROC larger than 30 m. *RMS* deviation from the initial reference sphere does not exceed 0.5 μm . Actuator hysteresis is better than 10%. The mirror can be actively flattened with respect to the initial sphere with a *RMS* error of better than $\lambda/20$. An example of the mirror correction performance is shown in Fig. 2 and 3. The first live interferogram corresponds to an aberrated wavefront with *RMS* error exceeding 1 μm , with strong contribution of astigmatism and higher-order terms. The second interferogram (Fig. 3) shows the flattened wavefront with *RMS* error not exceeding $\lambda/12$. Figures 4 to 6 show the mirror performance in forming different low-order aberrations.

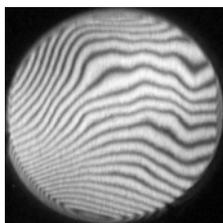


Fig.2. Aberrated

RMS=1.12 μm

P-V=7.12 μm

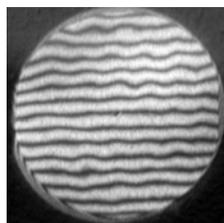


Fig.3. Corrected

RMS=0.04 μm

P-V=0.32 μm



Fig. 4. Astigmatism

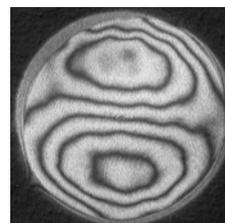


Fig. 5. Coma

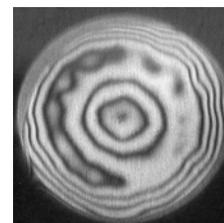


Fig. 6. Spherical aberration

The 109-ch 50 mm piezoelectric OKO mirror is suitable for fast correction of large high-order aberrations in vision and ophthalmic systems, laser systems and medium-size telescopes. The mirror can be coated with metal, metal-dielectric and multilayer dielectric coatings for high reflectivity. The mirror surface is robust and can be cleaned using a standard “pull-off” procedure.