

2022 年 1 月

一、

1. 已知某激光器输出的激光束为高斯光束，其束腰半径 $w_0 = 1 \text{ cm}$ ，束腰位置位于激光器输出镜处。该激光束在传播过程中经过一个焦距 $f = 2 \text{ m}$ 的薄透镜，并在透镜后 1 m 处会聚成一个新的束腰。求该会聚束腰的半径 w_0' 及位置（相对于透镜的距离）。

解：根据高斯光束的成像公式，有
$$\frac{1}{R'} = \frac{1}{R} - \frac{1}{f}$$
 其中 R 为入射光束在透镜处的波前曲率半径， R' 为出射光束在透镜后的波前曲率半径。对于入射高斯光束，在束腰处 $R \rightarrow \infty$ ，因此 $\frac{1}{R} = 0$ 。代入上式得 $\frac{1}{R'} = -\frac{1}{f}$ ，即 $R' = -f = -2 \text{ m}$ 。

根据高斯光束的成像公式，有
$$\frac{1}{q'} = \frac{1}{q} - \frac{1}{f}$$
 其中 q 为入射光束在透镜处的复波数， q' 为出射光束在透镜后的复波数。对于入射高斯光束，在束腰处 $q = i z_R$ ，其中 $z_R = \frac{\pi w_0^2}{\lambda}$ 为瑞利长度。代入上式得 $\frac{1}{q'} = \frac{1}{i z_R} - \frac{1}{f}$ 。

出射光束在透镜后的束腰位置 z_0' 满足 $q' = i z_0'$ ，因此
$$\frac{1}{i z_0'} = \frac{1}{i z_R} - \frac{1}{f}$$
 解得
$$z_0' = \frac{f z_R}{z_R + i f}$$
 代入 $z_R = \frac{\pi w_0^2}{\lambda}$ 得
$$z_0' = \frac{f \pi w_0^2}{\pi w_0^2 + i \lambda f}$$
 由上式可得会聚束腰的半径 w_0' 及位置 z_0' 。

二、

- (1) 已知某激光器输出的激光束为高斯光束，其束腰半径 $w_0 = 1 \text{ cm}$ ，束腰位置位于激光器输出镜处。该激光束在传播过程中经过一个焦距 $f = 2 \text{ m}$ 的薄透镜，并在透镜后 1 m 处会聚成一个新的束腰。求该会聚束腰的半径 w_0' 及位置（相对于透镜的距离）。
- (2) 30 J / cm^2 的脉冲激光束，其脉宽为 10 ns 。
- (3) 已知某激光器输出的激光束为高斯光束，其束腰半径 $w_0 = 1 \text{ cm}$ ，束腰位置位于激光器输出镜处。该激光束在传播过程中经过一个焦距 $f = 2 \text{ m}$ 的薄透镜，并在透镜后 1 m 处会聚成一个新的束腰。求该会聚束腰的半径 w_0' 及位置（相对于透镜的距离）。
- (4) 已知某激光器输出的激光束为高斯光束，其束腰半径 $w_0 = 1 \text{ cm}$ ，束腰位置位于激光器输出镜处。该激光束在传播过程中经过一个焦距 $f = 2 \text{ m}$ 的薄透镜，并在透镜后 1 m 处会聚成一个新的束腰。求该会聚束腰的半径 w_0' 及位置（相对于透镜的距离）。
- (5) $\lambda = 5 \mu\text{m}$



Optical components and optical system for post objective scanning system

Dynamic scanning optical system optics: 1pc small focus lens、 1-2pcs focus lens、 Galvo mirror. The entire optical lens forms a function of beam expansion, focusing and beam deflection and scanning. The expanding part is a negative lens, ie small focus lens, which realizes beam expansion and moving zoom, the focusing lens is composed of a group of positive lenses. The galvo mirror is mirror in the galvanometer system.



CO2 Post-Objective Lens

Max Entrance Pupil (mm)	Optics 1 Diameter(mm)	Optics 2 Diameter(mm)	Optics 3 Diameter(mm)	Scan Field (mm)	Clear Aperture of Scanner (mm)
8	15	55	55	600x600 800x800	30
12	22	55	55	1600x1600	30

1030-1090nm Post-Objective Lens

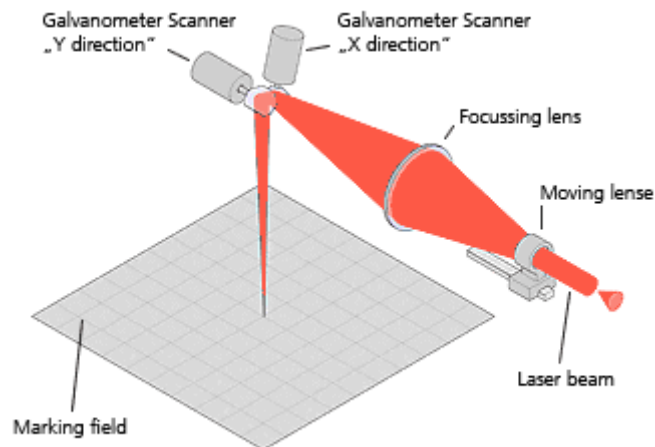
Max Entrance Pupil (mm)	Optics 1 Diameter(mm)	Optics 2 Diameter(mm)	Optics 3 Diameter(mm)	Scan Field (mm)	Clear Aperture of Scanner (mm)
8	16	55	55	600x600 800x800	30

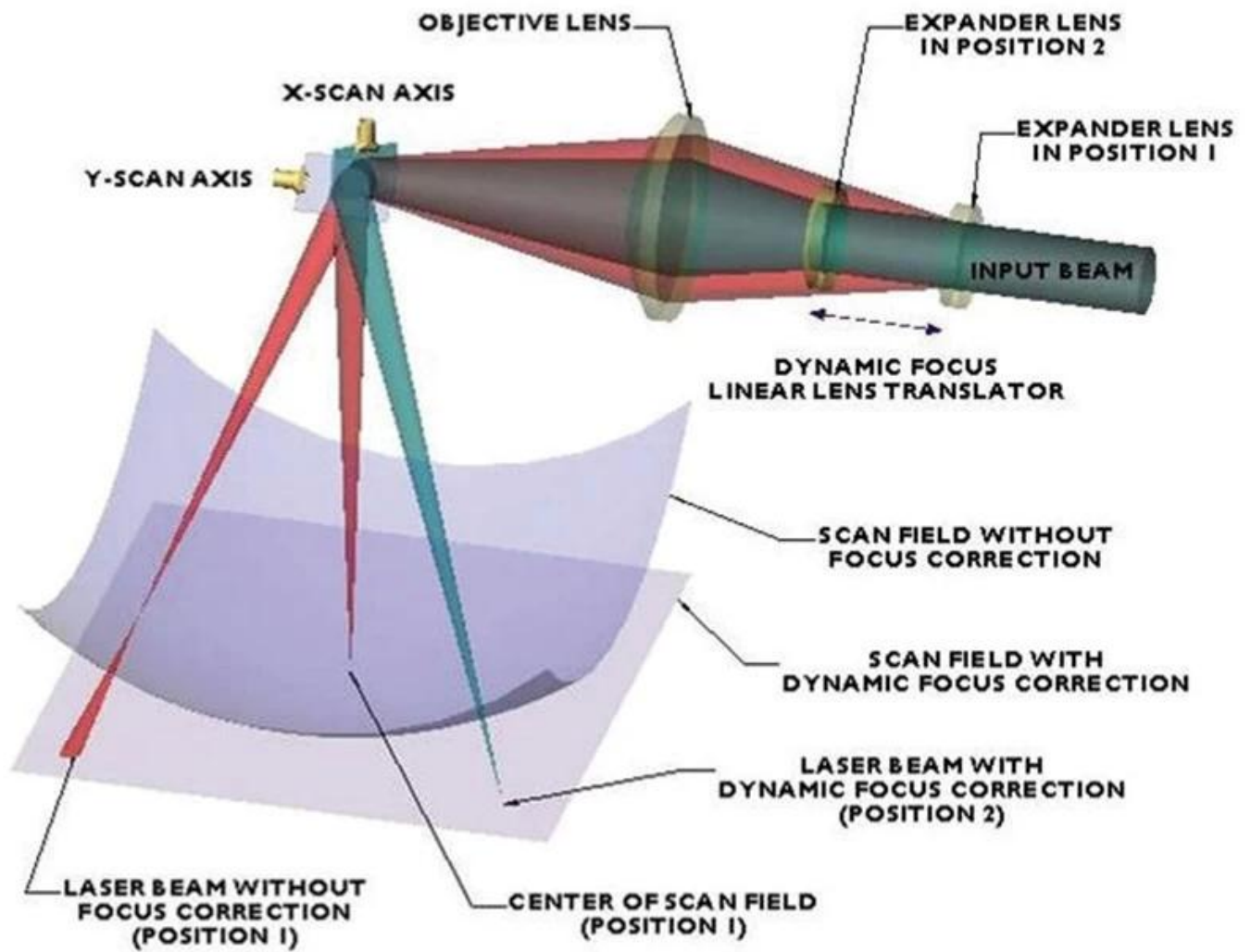
532nm Post-Objective Lens

Max Entrance Pupil (mm)	Optics 1 Diameter(mm)	Optics 2 Diameter(mm)	Optics 3 Diameter(mm)	Scan Field (mm)	Clear Aperture of Scanner (mm)
8	15	35	35	300x300	10

355nm Post-Objective Lens

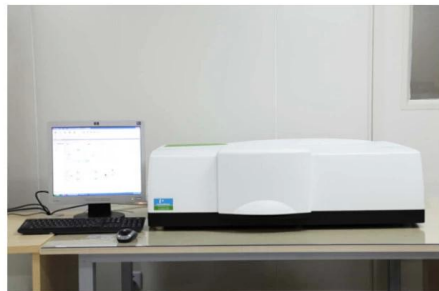
Max Entrance Pupil (mm)	Optics 1 Diameter(mm)	Optics 2 Diameter(mm)	Optics 3 Diameter(mm)	Scan Field (mm)	Clear Aperture of Scanner (mm)
8	15	35	35	300x300	10







TRIOPTICS OptiSpheric 2000 AF
---Testing EFL, R, Centering Error, Wedge Angle, BFL, MTF



PerkinElmer Lambda 950---Testing Transmission and Reflectivity



Carmanhaas Coating Machine



Packaging & Shipping

Packaging 1



Packaging 2



Packaging 3



Shipping 4



Lens Cleaning

1. For light pollution (dust, fiber particles) were flexible cleaning.

Using a blowing balloon, Blow off scattered contaminants on the surface of the optical element.



2. For light pollution (stains, fingerprints) were flexible cleaning.

Propanol, acetone glue with a cotton swab or alcohol to gently wipe the surface.



3. For moderately polluted (saliva, oil) in moderate-intensity cleaning.

Infiltrating distilled white vinegar with a cotton swab, wipe the surface a little pressure.



QUESTION: (in red)

- :QUESTION
- QUESTION (1 QUESTION)
- QUESTION (2 QUESTION)
- QUESTION (3 QUESTION)
- QUESTION (4 QUESTION)

QUESTION: (in red)

QUESTION

QUESTION Exwork | FOB | CNF | CIF



QUESTION

A1: QUESTION

Q2.How QUESTION

QUESTION :2

QUESTION .3

A3: QUESTION

QUESTION .4

A4: QUESTION

QUESTION .5

QUESTION :5

QUESTION .6

A6: QUESTION

QUESTION .7

A7: QUESTION OEM / ODMers. QUESTION

QUESTION .8

A8: 0000 00 00000 00000 T / T 000 000 00000000 0000 0000000 00000 000000 000000.