Zemax 2003 中步骤：

Anaylsis-calculations-gaussian beam 中计算高斯光束传输（快捷键 ctrl +B）

Gaussian beam data-setting 中初始高斯光束

参数设置：

M2：光束的模式，为大于 1 的整数，1 为单基模，大于 1 为多模。
Surf 1 to Waist：1 面距离束腰的距离，因此一般做法是在物面和光学组前插一个 1 面，将束腰“放在”1 面上。
Divergence：远场发散角。
Radius：光波的半径，束腰处无穷大。
Rayleigh：瑞利长度，这三个随便一本激光原理的书里都有。

目前我的一个认识：高斯光束计算在 zemax 2003 中可以也只能计算束腰尺寸，位置，远场发散角等，欢迎大家相互交流。Email: boooq@yahoo.cn
by hust—booq 2008-1-26
PS：没有时间翻译，在这里把 Zemax 里所有有关资料汇总一下，给出一个简单案例。
-=-=-=-=--=-=-=-=-=--=-=-=-=-=--=-=-=-=-=--=-=-=-=-=--=-=-=-=-=-

高斯光束 Zemax 介绍

Computes Gaussian beam parameters.
Wavelength: The wavelength number to use for the calculation.
M2 Factor: The M2 quality factor used to simulate mixed mode beams. See the Discussion.
Waist Size: The radial size of the embedded (perfect TEM00 mode) beam waist in object space in lens units.
Surf 1 to Waist: The distance from surface 1 (NOT the object surface) to the beam waist location. This parameter will be negative if the waist lies to the left of surface 1.
Update, Orient, Surface: See below.

Discussion: This feature computes ideal and aberrated Gaussian beam data, such as beam size, beam divergence, and waist locations, as a given input beam propagates through the lens system. This discussion is not meant to be a complete tutorial on laser beam propagation theory. For more information on Gaussian beam propagation, see one of the following references: "Lasers", A. E. Siegman, University Science Books (1986), "Gaussian beam ray-equivalent modeling and optical design", R. Herloski, S. Marshall, and R. Antos, Applied Optics Vol. 22, No. 8 pp. 1168 (1983), "Beam characterization and measurement of propagation attributes", M. W. Sasnett and T. F. Johnson, Jr., Proc. SPIE Vol. 1414, pp 21 (1991), and "New developments in laser resonators", A. E. Siegman, Proc. SPIE Vol. 1224, pp 2 (1990).

A Gaussian laser beam is described by a beam waist size, a wavelength, and a location in object space. The Gaussian beam is an idealization that can be approached but never attained in practice. However, real laser beams can be well described by an embedded Gaussian beam with ideal characteristics, and a quality factor, called M2, which defines the relative beam size and divergence with respect to the

embedded Gaussian mode. The ideal M2 value is unity, but real lasers will always have an M2 value greater than unity.

This feature requires the definition of the initial input embedded beam properties, and the M2 value. The input embedded beam is defined by the location of the input beam waist relative to surface 1 (note this is not the object surface, but the first surface after the object) and the waist radial size at this location. ZEMAX then propagates this embedded beam through the lens system, and at each surface the beam data is computed and displayed in the output window. ZEMAX computes the Gaussian beam parameters for both X and Y orientations.

Default beam parameters:
ZEMAX defaults to a waist size of 0.05 lens units (no matter what the lens units are) and a surface 1 to waist distance of zero; this of course means the waist is at surface 1. The default values may be reset by clicking on the "Reset" button. After the default values are computed and displayed, any alternate beam waist size and location may be entered and that Gaussian beam will be traced instead.
Propagating the embedded beam:
Once the initial beam waist and location parameters are established, ZEMAX traces the embedded beam through the system and computes the radial beam size, the narrowest radial waist, the surface coordinate relative to the beam waist, the phase radius of curvature of the beam, the semi-divergence angle, and the Rayleigh range for every surface in the system. ZEMAX calls these parameters the Size, Waist, Waist Z, Radius, Divergence, and Rayleigh, respectively, on the text listing that is generated.

The quality factor:
All of the preceding results are correct for the ideal embedded Gaussian beam. For aberrated, mixed-mode beams, a simple extension to the fundamental Gaussian beam model has been developed by Siegman. The method uses a term called the beam quality factor, usually denoted by M2. The factor M2 can be though of as "times diffraction limited" number, and is always greater than unity. The M2 factor determines the size of the real, aberrated Gaussian beam by scaling the size and divergence of the embedded Gaussian mode by M. It is common practice to specify M2 for a laser beam, rather than M, although the factor M is used to scale the beam size. The M2 factor must be measured to be determined correctly. If the M2 factor is set to unity, the default value, ZEMAX simply computes the TEM00 data described above. If M2 is greater than unity, them ZEMAX computes both the embedded Gaussian beam parameters as well as the scaled data.

Because the embedded Gaussian beam parameters are based upon paraxial ray data the results cannot be trusted for systems which have large aberrations, or those poorly described by paraxial optics, such as non-rotationally symmetric systems. This feature ignores all apertures, and assumes the Gaussian beam propagates well within the apertures of all the lenses in the system.
Interactive Analysis:
The Settings dialog box for this feature also supports an interactive mode. After defining the various input beam parameters, clicking on "Update" will immediately trace the specified Gaussian beam, and display the usual results in the dialog box. The parameters for any surface may be viewed, and the surface number selected from the drop down list. The orientation may also be selected using the provided control.

The interactive feature does not in any way modify the lens or the system data; it is simply a handy calculator for displaying Gaussian beam data.

-=-=-=-=--=-=-=-=-=--=-=-=-=-=--=-=-=-=-=--=-=-=-=-=--=-=-=-=-=--=-=-=-=-=--=-=-=-=-=-

相应评价函数：

GBW0, GBWA, GBWD, GBWZ, GBWR

GBW0: Minimum Gaussian beam waist in image space of specified surface.

GBWA: Radial beam size on specified surface.

GBWD: Beam divergence in optical space after specified surface.

GBWZ: Z-coordinate of image space Gaussian beam waist relative to surface.

GBWR: Radius of curvature of Gaussian beam at surface.

If Hx is non-zero, then the computation is for the x-direction beam, otherwise, it is for the y-direction. Hy is used to define the input beam waist, and Px is used to define the Surface 1 to waist distance.

See the Gaussian Beam feature for details.

-=-=-=-=--=-=-=-=-=--=-=-=-=-=--=-=-=-=-=--=-=-=-=-=--=-=-=-=-=--=-=-=-=-=--=-=-=-=-=-

一个案例：

Gaussian Beam Parameters

File : D:\setup\zemax\Samples\LENS1.ZMX
Title: Expander for aiming
Date : THU MAR 20 2008

Data for 0.5320 microns.
Size : The radial beam size at the surface.
Waist : The radial beam waist.
Waist Z : The distance from the waist to the surface.
Radius : The phase radius of curvature at the surface.
Divergence: The semi-angle of the beam asymptote.
Rayleigh : The Rayleigh range.
Units for size, waist, waist-z, radius, and Rayleigh are Millimeters.
Units for divergence semi-angle are radians.

Input Beam Parameters:
Waist size : 1.00000E-001
Surf 1 to waist distance: 0.00000E+000
M Squared : 2.00000E+000

Y-Direction:

TEM00 fundamental mode results:

Sur	Size	Waist	Waist Z	Radius	Divergence	Rayleigh

1	1.00000E-001	1.00000E-001	0.00000E+000	Infinity	1.69341E-003	5.90525E+001
STO	1.00014E-001	6.56052E-002	4.60862E+001	8.08929E+001	1.63803E-003	4.00513E+001
3	1.10241E-001	3.79435E-002	2.31920E+001	2.63087E+001	4.46294E-003	8.50186E+000
IMA	4.47332E+001	3.79435E-002	1.00232E+004	1.00232E+004	4.46294E-003	8.50186E+000

Mixed Mode results for M2 = 2.0000:

Sur	Size	Waist	Waist Z	Radius	Divergence	Rayleigh
OBJ	1.41421E-001	1.41421E-001	0.00000E+000	1.00000E+010	2.39484E-003	5.90525E+001
1	1.41421E-001	1.41421E-001	0.00000E+000	1.00000E+010	2.39484E-003	5.90525E+001
STO	1.41442E-001	9.27797E-002	4.60862E+001	8.08929E+001	2.31652E-003	4.00513E+001
3	1.55904E-001	5.36603E-002	2.31920E+001	2.63087E+001	6.31155E-003	8.50186E+000
IMA	6.32623E+001	5.36603E-002	1.00232E+004	1.00232E+004	6.31155E-003	8.50186E+000

X-Direction:

TEM00 fundamental mode results:

Sur	Size	Waist	Waist Z	Radius	Divergence	Rayleigh
1	1.00000E-001	1.00000E-001	0.00000E+000	Infinity	1.69341E-003	5.90525E+001
STO	1.00014E-001	6.56052E-002	4.60862E+001	8.08929E+001	1.63803E-003	4.00513E+001
3	1.10241E-001	3.79435E-002	2.31920E+001	2.63087E+001	4.46294E-003	8.50186E+000
IMA	4.47332E+001	3.79435E-002	1.00232E+004	1.00232E+004	4.46294E-003	8.50186E+000

Mixed Mode results for M2 = 2.0000:

Sur	Size	Waist	Waist Z	Radius	Divergence	Rayleigh
OBJ	1.41421E-001	1.41421E-001	0.00000E+000	1.00000E+010	2.39484E-003	5.90525E+001
1	1.41421E-001	1.41421E-001	0.00000E+000	1.00000E+010	2.39484E-003	5.90525E+001
STO	1.41442E-001	9.27797E-002	4.60862E+001	8.08929E+001	2.31652E-003	4.00513E+001
3	1.55904E-001	5.36603E-002	2.31920E+001	2.63087E+001	6.31155E-003	8.50186E+000
IMA	6.32623E+001	5.36603E-002	1.00232E+004	1.00232E+004	6.31155E-003	8.50186E+000