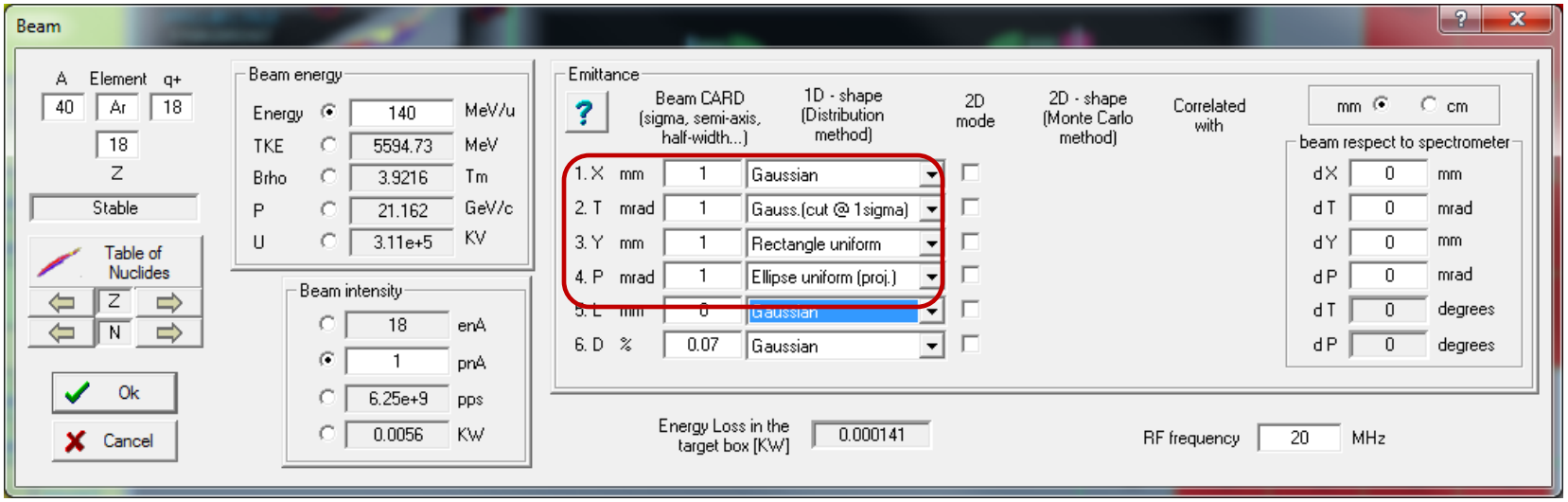
Beam Shapes

version 9.2.88

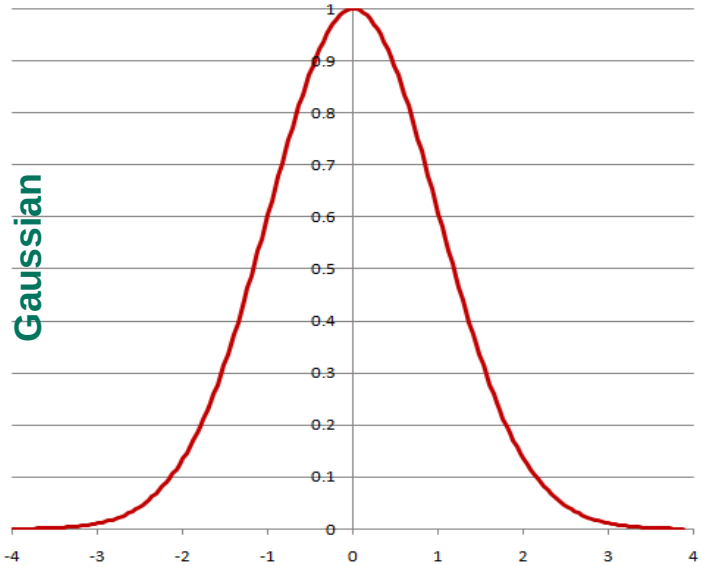


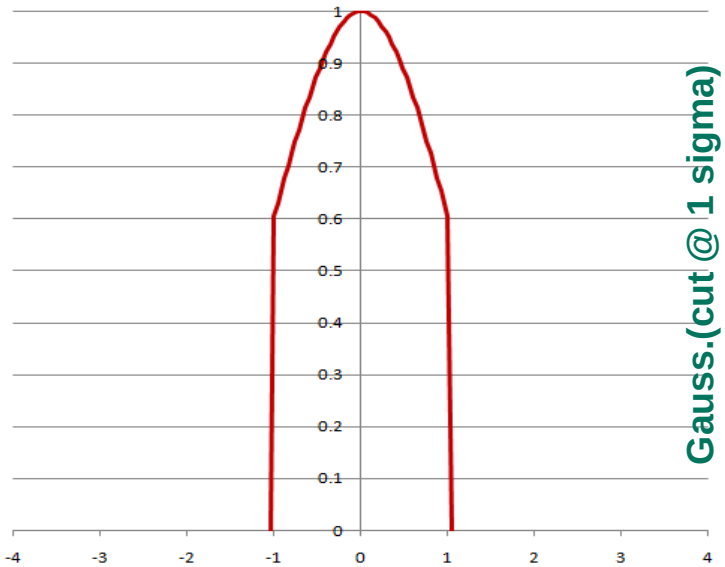
1D-shape

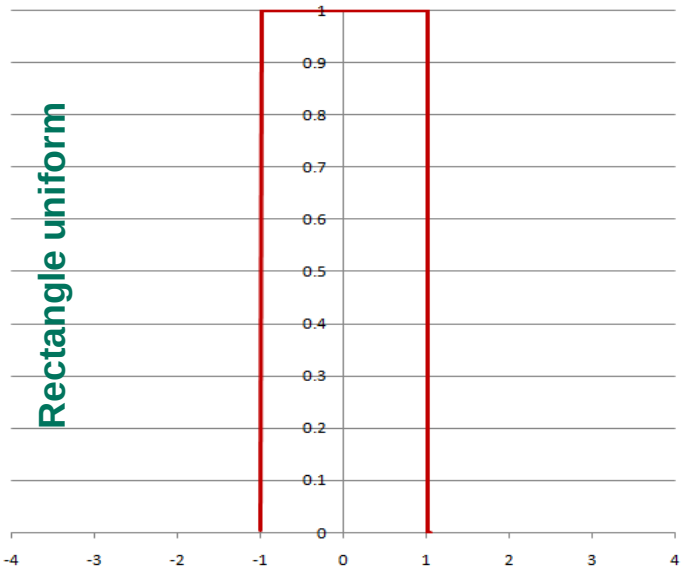
1.	Gaussian	Sigma=1	=>	Area = 2.51	St.Dev = 1
2.	Gauss.(cut @ 1 sigma)	Sigma=1	=>	Area = 1.74	St.Dev = 0.55
3.	Rectangle uniform	Half-width=1	=>	Area = 2.00	St.Dev = 0.58
4.	Ellipse uniform(proj.)	Semi-axis=1	=>	Area = 1.56	St.Dev = 0.51

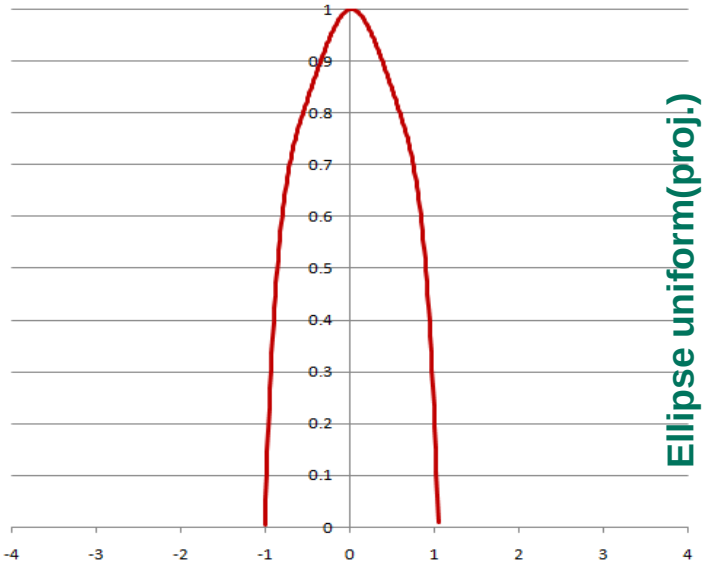
See the next slide

1D - shapes

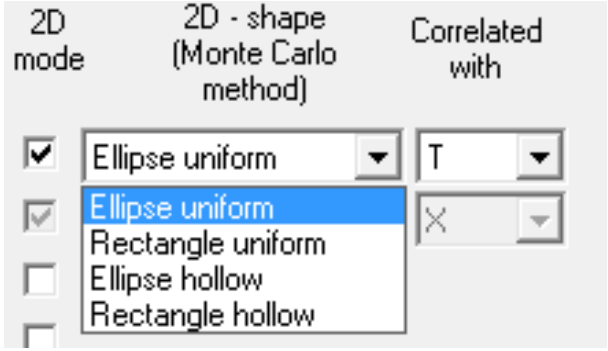

Gaussian
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
-4
-3
-2
-1
0
1
2
3
4


Gauss.(cut @ 1 sigma)
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
-4
-3
-2
-1
0
1
2
3
4


Rectangle uniform
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
-4
-3
-2
-1
0
1
2
3
4

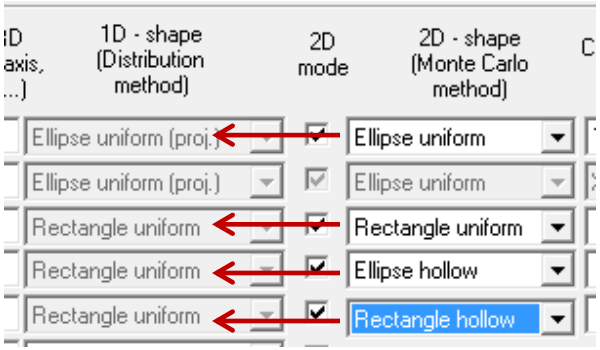

Ellipse uniform(proj.)
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
-4
-3
-2
-1
0
1
2
3
4

2D - shapes (for Monte Carlo mode)

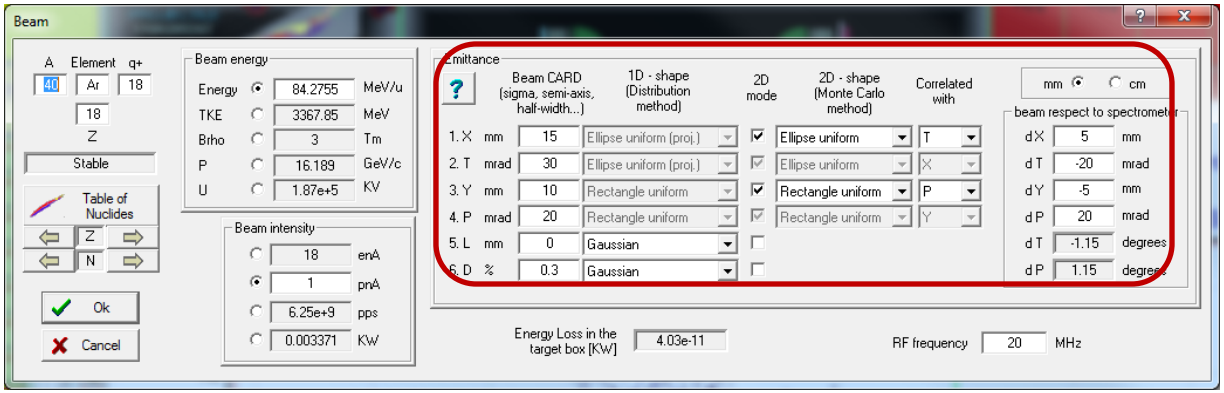


Four 2D-shapes.
Hollow configurations (which are not physical) are designed for debug purposes

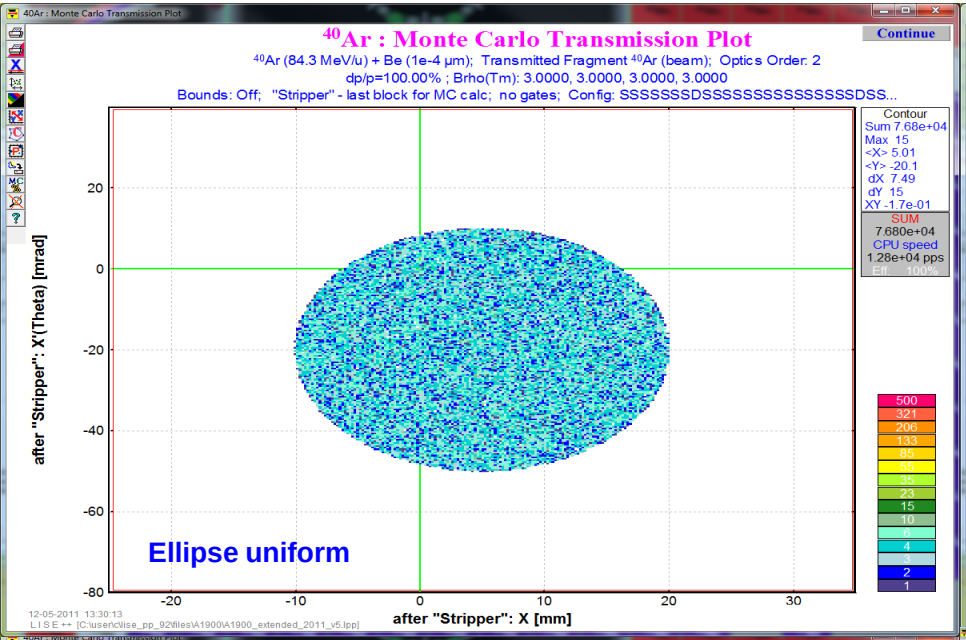
Assignment for 1D-shapes, which are used for the Distribution method

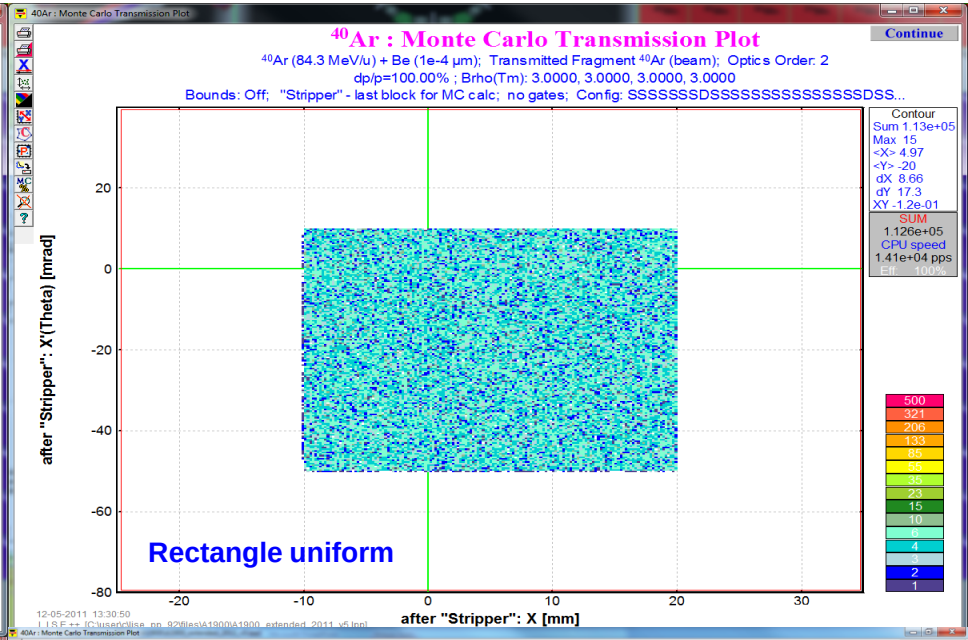


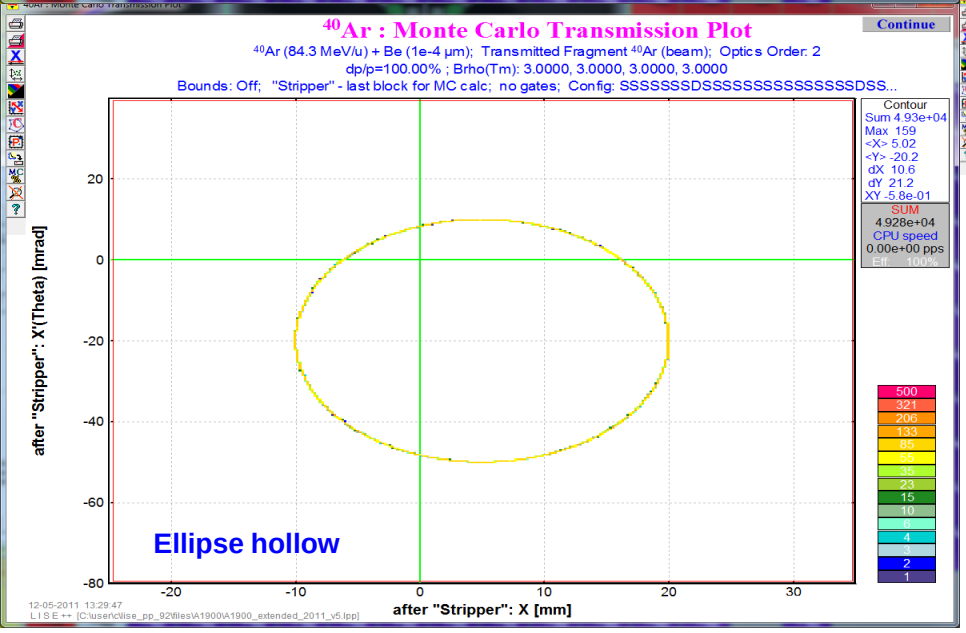
File used for the next slides: http://groups.nscl.msu.edu/lise//9_2/9_2_85/A1900_extended_2011_v5.lpp

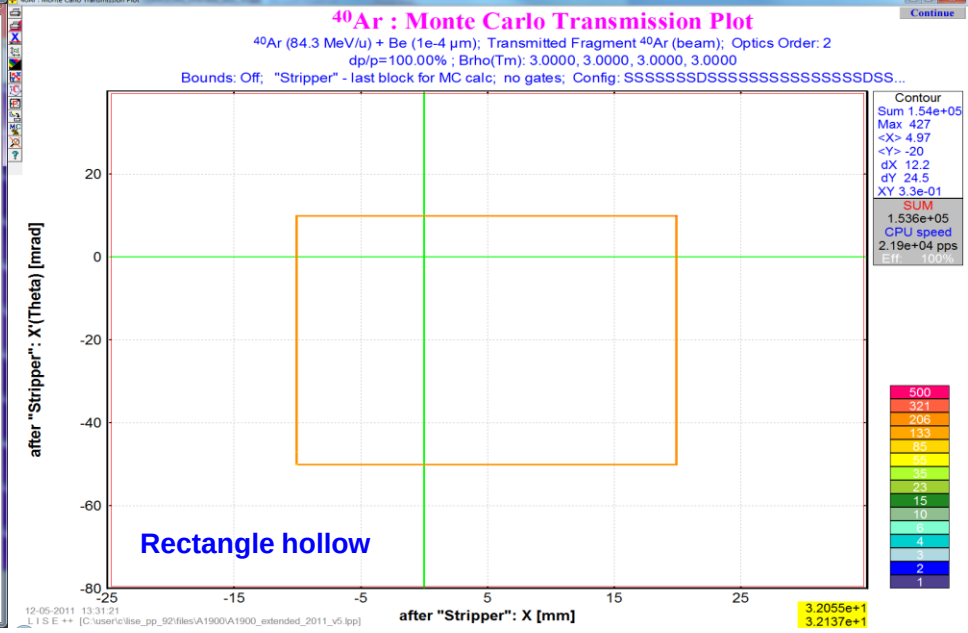


2D - shapes : after target

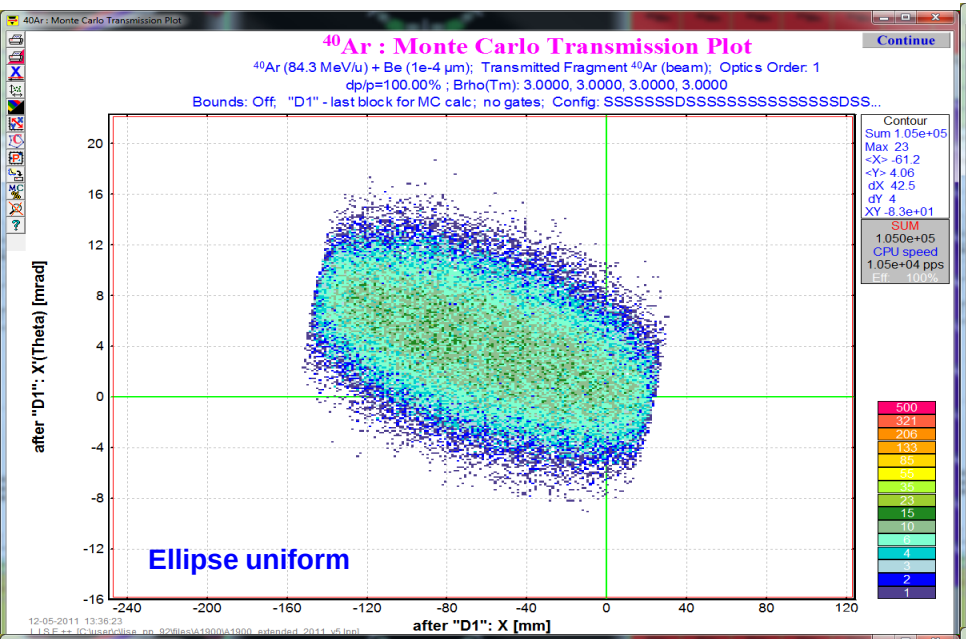


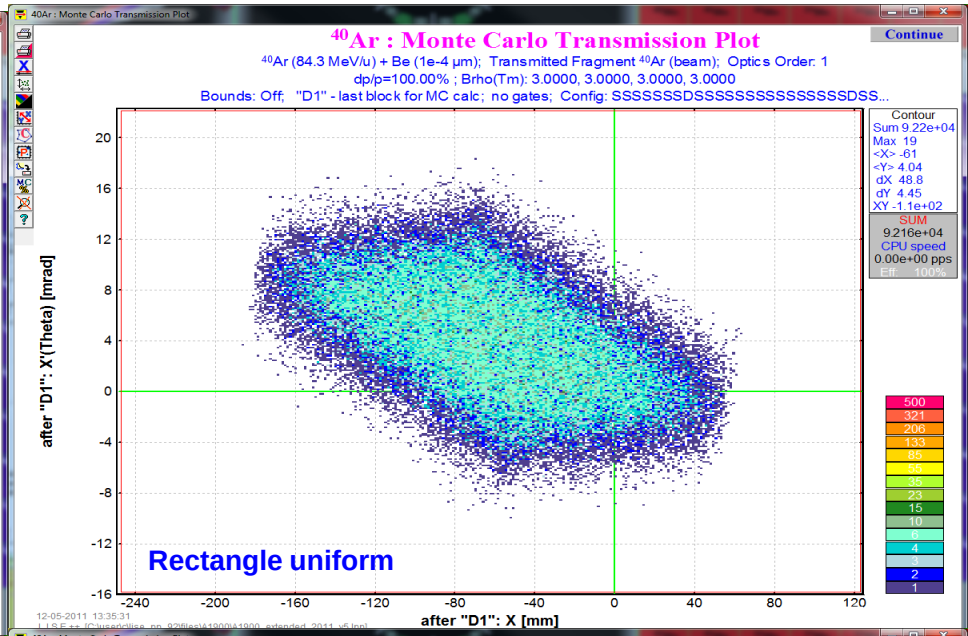


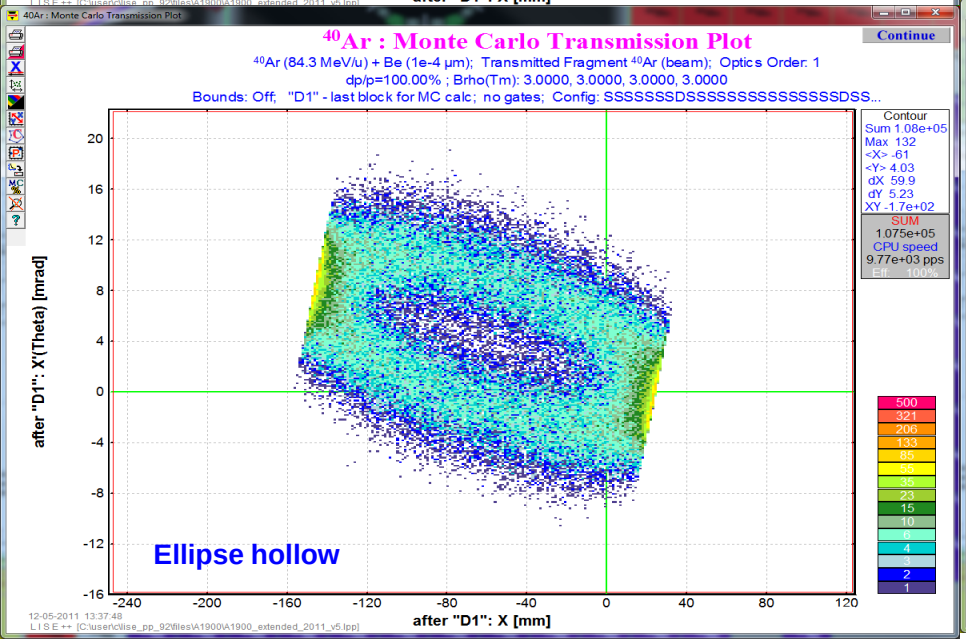


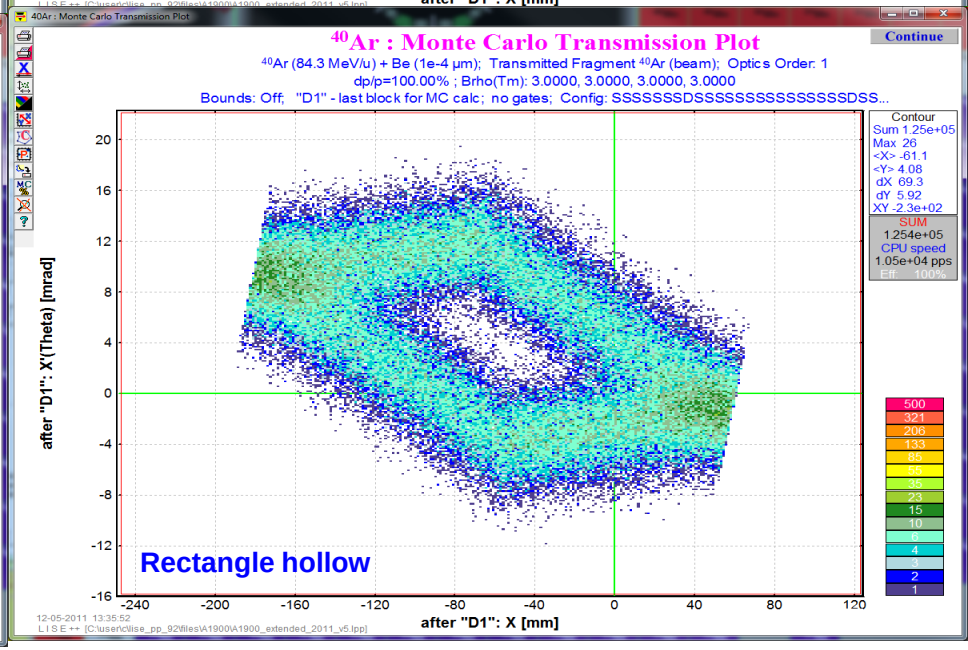


2D - shapes : after 1st dipole (1st order)

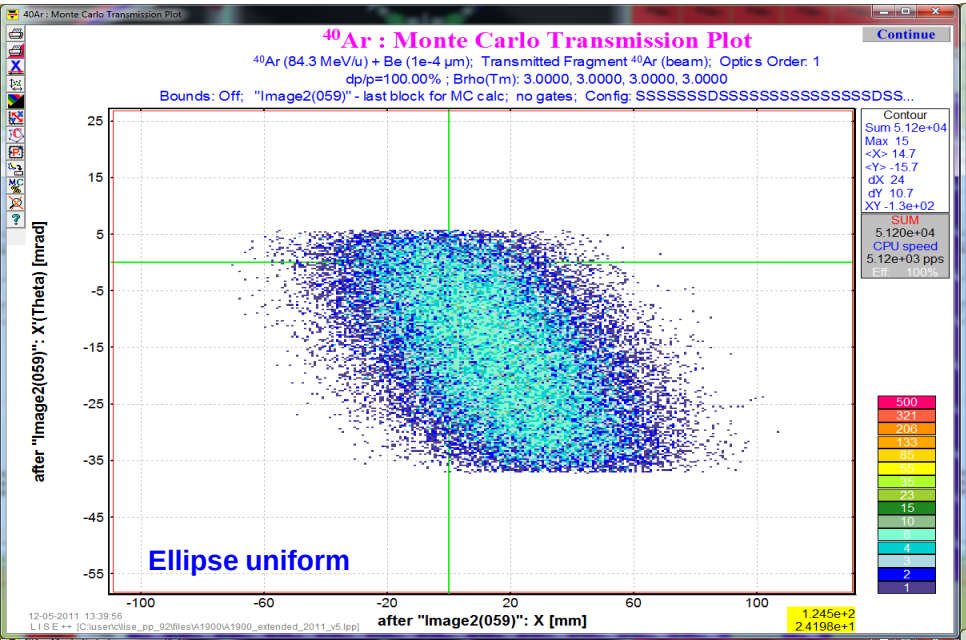


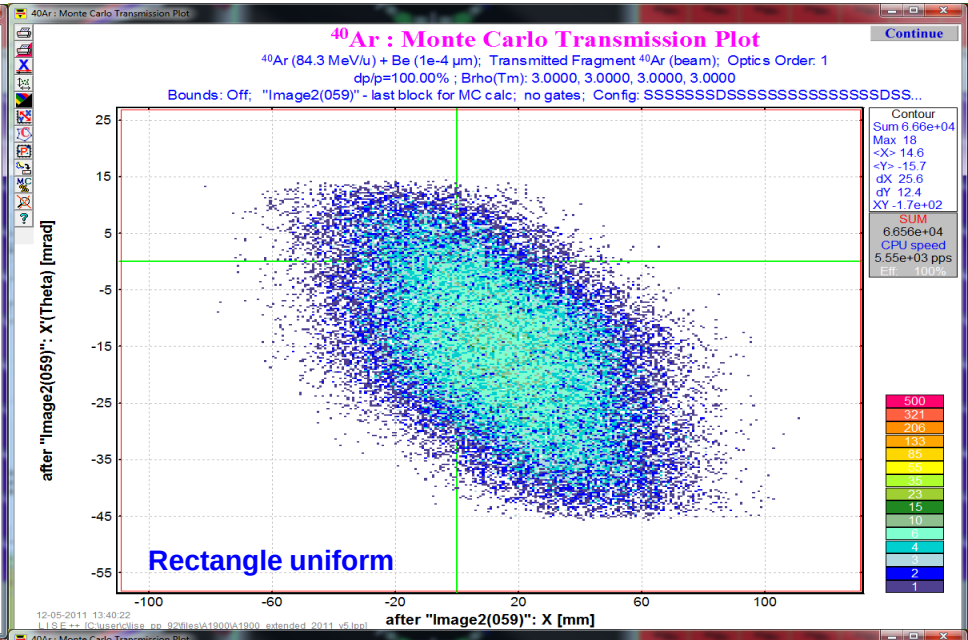


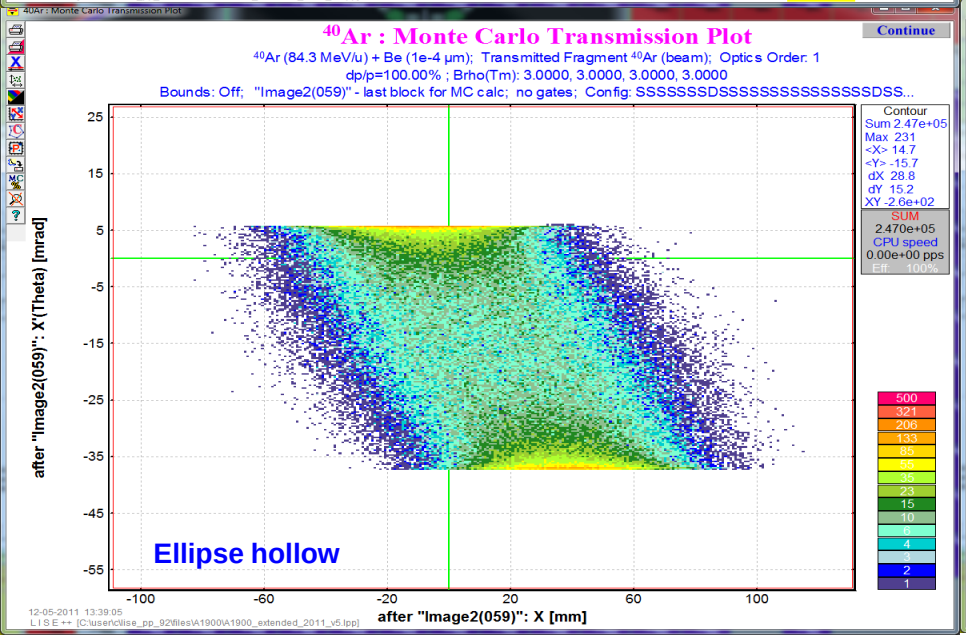


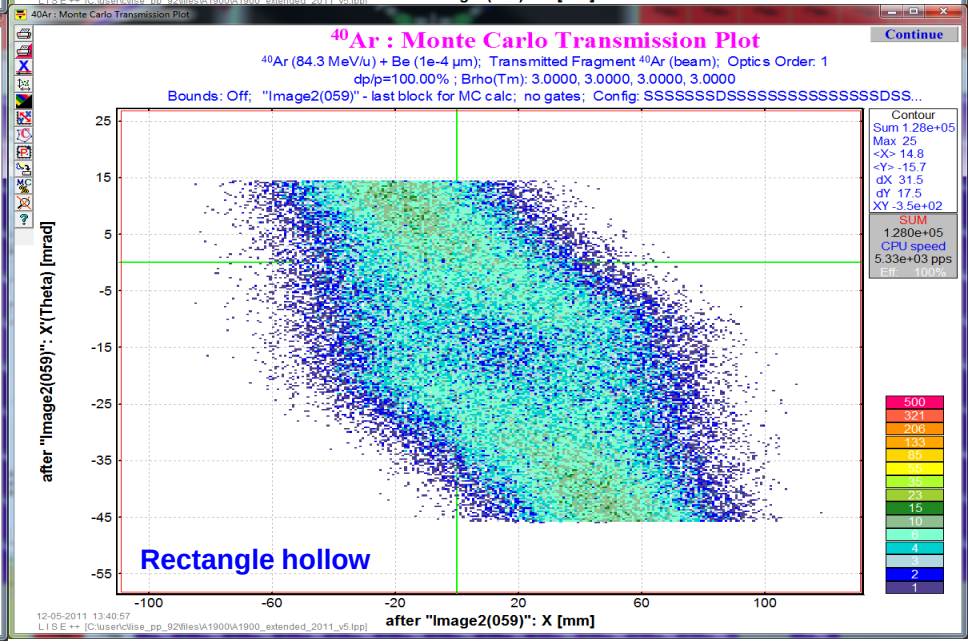


2D - shapes : after Image 2 (Z059) (1st order)

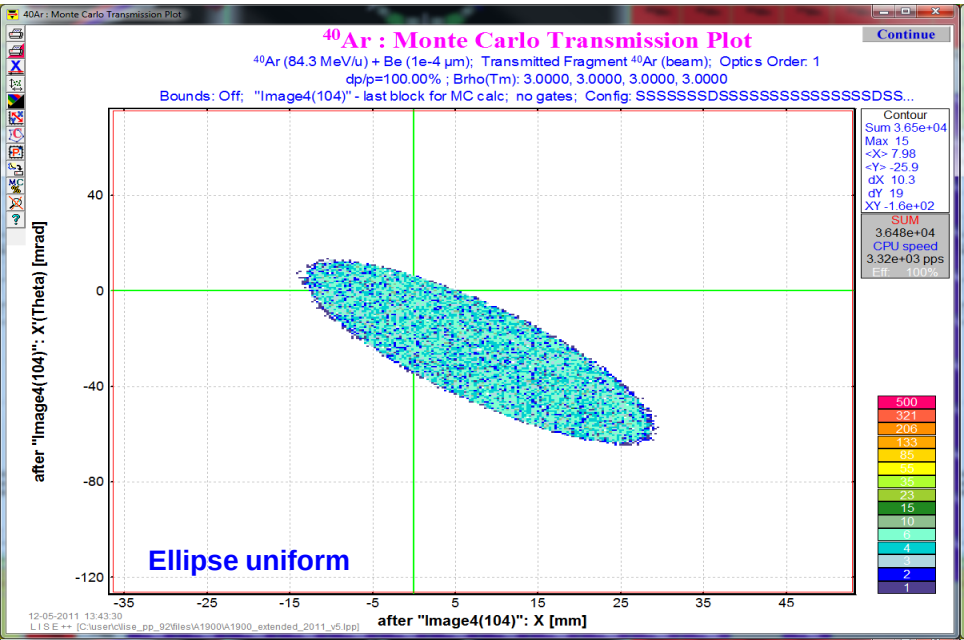


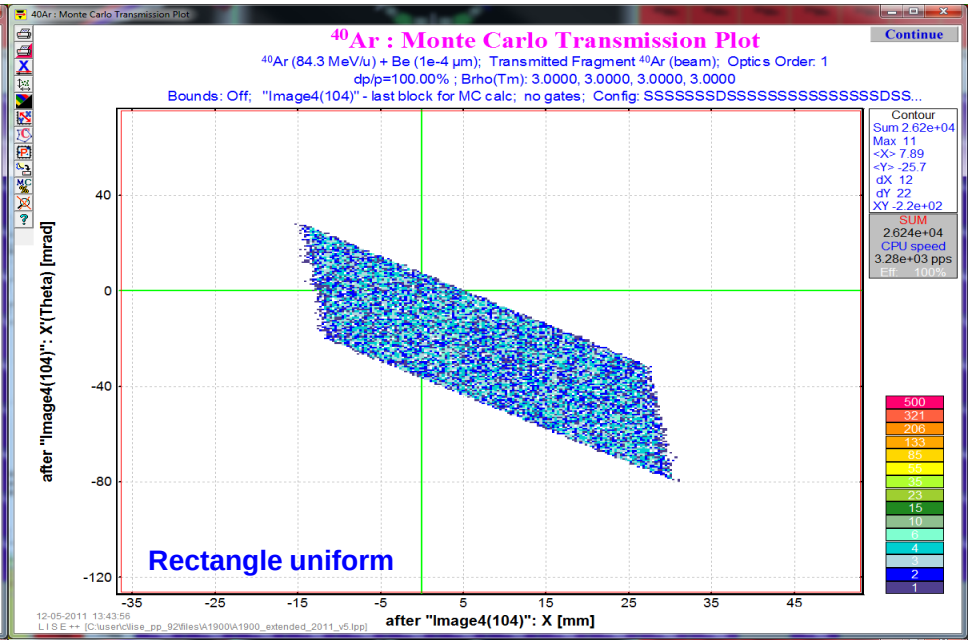


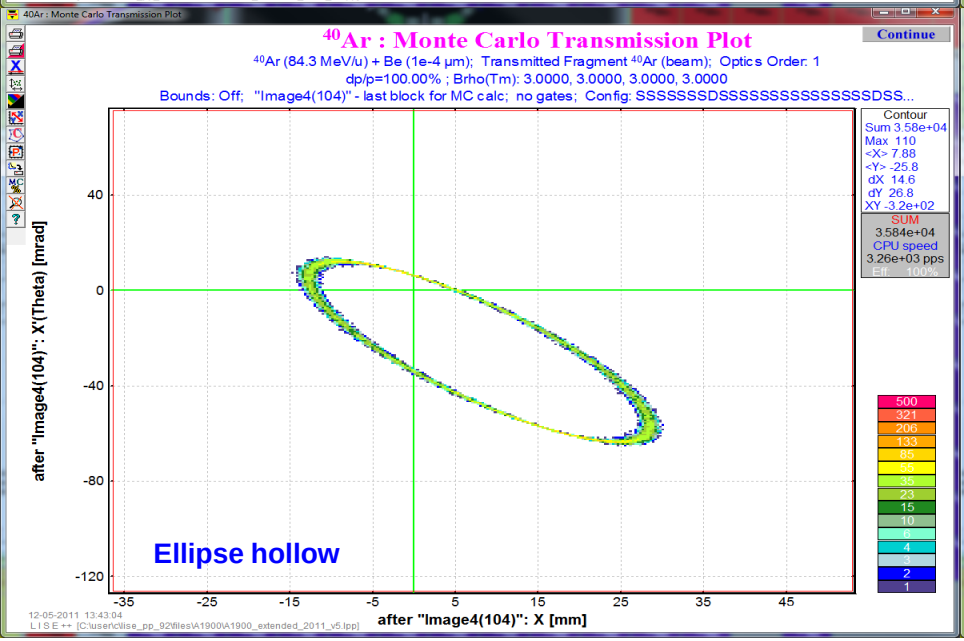


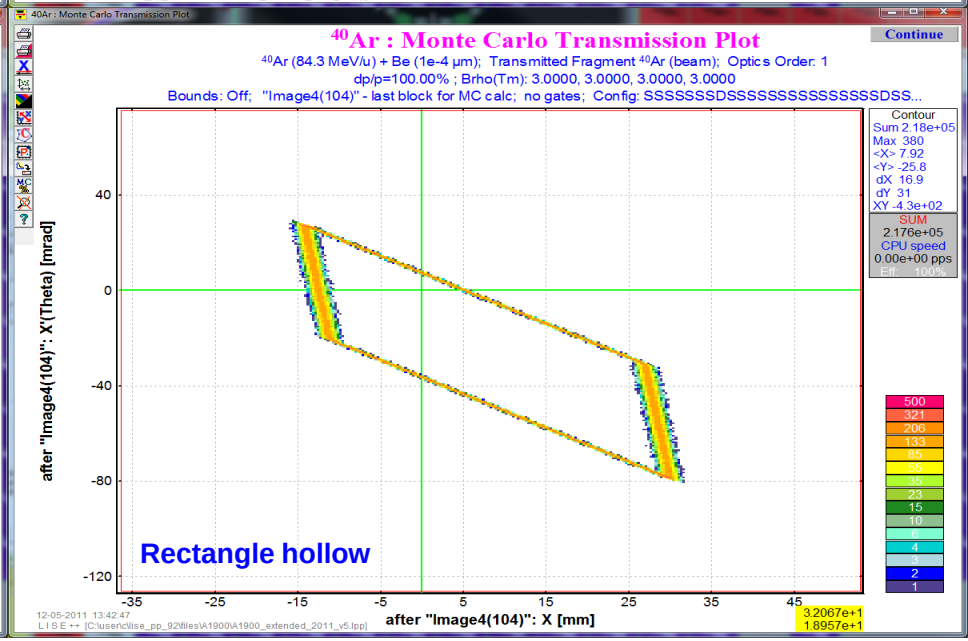


2D - shapes : after Image 4 (Z104) (1st order)

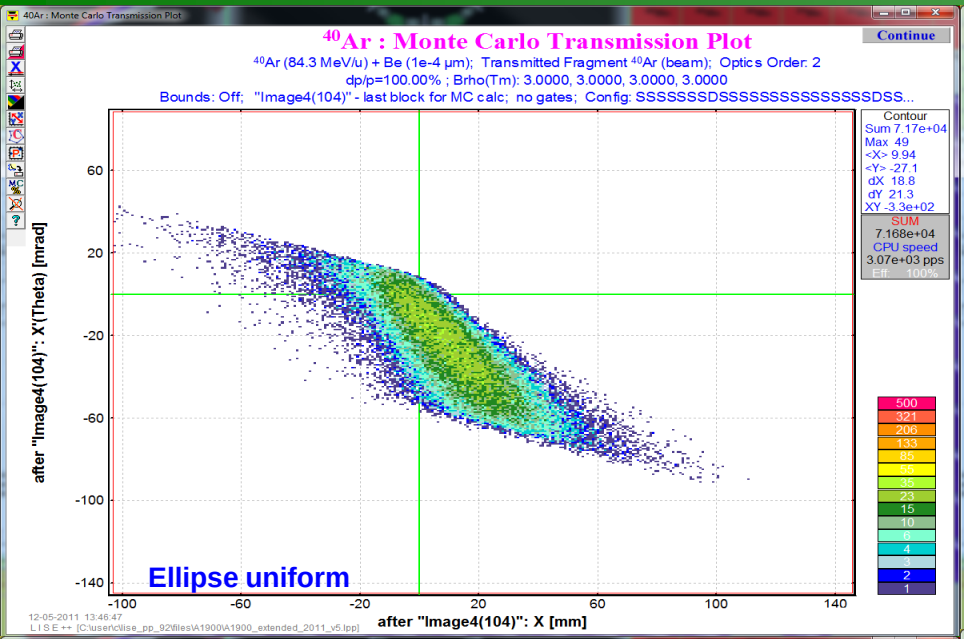


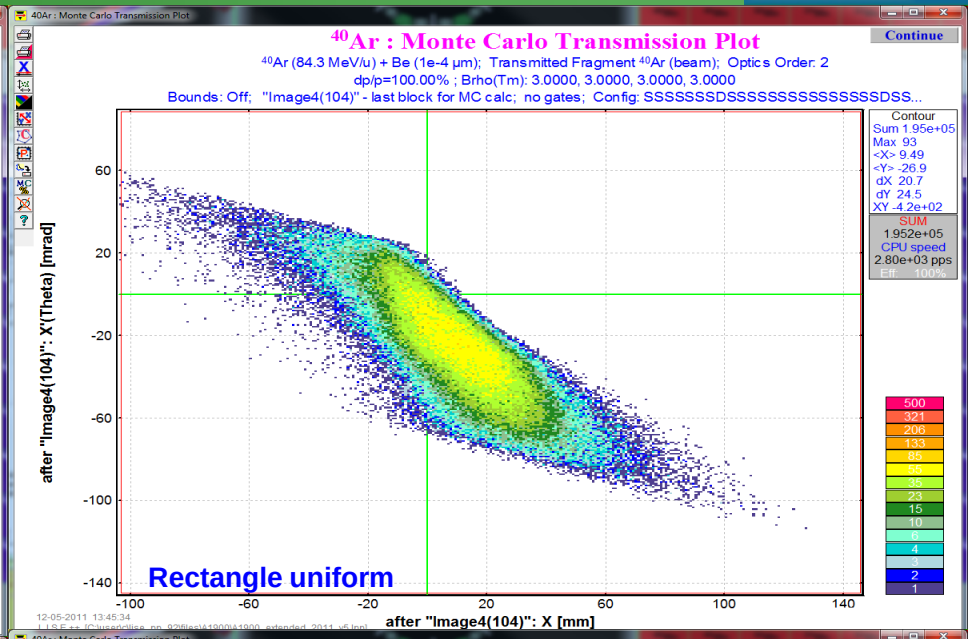


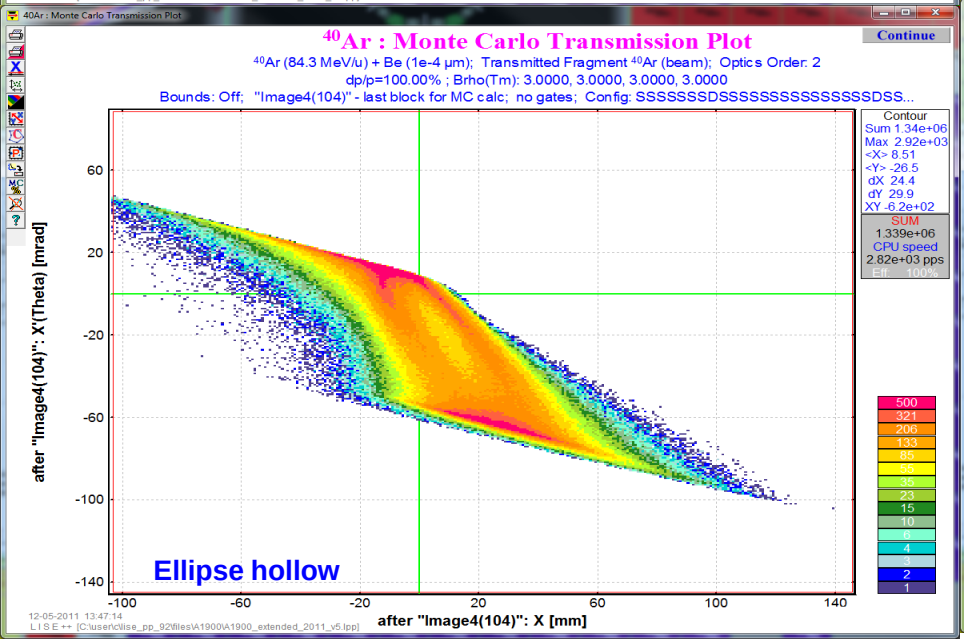


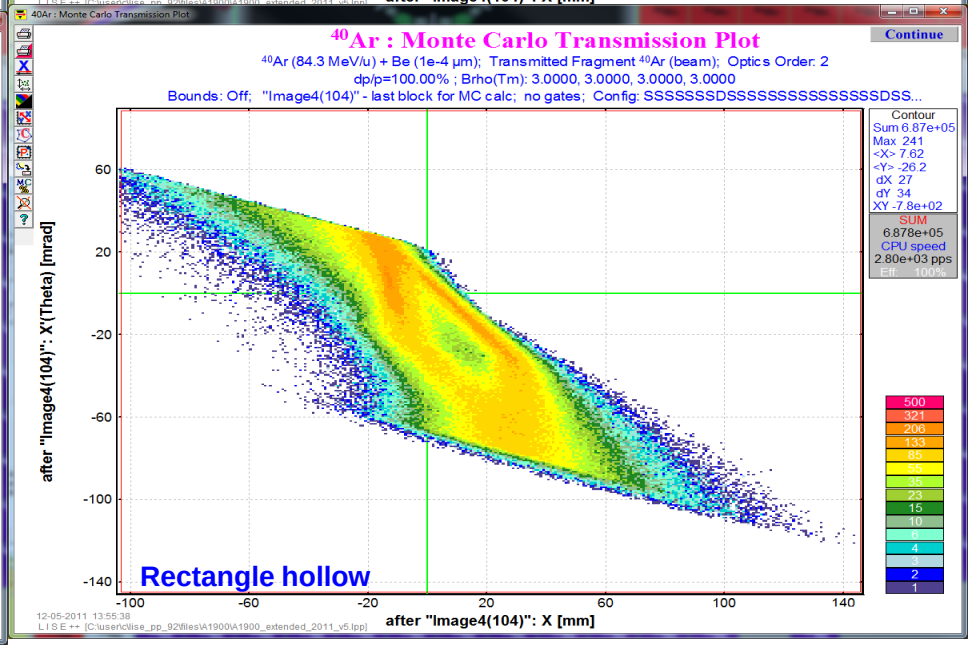


2D - shapes : after Image 4 (Z104) (2nd order)

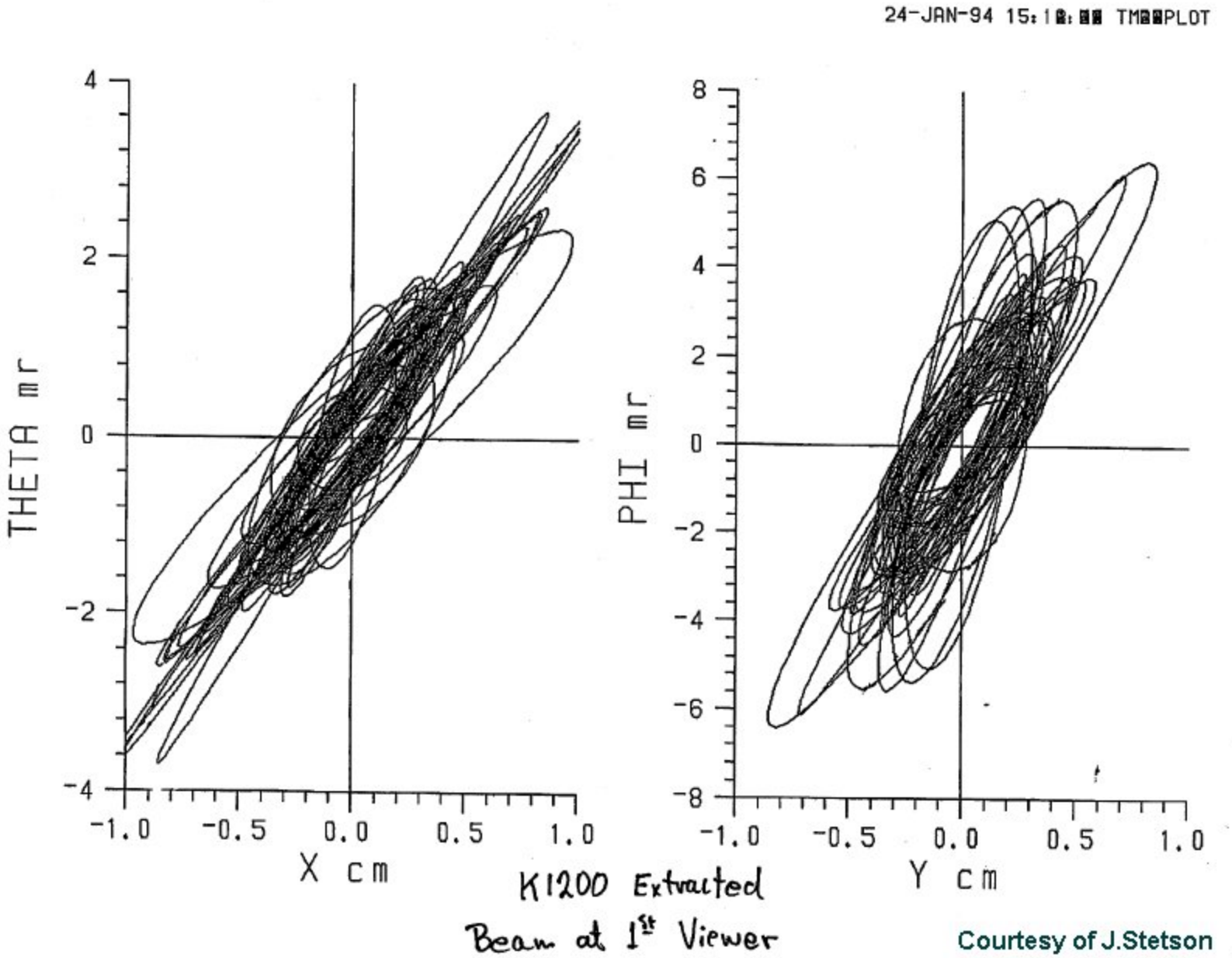








Beam shapes : K1200



MOCADI beam shapes

3.3 BEAM

The "BEAM" keyword marks the beginning of Monte Carlo simulation. The keyword should be written once in the beginning of a MOCADI input file.

BEAM
N
E_0, T_0, *mass*, *nuclear charge*, *electrons*
$mode_{XA}$
max_X, max_A, r_{XA}, X_0, A_0
$mode_{YB}$
max_Y, max_B, r_{YB}, Y_0, B_0
$mode_{ET}$
max_E, max_T, r_{ET}, E_1, T_1

N ions of the primary beam with *charge*, *mass*, *electrons* are produced with initial position distribution (X, Y), angular distribution (A, B), energy distribution (E) and time distribution (T). The initial distributions are calculated event by event as follows. (The r parameter is not used up to now.)

$X=X_0+dX$
$A=A_0+dA$
$Y=Y_0+dY$
$B=B_0+dB$
$E=E_0*(1+(E_1+dE)/100)$
$T=T_0*(1+(T_1+dT)/100)$

where distributions dX, dA, dY, dB, dE, and dT are calculated from $mode*$, $max*$ and $r*$ parameters.

mode	
0	fixed. $d=max$
1	uniform distribution, $-max* < d* < +max*$
2	Gaussian distribution, $sigma*=max*$
4	uniform distribution in the Ellipse $(d1/max_1)^2+(d2/max_2)^2<= 1$
6	uniform distribution in the 6 dimensional Ellipse (only for $mode_{XA}$), $(dX/max_X)^2 + (dA/max_A)^2 + (dY/max_Y)^2 + (dB/max_B)^2 + (dE/max_E)^2 + (dT/max_T)^2 <= 1$
7	uniform distribution in the 4 dimensional Ellipse (only for $mode_{XA}$), $(dX/max_X)^2 + (dA/max_A)^2 + (dY/max_Y)^2 + (dB/max_B)^2 <= 1$
8	uniform distribution in the 2 dimensional Ellipse (only for $mode_{XA}$), $(dX/max_X)^2 + (dY/max_Y)^2 <=1$, $(dA/max_A)^2 + (dB/max_B)^2 <= 1$
9	Gaussian distribution with $sigma_X=max_X$, $sigma_A=max_A$, $sigma_Y=max_Y$, $sigma_B=max_B$, $sigma_E=max_E$, $sigma_T=max_T$, (only for $mode_{XA}$)

The units of energy(E), time(T), position(X, Y), and angle(A, B) are MeV/u, micro-second, centimeter, and milli-radian, respectively.