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2006/8/6:
2007/12/5:

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Nd-YAG

(55) (1) (1.064)
(1.248)

encircled energy, spot size
modulation transfer point spread function,
optical path difference function
chromatic focal shift

55

Abstract:

An optical system has been designed with spherical lenses to focus high power (~ kJ), Nd-YAG laser (1.06) μ m with 55mm beam diameter to spot size diameter (1.248 μ m). Minimum number and thin lenses were used in the design. The spot diagram, the point spread function (PSF), and accumulated energy, were used as parameters to qualify the performance of the system.

The results show the high quality of the system for laser diameter less 55mm and the a spherical lenses are necessary for larger diameters.

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(Nd-YAG)

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(1.064)

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(1.06)

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100

55

, [1,2,3]

1

(RD)

.

ZEMAX

(Cv)

[4]

.

ZEMAX

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-1

.

-2

.

dispersion

-3

()
(11-3)
(BK7)

[5]

(optimization)

(5 , 4 ,3, 2)

(4, 3 , 2)

()

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(1)

(1.248)

(2)

(3)

(4)

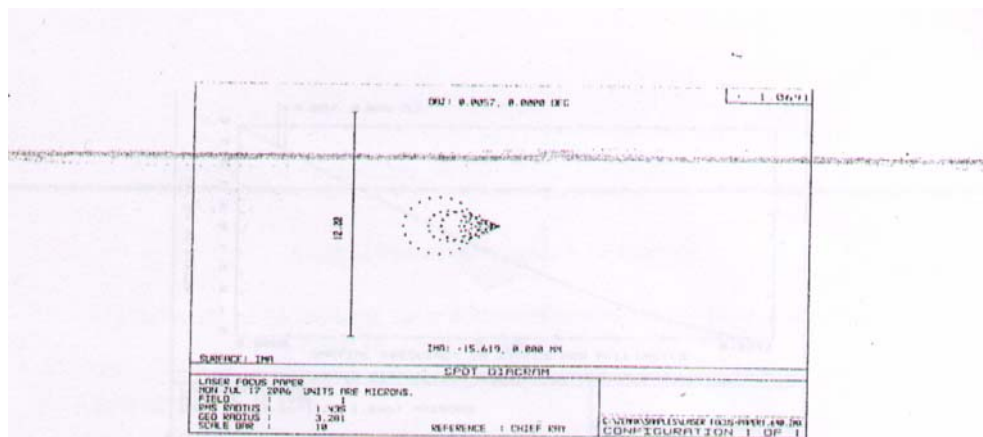
(5)

spherical aberration

(6)

26

BK7



Figure(1) Spot Diagram.

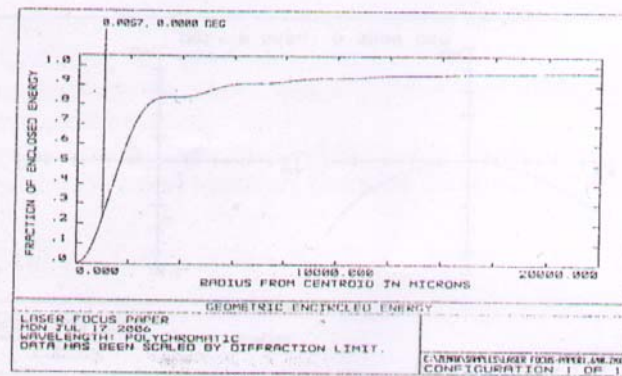
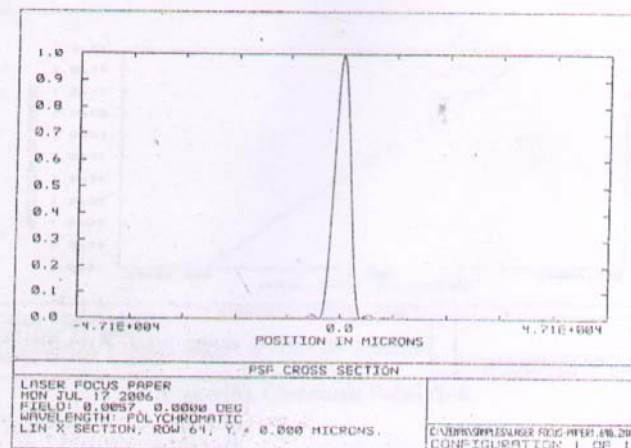
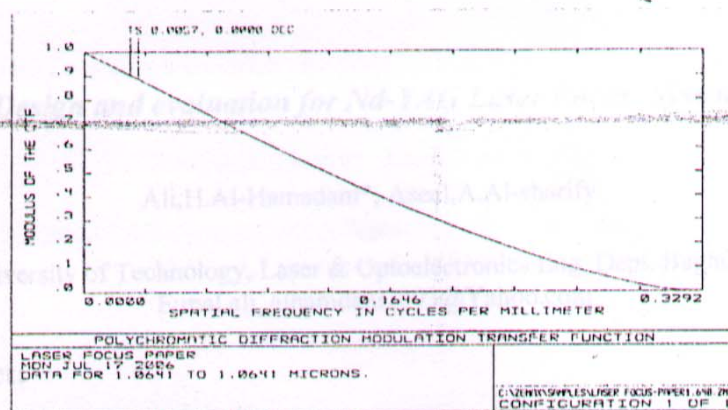


Figure (2), Accumulated energy



Figure(3), The point spread function



Figure(4), Modulation Transfer Function

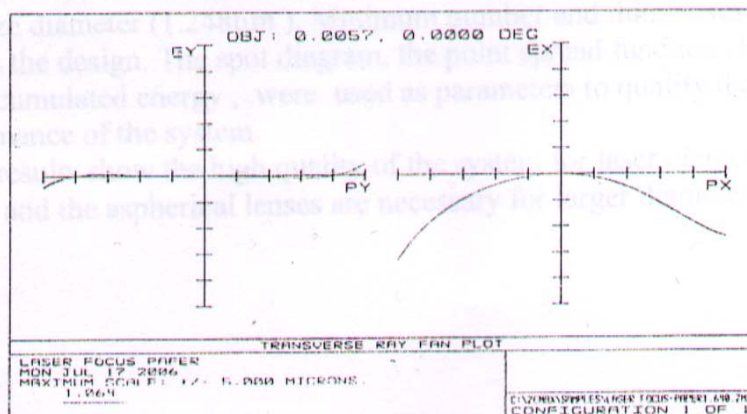
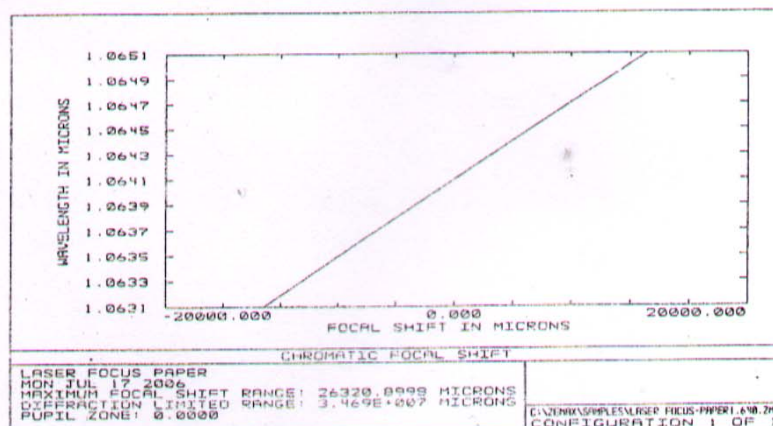


Figure (5), Transverse Ray Fan Plot.



Figure(6), Chromatic Focal shift.

(1)

<i>Surface N0.</i>	<i>type</i>	<i>Radius mm</i>	<i>Thickness mm</i>	<i>Glass</i>	<i>Diameter mm</i>
<i>Object</i>	<i>standard</i>	∞	∞	<i>air</i>	
<i>Stop surface</i>	<i>standard</i>	∞	<i>0</i>	<i>air</i>	<i>55</i>
<i>surface2</i>	<i>standard</i>	<i>286.892</i>	<i>11</i>	<i>BK7</i>	<i>54.00026</i>
<i>surface3</i>	<i>standard</i>	<i>283.545</i>	<i>3.53</i>	<i>air</i>	<i>54.29008</i>
<i>surface4</i>	<i>standard</i>	<i>288.581</i>	<i>8.98</i>	<i>BK7</i>	<i>54.29932</i>
<i>surface5</i>	<i>standard</i>	<i>283.873</i>	<i>153391.7</i>	<i>air</i>	<i>53.73693</i>
<i>image</i>	<i>standard</i>	<i>0</i>	∞	<i>air</i>	<i>31.24455</i>

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