



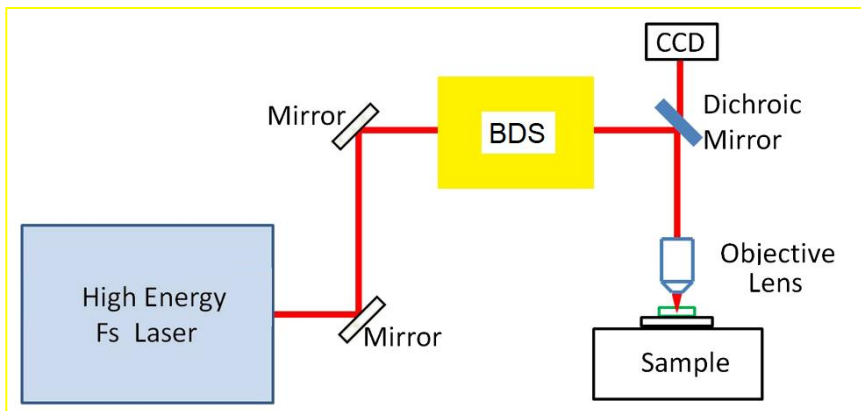
Optical systems for beam delivery and beam shaping

May 25th, 2020

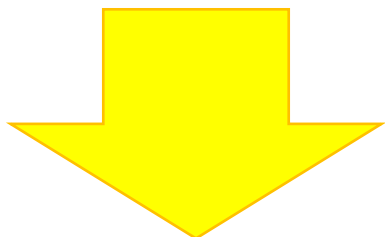
EPIC Online Technology Meeting on Laser Beam and Pulse Shaping

Tadas Lipinskas





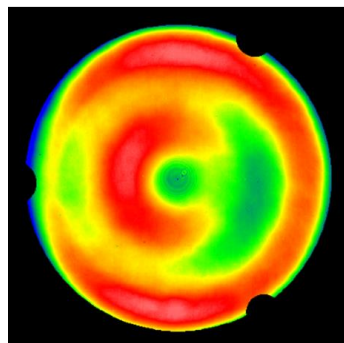
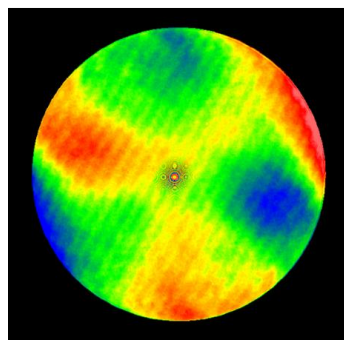
Femtosecond laser micro-processing setup example



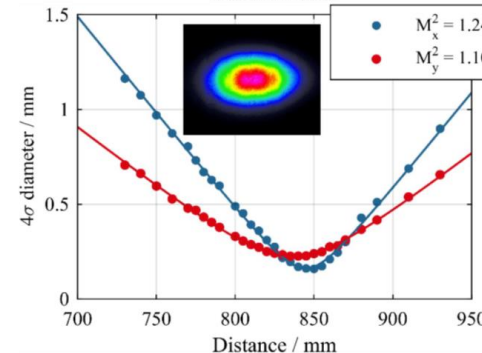
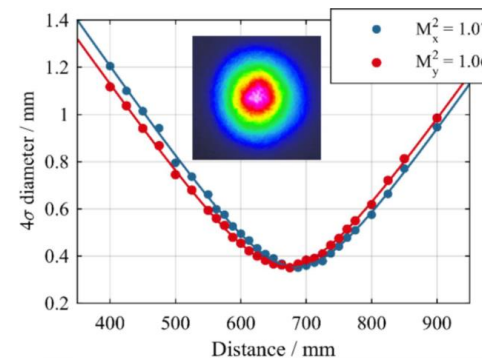
- Diameter**
- Divergence**
- Intensity distribution**
- Polarization control**
- Beam shaping**
- Laser power control**
- Etc.**



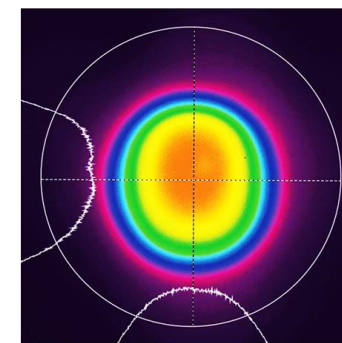
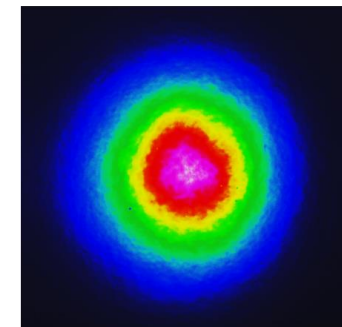
Complicated integration
Beam pointing stability during operation
Beam shaping during processing
 Fully automated laser beam control
High LIDT & no internal ghosts



Wavefront error ?



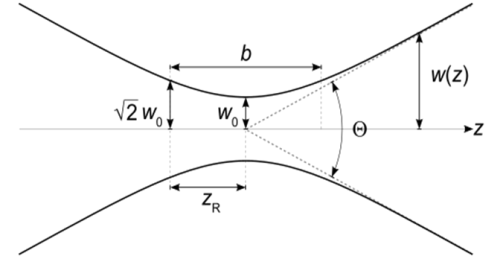
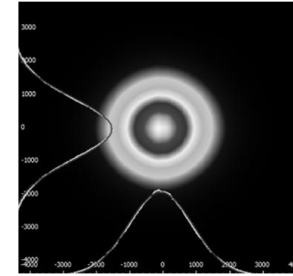
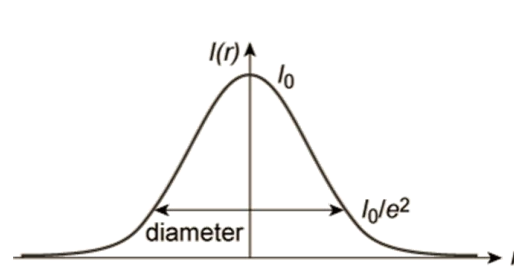
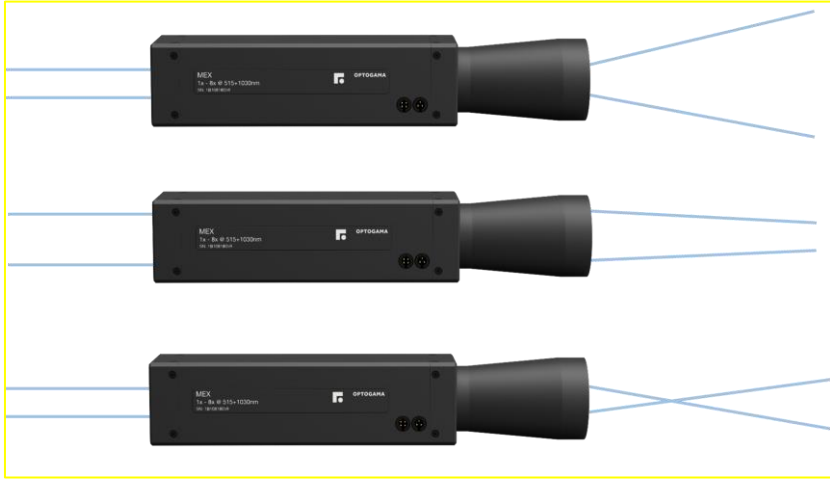
Astigmatism or beam quality ?



Intensity distribution ?

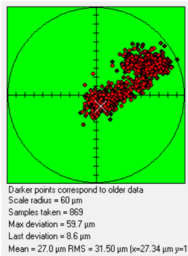


simple – robust – reliable – dedicated for your application / integration



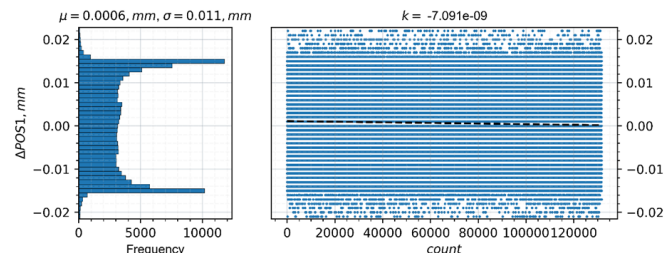
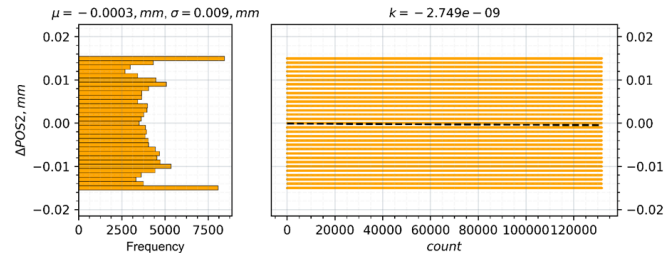
Conical optics - aspherics – multifocal – beam/polarization wobbling etc.

Pointing stability – 0.1 mrad

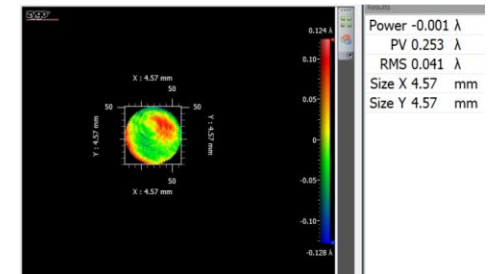
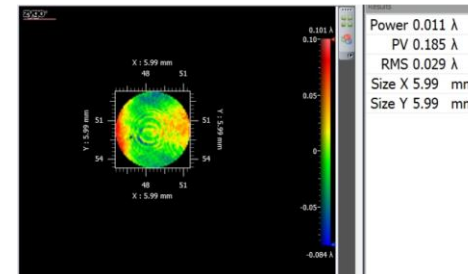
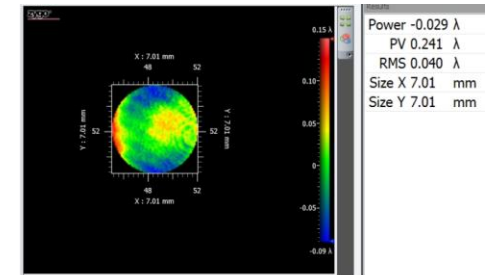
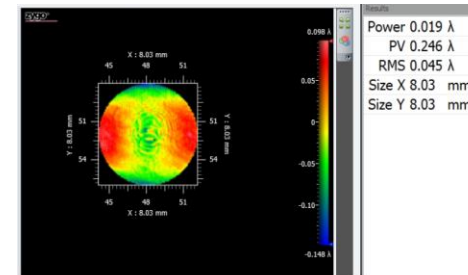
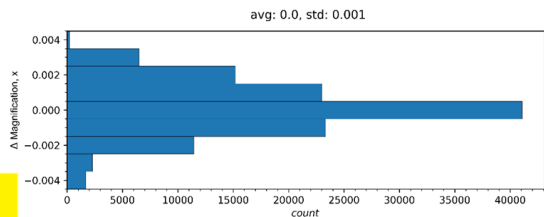


MEX beam wander after 0.6 meters. Measured during lens movement with 0.2 magnification step for at least 20 cycles

Lens position accuracy – ±0.020 mm



Magnification repeatability – ±0.005 X





Laser beam delivery and beam shaping devices



Compact motorized laser beam expanders MEX



High-power motorized beam expanders MEX-HP



Motorized laser power attenuators LPA



Variable beam expanders VEX and reducers VRE



Advanced laser power attenuators LPA-A



Manual laser power attenuators LPA-M



Beam delivery systems BDS



Fixed ratio laser beam expanders FEX