

## New volume-shape list

This manual describes the new volume-shapes that are not listed in the Epics manual. More than twenty new shapes are defined and simple “config” files are given in *EPICS/prog/NewVol/Config*. The basic subprograms to treat the new volume-shapes are stored in the *EPICS/prog/NewVol* directory. Those for drawing the volumes are in the *EPICS/Util/DrawNewVol* directory.

### 1 How to use

The procedure to use some of the new volume-shapes is the same as described in the Epics manual and repeated here. Suppose you are using “sccyl” (sliced cut cylinder) and “sqpipe” (square pipe).

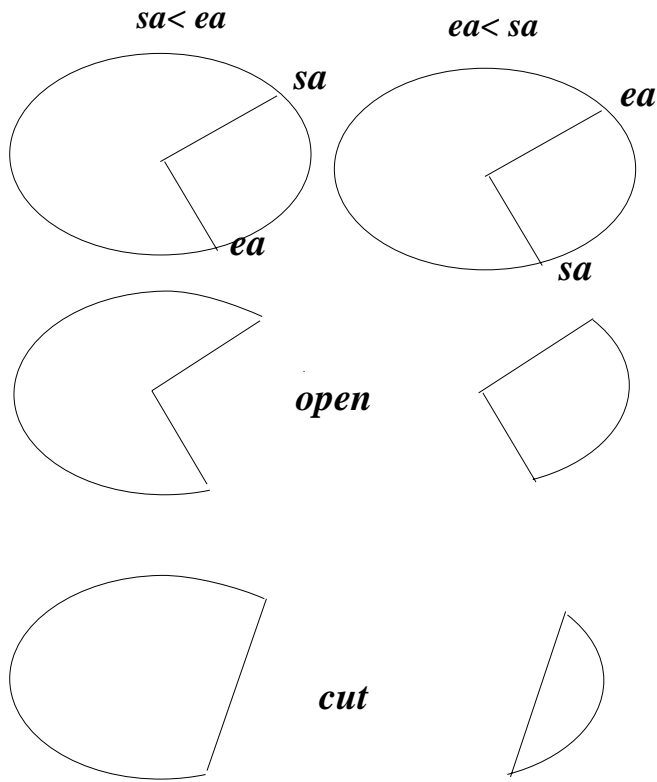
- You should define the new volumes in your configuration file which would include the following lines somewhere:

```
#news    new-1  sccyl
...
#news    new-4  sqpipe
...
1 ...
2  sccyl Fe   0 0 / 0 0 0 3 5    7.071067812E-01 ...
..
6  sqpipe Al  0 0 / ...
```

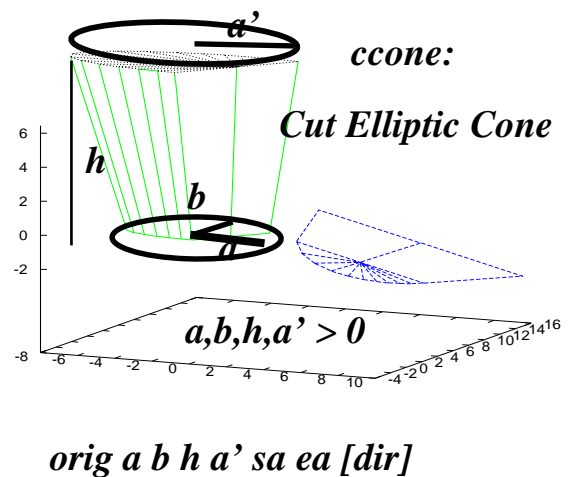
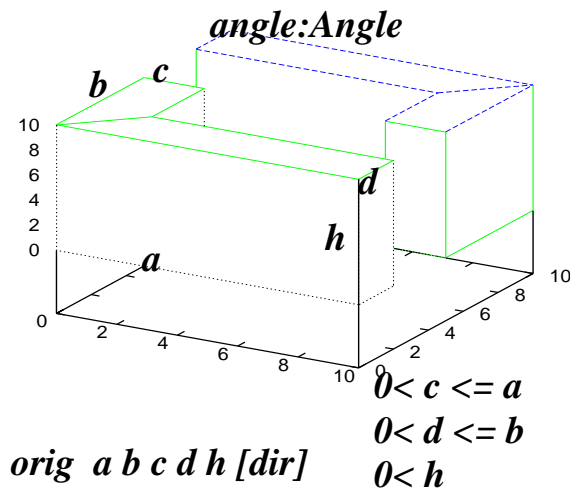
- In *EPICS/Util*, you have to issue,  
`./usenewvol config`  
where *config* is the path to your config file.
- To draw the new configuration, in *EPICS/Util*  
`./drawconfig`
- The `./usenewvol` command is needed only when your config file contains new volume-shape(s) which didn't included in the config file used by previous `./usenewvol`.

### 2 Description of each new volume-shape

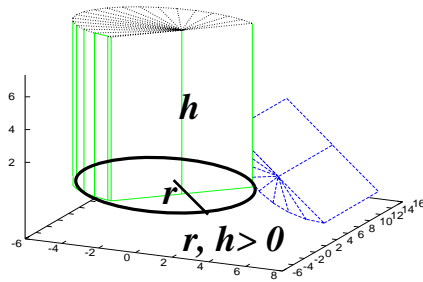
We shall show volume attributes of a canonical form along with a corresponding figure and (at least) one additional non-canonical form. You will be able to get the same display by specifying the “config file” in *EPICS/prog/NewVol/Config*. The origin of the volume is always needed. For a non-canonical form, the translation will be indicated by a non-canonical origin (normally non-zeros) and for rotation, additional direction cosines of the x and y axes of the canonical form (6 values) are needed. For the symmetrical object around the z-axis, the direction cosine of the z-axis (3 values) may be given. It is important to know that the rotation is first applied to the canonical form and then the translation of the origin is performed.



For a cylinder like object, sometimes 'cut' or 'open' is specified. For example, 'ccone' means cut elliptic cone and ocyl is for open cylinder. For such an object, starting angle (sa) and ending angle (ea) must be specified. The cases of  $sa < ea$  and  $ea < sa$  lead to quite different results and shown left. The meaning of 'open' and 'cut' is also show left.

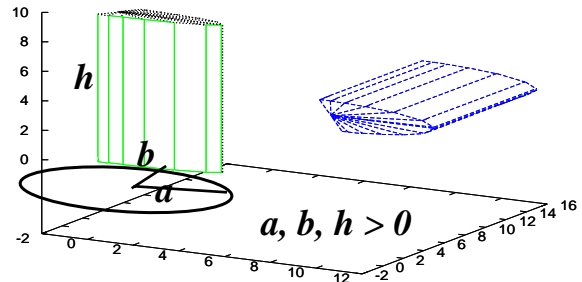


**ccyl: Cut Cylinder**



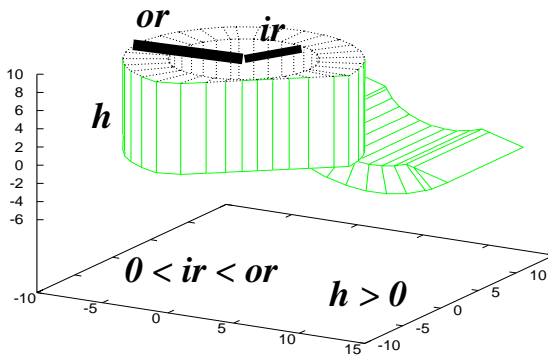
**orig r h sa ea [dir]**

**cecyl: Cut Elliptic Cylinder**



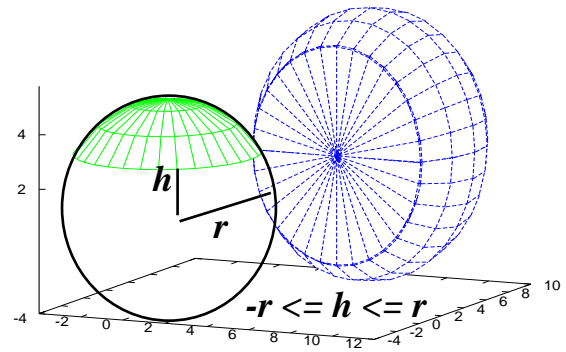
**orig a b h sa ea [dir]**

**cpipe: Cut Pipe**



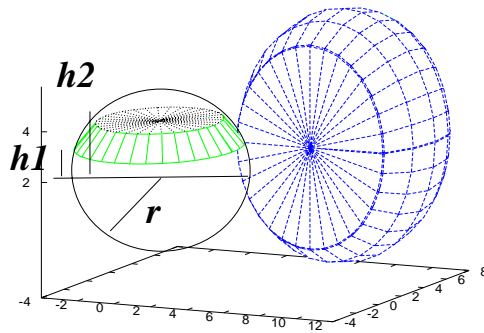
**orig ir or h sa ea [dir]**

**csph: Cut Sphere**



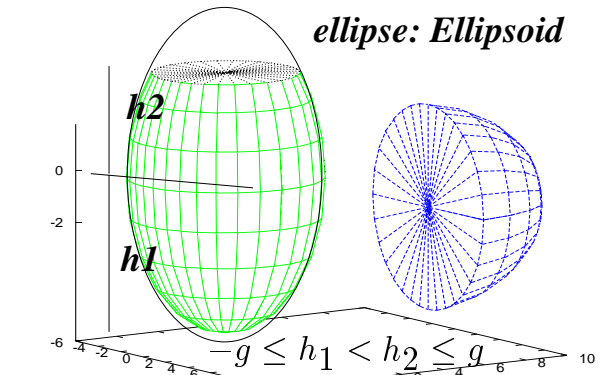
**orig r h [dir] [dir] is for z**

**dcsph; Double Cut Sphere**

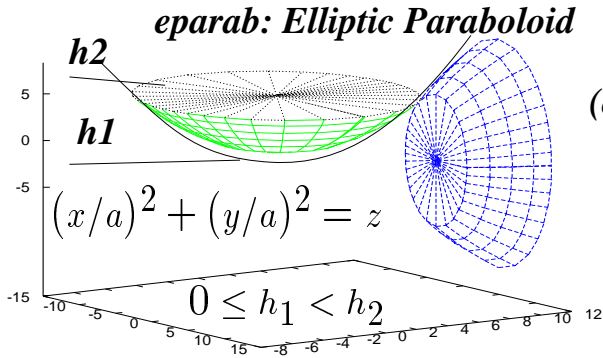


**orig r h1 h2 [dir]**  
**[dir] is for z axis**

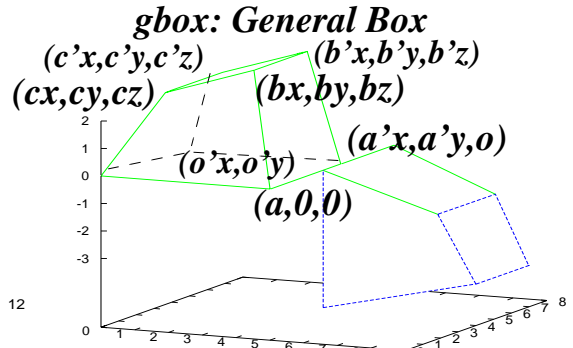
**ellipse: Ellipsoid**



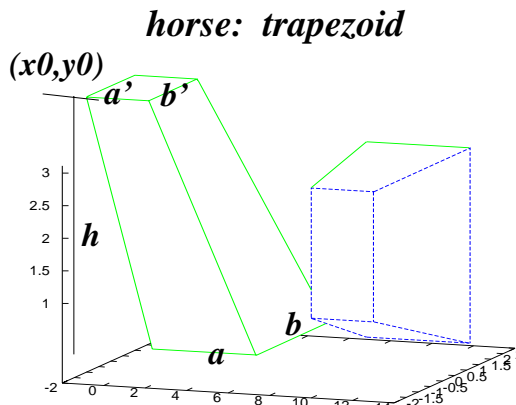
$(x/a)^2 + (y/a)^2 + (z/g)^2 = 1$   
**orig a b g h1 h2 [dir]**



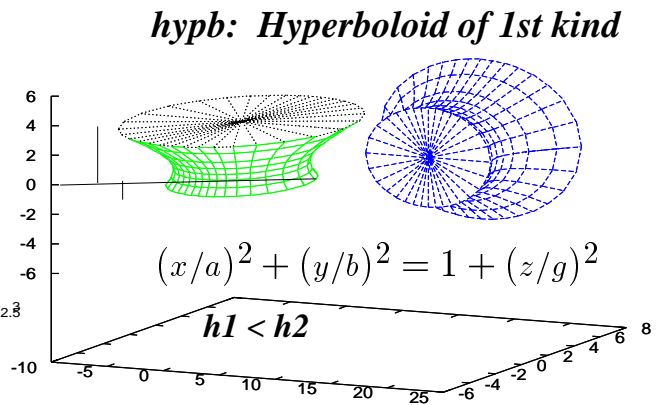
orig a b h1 h2 [dir]



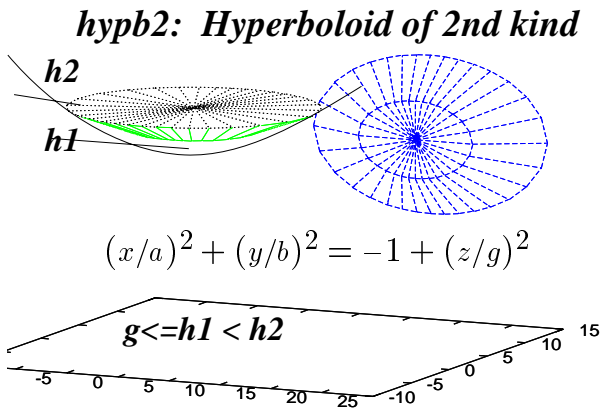
orig a bx by bz cx cy cz a'x a'y b'x b'y b'z  
 c'x c'y c'z o'x o'y [dir]



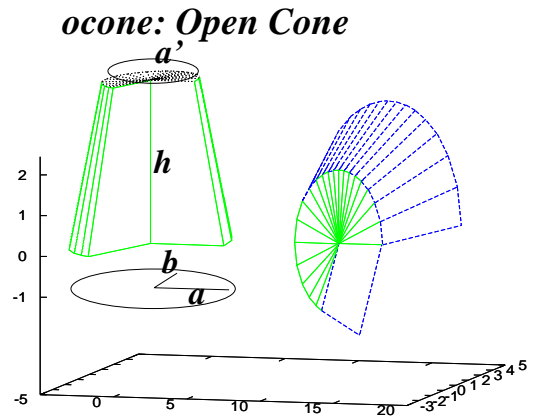
$h > 0$   $a, b, a', b' \geq 0$  but  
 not  $a=b=a'=b'=0$   
 orig a b h x0 y0 a' b' [dir]



orig a b g h1 h2 [dir]

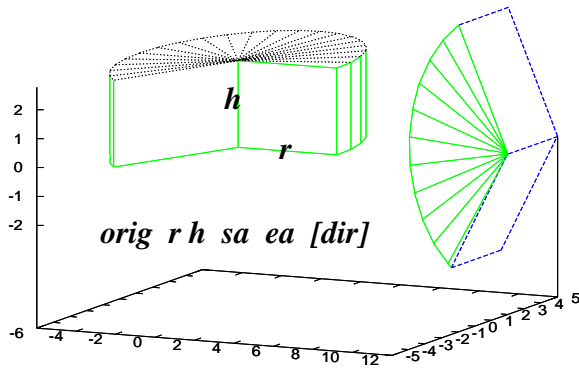


orig a b g h1 h2 [dir]

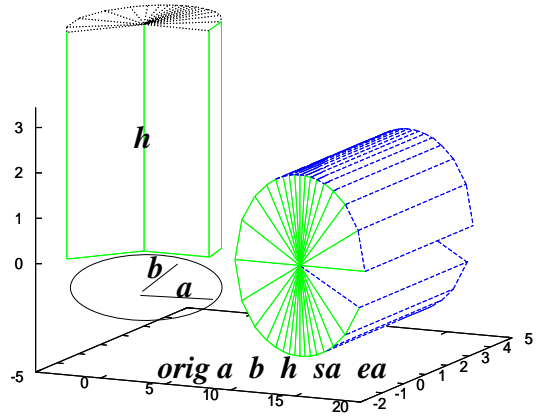


orig a b h a' sa ea

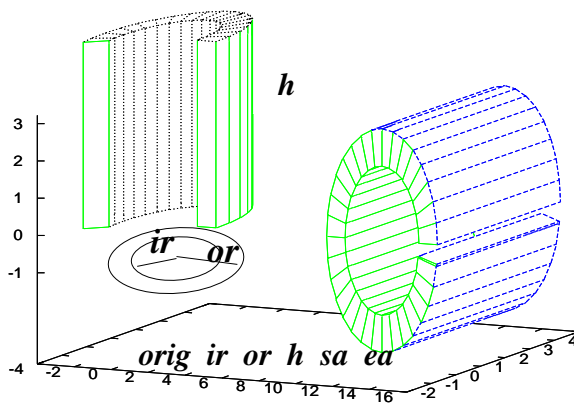
**ocyl: Open Cylinder**



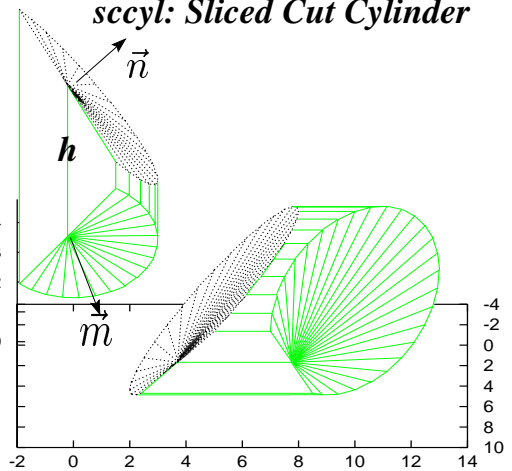
**oecyl: Open Elliptic Cylinder**



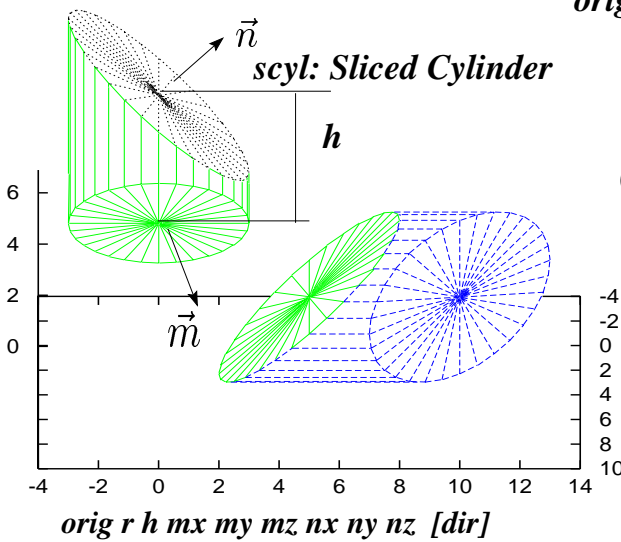
**opipe: Open Pipe**



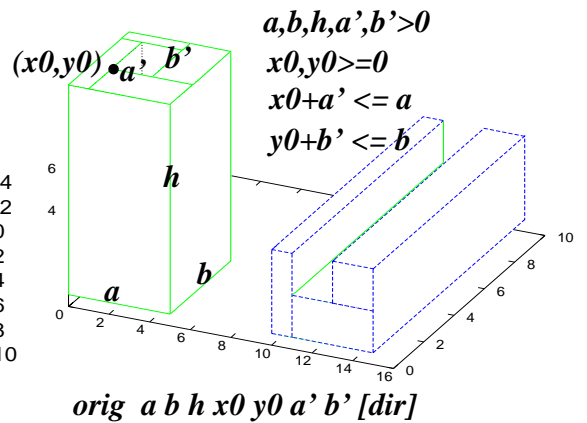
**sccyl: Sliced Cut Cylinder**

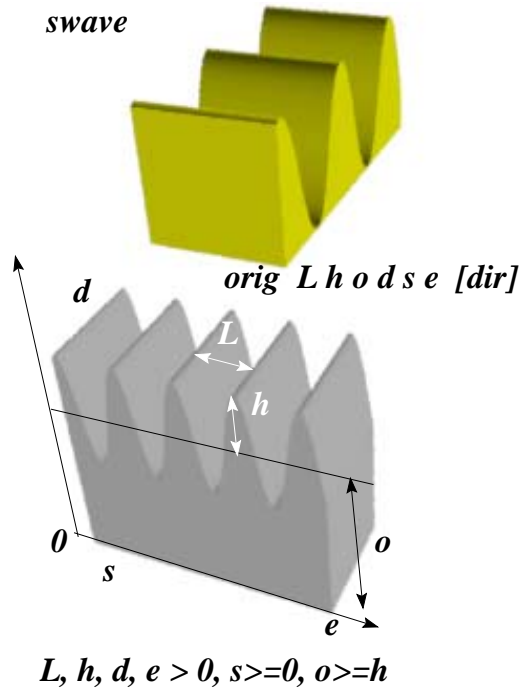
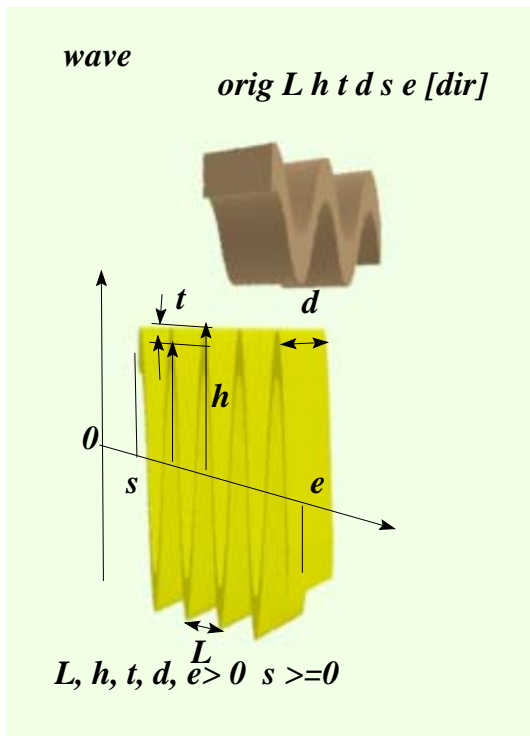
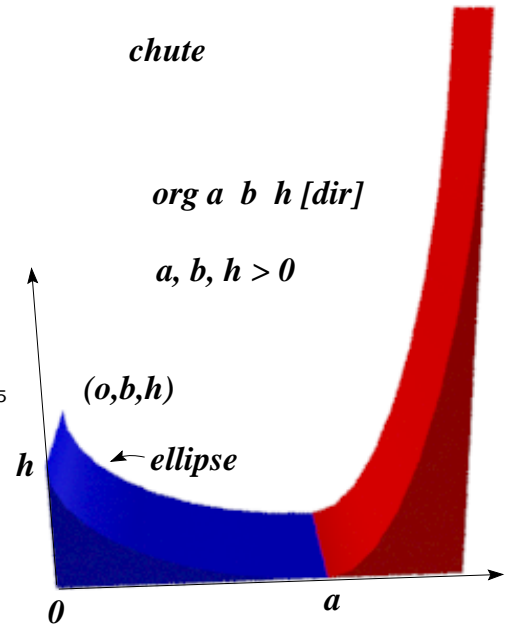
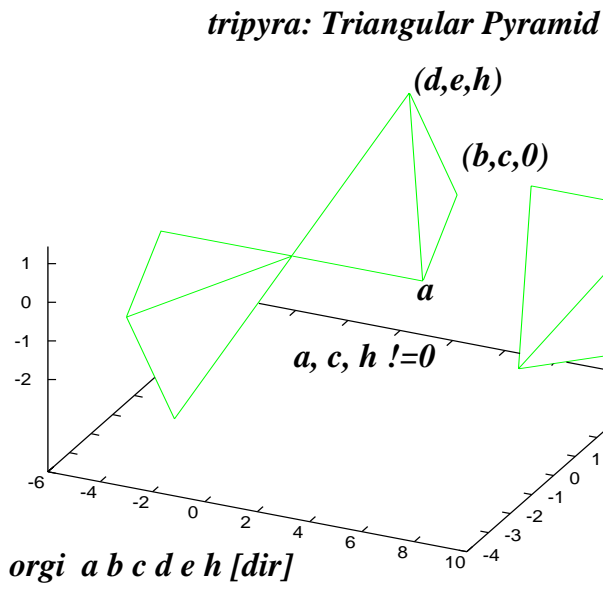


**scyl: Sliced Cylinder**



**sqpipe: Square Pipe**





elightg: elliptic light guide

