

## Synchrotron Profile

Position of the synchrotron light:  $x_\gamma = x + p L$

In Action-Angle var.

$$xy = x + Lp = \sqrt{\frac{2J}{\beta}}((-L\alpha + \beta) + L\sin\theta) \leq \sqrt{\frac{2J((-L\alpha + \beta)^2 + L^2)}{\beta}}$$

$$\sqrt{\frac{2J((-L\alpha + \beta)^2 + L^2)}{\beta}} < r \rightarrow J < \frac{r^2\beta}{2((-L\alpha + \beta)^2 + L^2)}$$

Thus

$$r = 13.6/2 = 6.8 \text{ mm}$$

Horizontal direction

Position	$\alpha$	$\beta$ [m]	L[m]	Jmax
QF1_ent	-183.2	34797	9.81+3.51	7.68e-10
_ctr	2989	31898	8.81+3.51	1.56e-10
_ext	5046	23595	7.81+3.51	8.37e-11
QD0_ent	2780	7159.5	5.71+3.51	1.54e-10
_ctr	1118	3143.6	4.71+3.51	4.78e-10
_ext	438.7	1540.0	3.71+3.51	1.61e-9

$$\text{Collimation depth} = \text{Sqrt}[\min[\text{Jmax}]/\epsilon_0x] = 3.7$$

here  $\epsilon_0x = 6.13e-12$

## Vertical direction

Position	$\alpha$	$\beta$ [m]	L[m]	Jmax
QF1_ent	-353.7	54798	9.81+3.51	5.05e-10
_ctr	-6046.3	61000	8.81+3.51	7.75e-9
_ext	-14142	80566	7.81+3.51	2.95e-10
QD0_ent	-19356	150914	5.71+3.51	4.60e-9
_ctr	10182	161759	4.71+3.51	6.21e-11
_ext	31909	112002	3.71+3.51	2.21e-11

Colimation depth= $\text{Sqrt}[\text{min}[J_{\text{max}}]/\epsilon_0 y]$

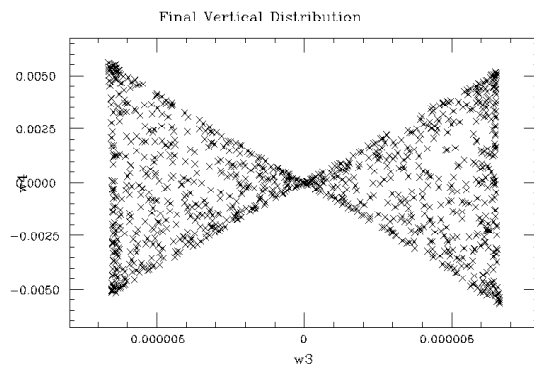
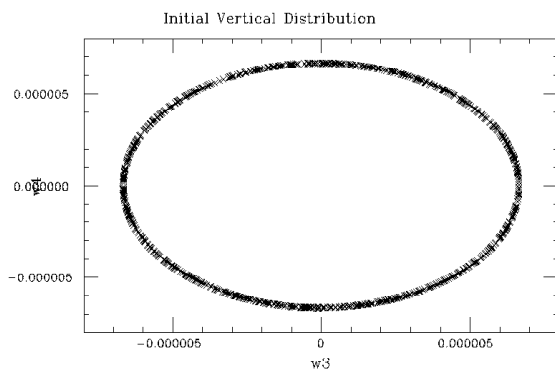
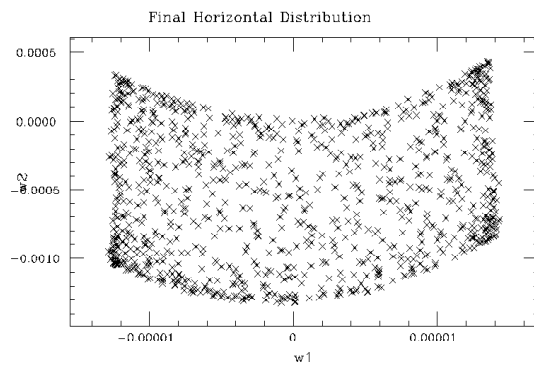
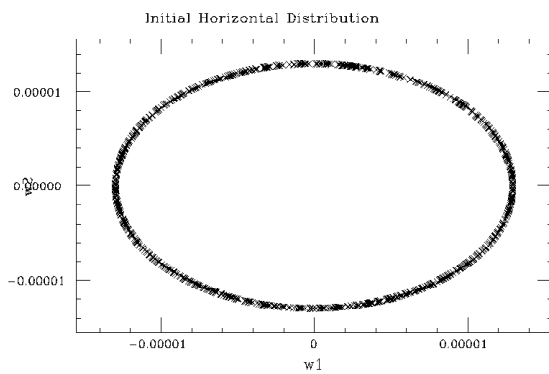
$$=19.0$$

here  $\epsilon_0 y = 6.13e-14$

Tracking from beginning of the line

To the entrance of QF1

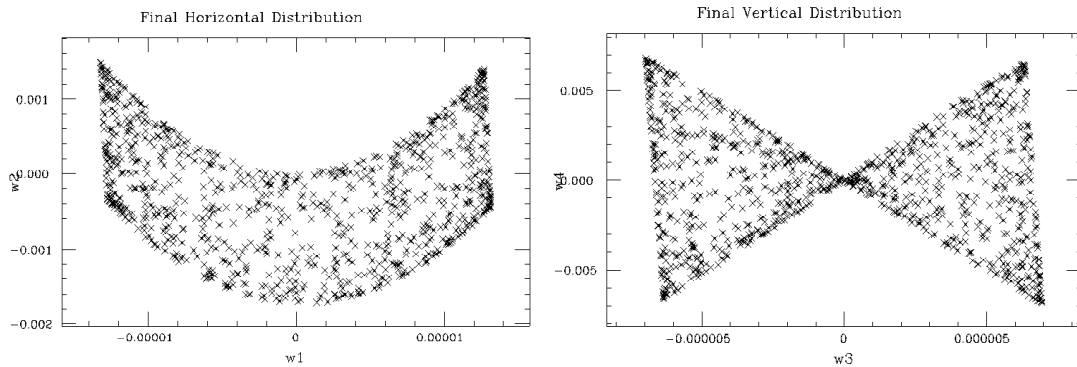
$(A_x, A_y) = (3.7, 19)$ ,  $dp/p = 0$



@QF1

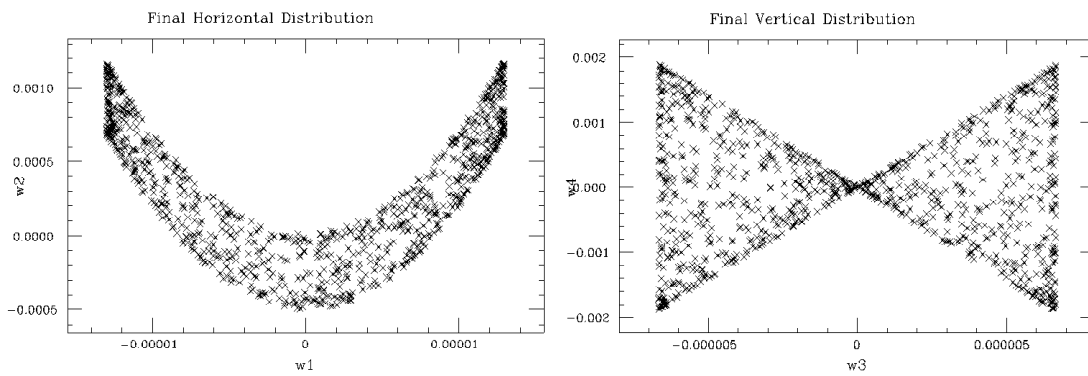
$\text{Max}(A_x, A_y) = (377, 16157)$

from AB7



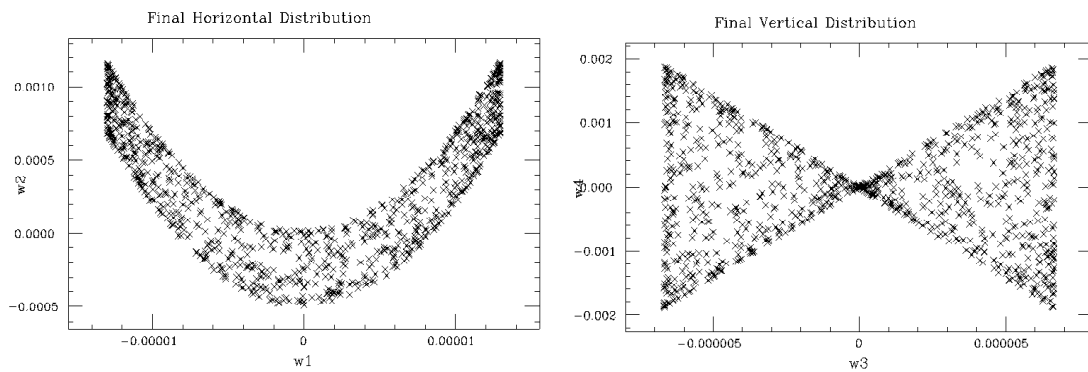
@QF1  $\text{Max}(A_x, A_y) = (490, 19478)$

from OC4



@QF1  $\text{Max}(A_x, A_y) = (333, 5401)$

from SF1( Just upstream of QF1 )



@QF1  $\text{Max}(A_x, A_y) = (333, 5380)$