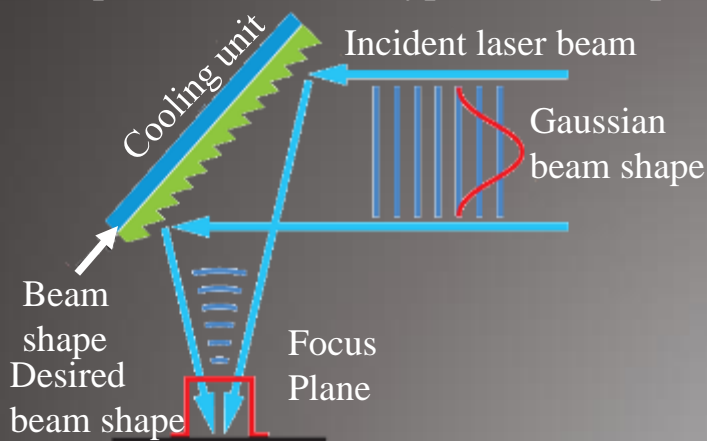


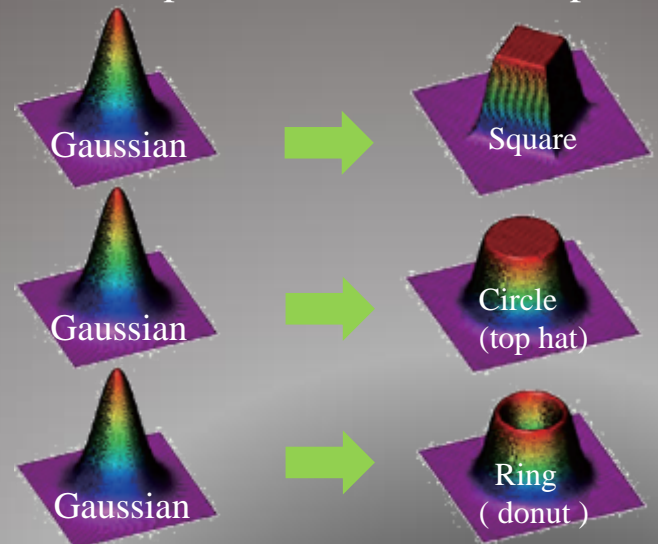
Reflection type DOEs (Diffractive Optical Element)

NTT-AT provides custom-made beam shaper for laser machining (cutting, ablation, drilling, welding, 3D printing, Laser marking, Annealing and etc.) The beam shaper can transform the Gaussian beam to various arbitrarily beam shape. Direct cooling system allows NTT-AT's reflection type beam shaper used with the high power laser (Conventional beam shaper may face the deformation due to the heat generated by the high power laser)

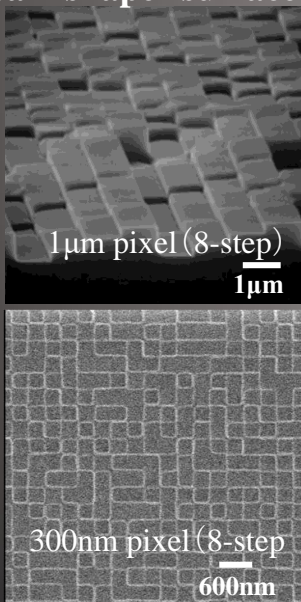
Principal of Reflection type Beam Shaping



Example of various beam shape



SEM micrograph of the beam shaper surface



Spec. Example

Item	Specifications
Intensity Distribution Shape	Gaussian → Square (Top hat)
Wavelength	1064 nm
Laser Power	~10 kW*
Incident Beam Diameter	30 mmφ
Incident angle	45°
Cooling Wafer : approx. 1L/min	300 W
Size	40 mm x 40 mm x 0.5 mm
Material	Si, SiC
Light Collection Efficiency	Without lens : 70% With lens : over 95%

(1) The above spec. is typical example.
(2) Customized parameters are available.