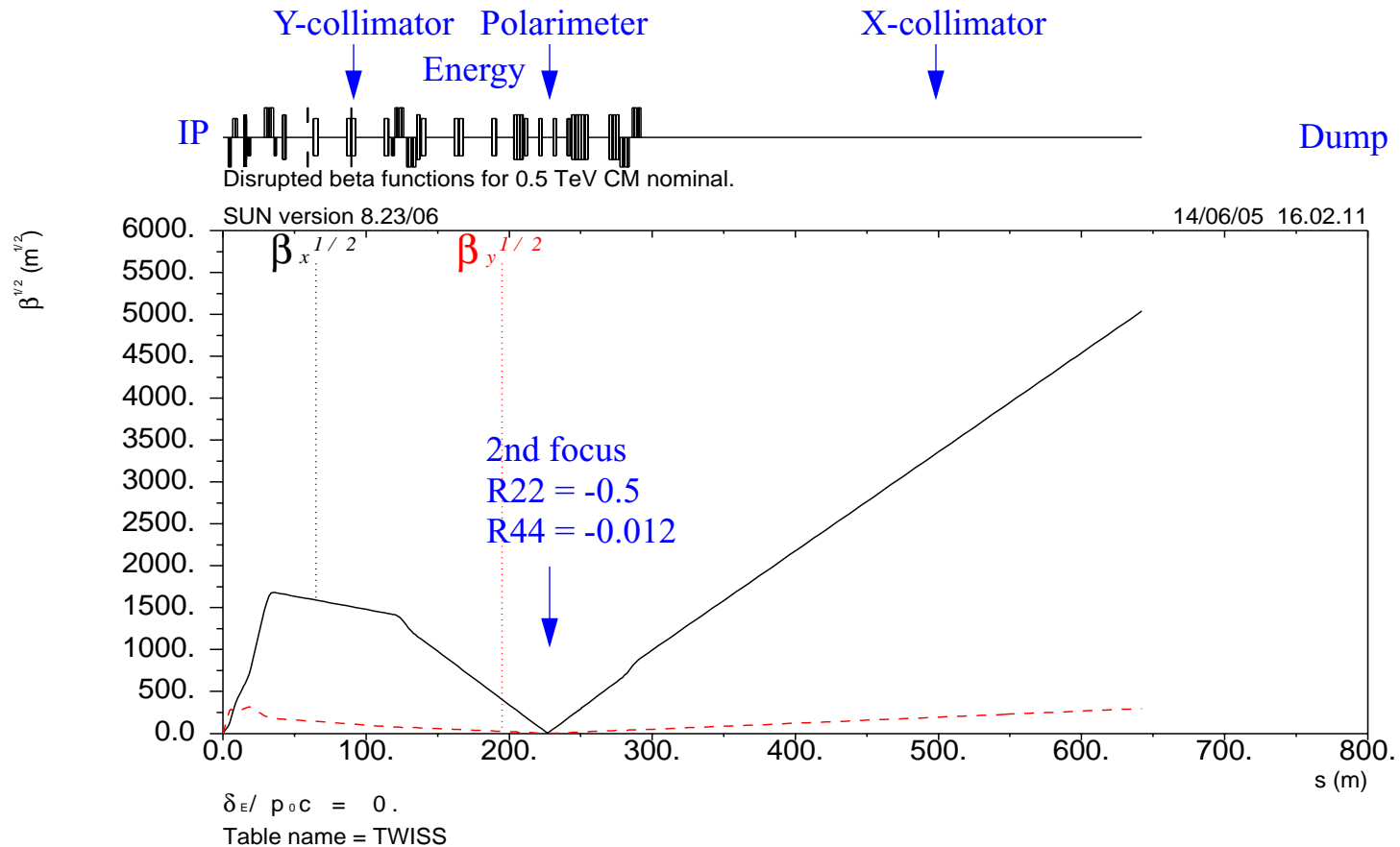


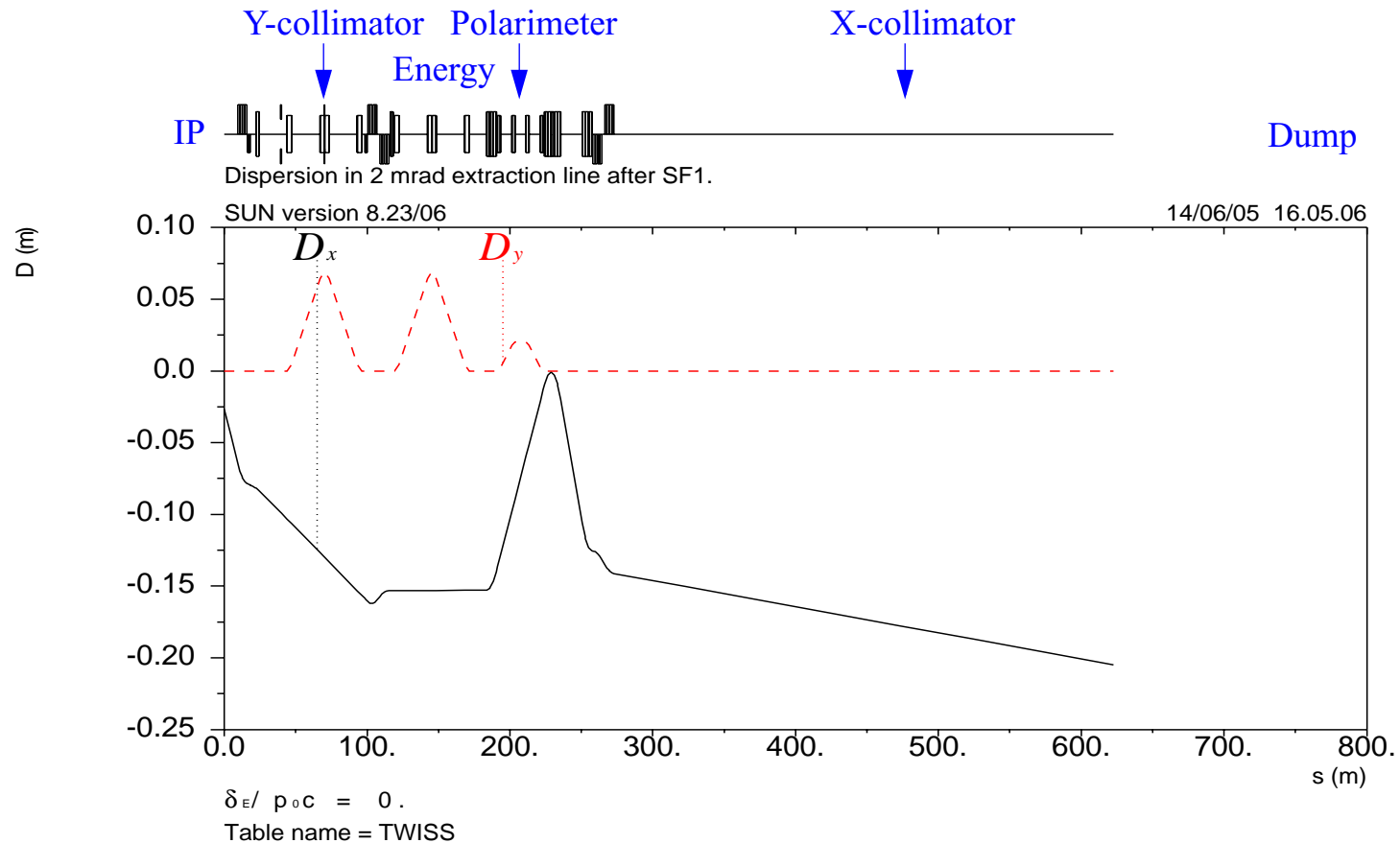
## 2 MRAD EXTRACTION LINE WITH DIAGNOSTIC CHICANES

- Short FD final focus optics
- 3 mrad vertical chicane for collimation
- 3 mrad vertical energy chicane
- 2 mrad vertical polarimeter chicane
- 2nd focus with 2 mrad x-angle
- Long drift to dump for 3.5 m offset
- X-collimation before dump
- Dump at ~800 m (for 6 mrad angle)

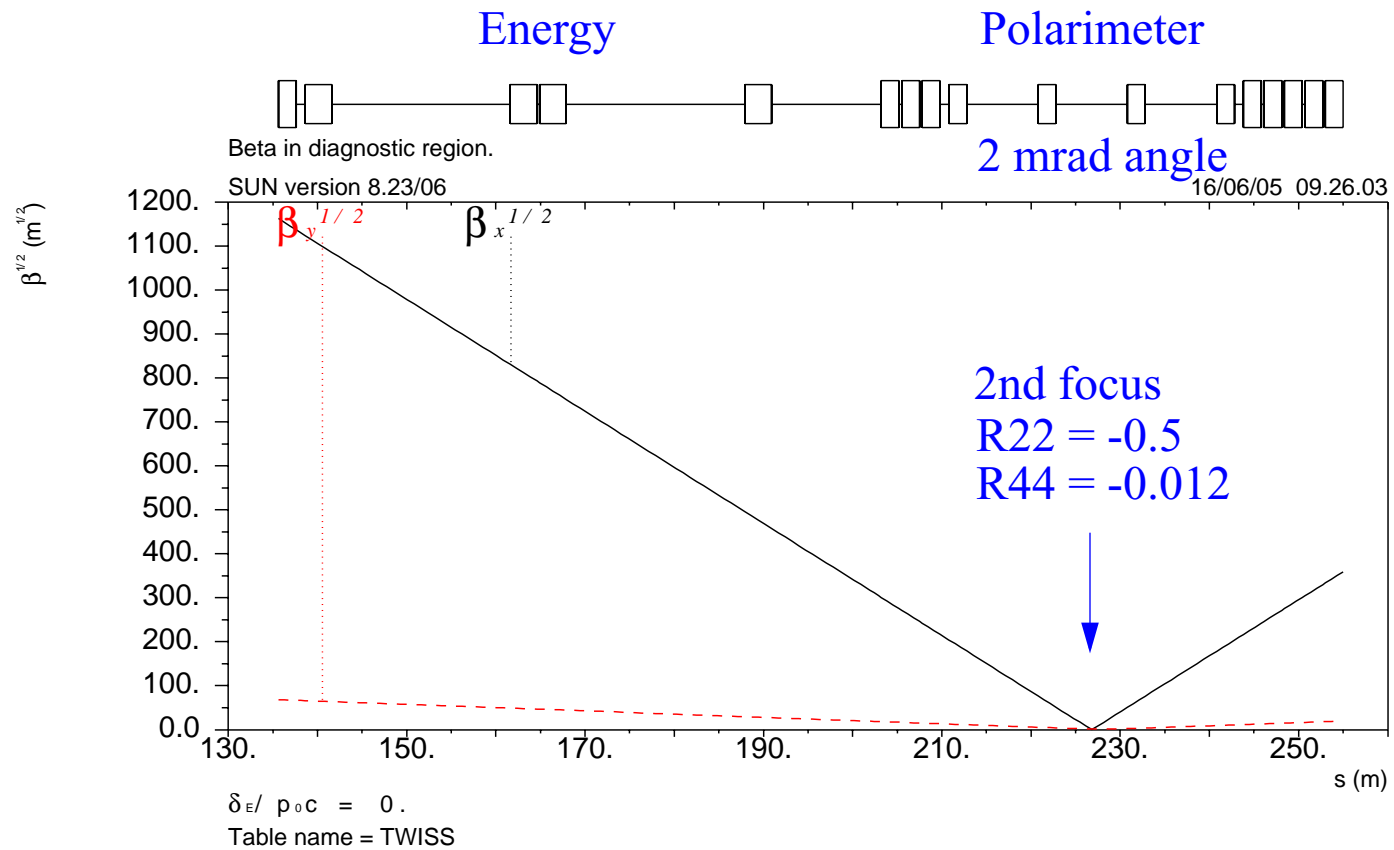


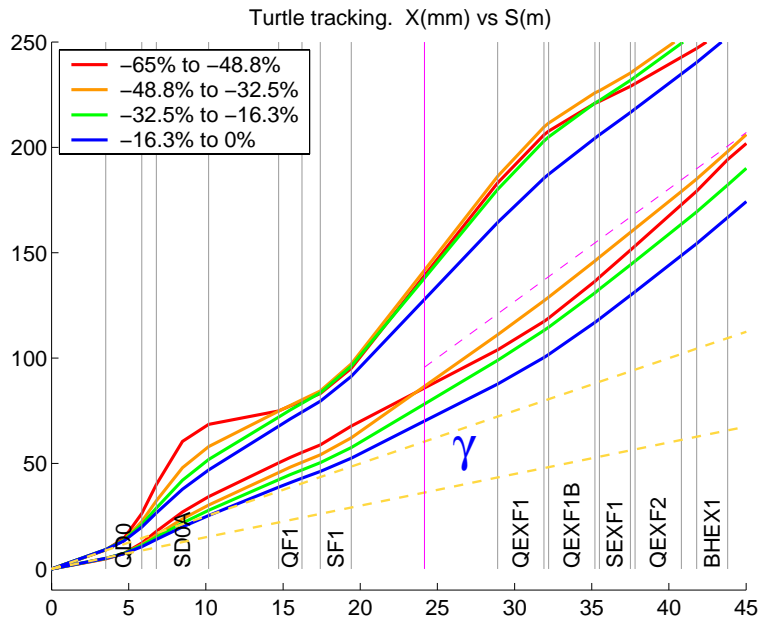
## Linear dispersion

- At Y-collimator:  $\eta_x = -13.0$  cm,  $\eta_y = 6.9$  cm
- At center of energy chicane:  $\eta_x = -15.3$  cm,  $\eta_y = 6.9$  cm
- At the 2nd focus:  $\eta_x = -7.5$  cm,  $\eta_y = 2.0$  cm
- At  $s = 642$  m:  $\eta_x = -20.5$  cm,  $\eta_y = 0$  cm



# Diagnostic chicanes

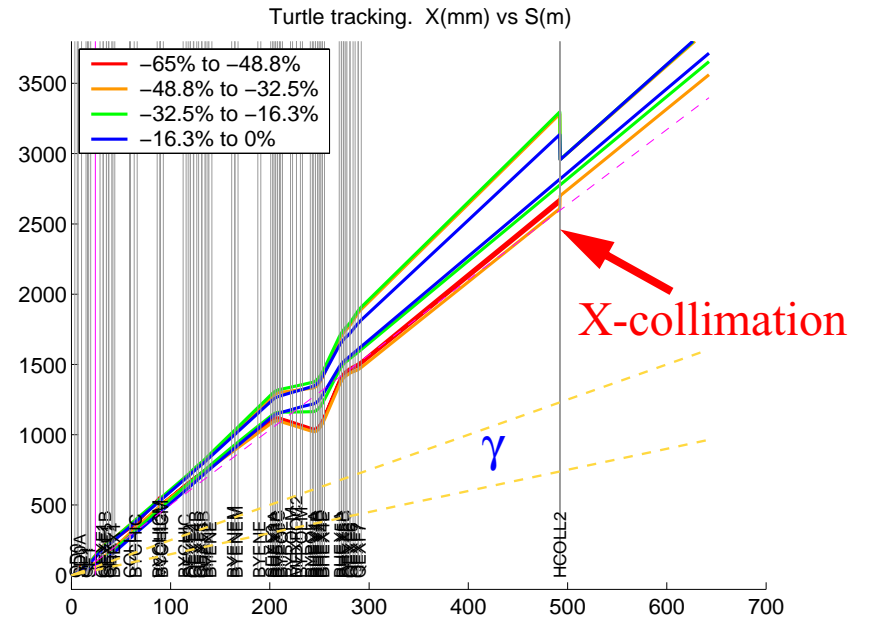




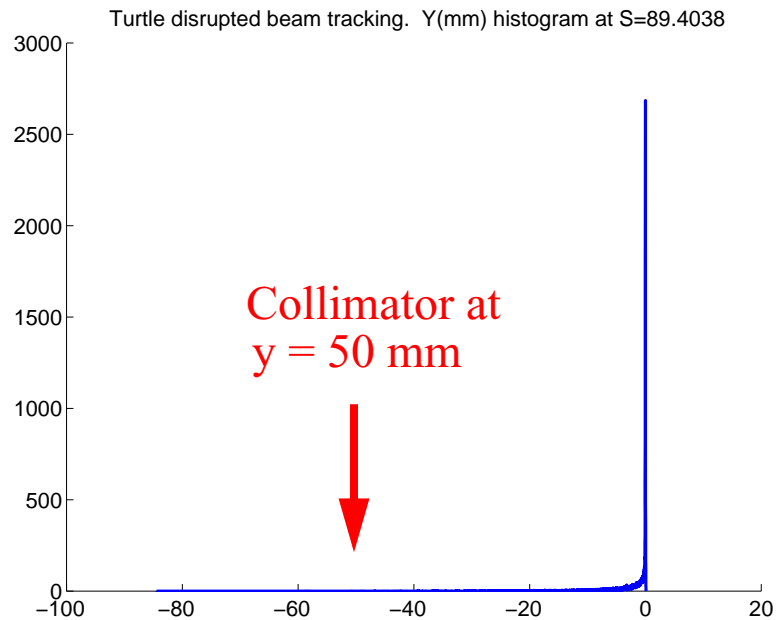
# TURTLE tracking for disrupted beam and 0.5 TeV CM nominal option

Horizontal beam envelope 45 m after IP

Horizontal beam envelope between IP and s = 642 m



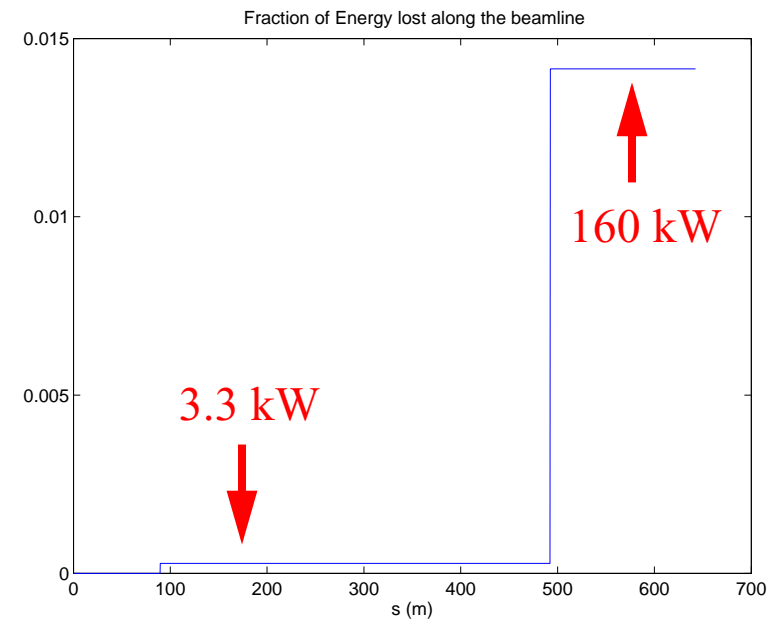


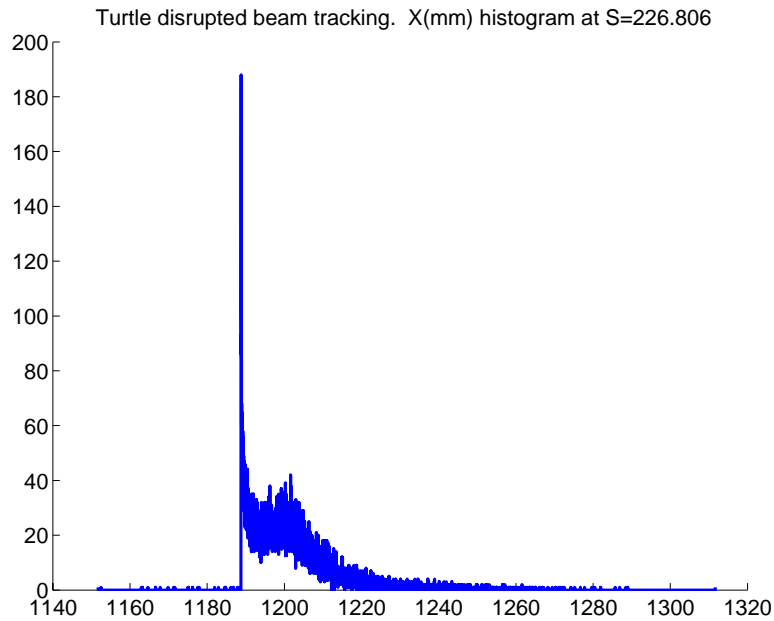


Vertical beam distribution at Y-collimator at  $s = 89.4$  m

Fractional energy loss at the Y and X collimators

Collimator made of copper balls immersed in flowing high pressure water can accept up to 150 kW. Aluminum ball collimator can accept up to 500 kW (L. Keller).

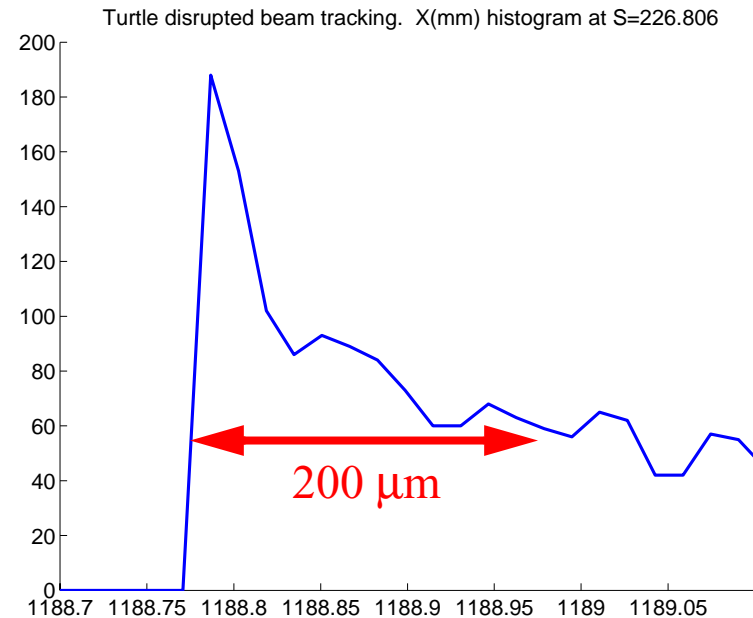


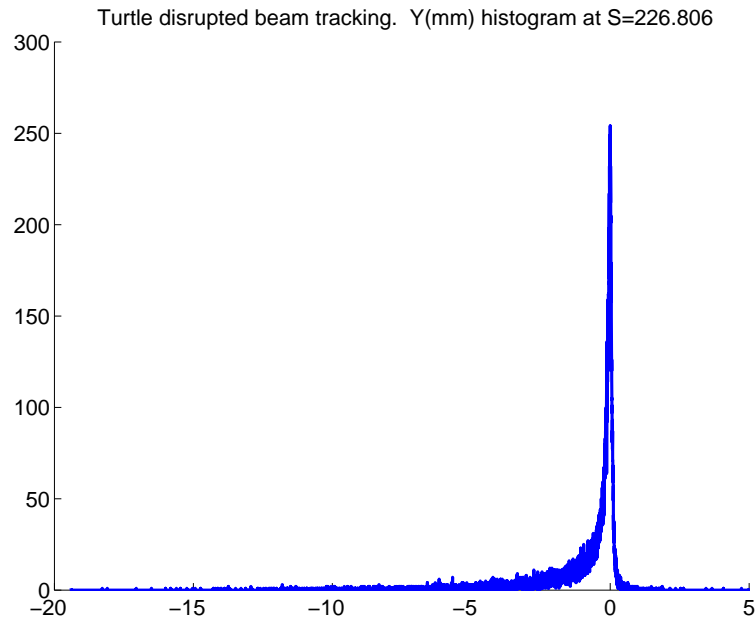


Full beam horizontal spread at the 2nd focus  
at  $s = 226.8$  m

Core beam horizontal spread at the 2nd focus  
at  $s = 226.8$  m

From MAD  $\beta$  and  $\eta$  functions:  
disrupted  $\sigma_x = 75 \mu\text{m}$  for  $\sigma_E = 0.1\%$

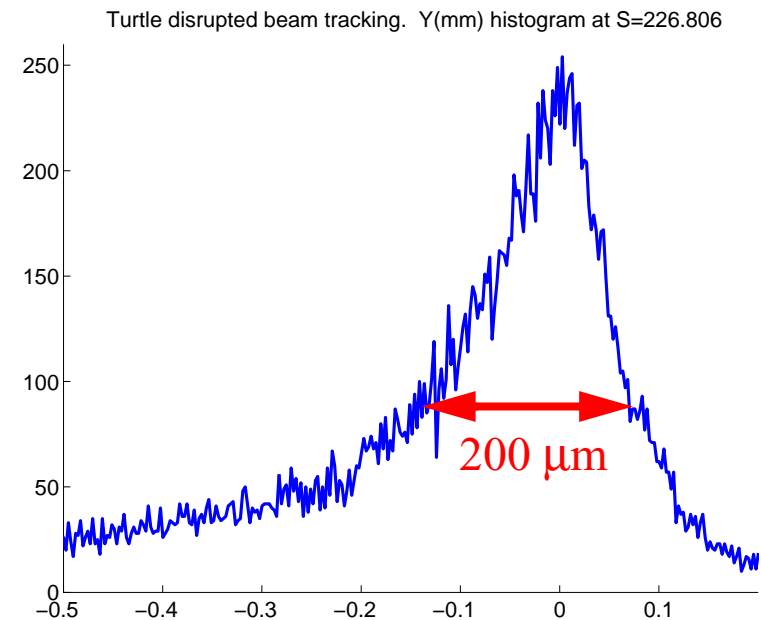




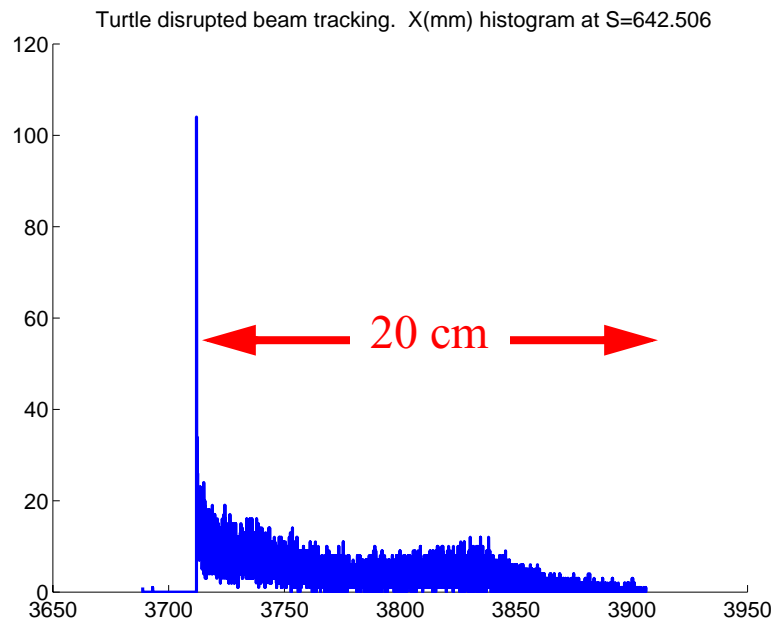
Full beam vertical spread at the 2nd focus at  
 $s = 226.8 \text{ m}$

Core beam vertical spread at the 2nd focus at  
 $s = 226.8 \text{ m}$

From MAD  $\beta$  and  $\eta$  functions:  
 disrupted  $\sigma_y = 20 \mu\text{m}$  for  $\sigma_E = 0.1\%$

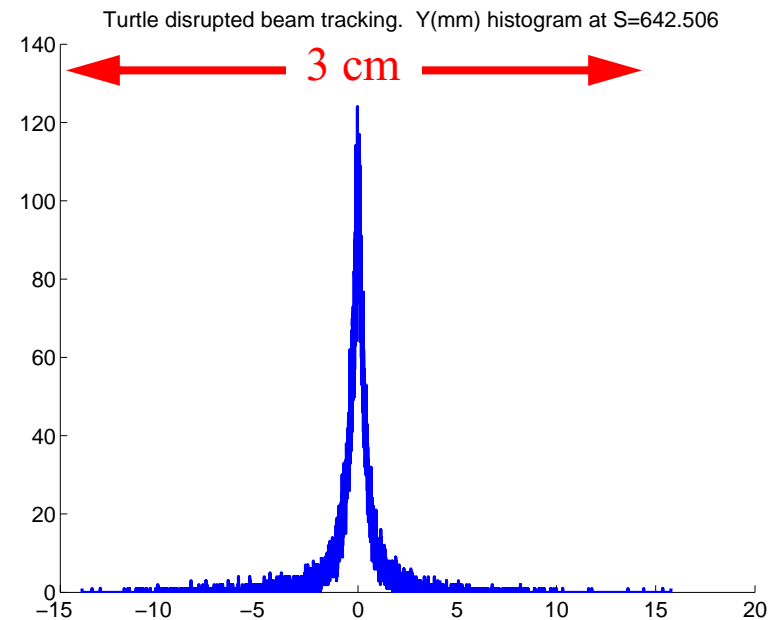






Horizontal beam spread near dump  
at  $s = 642$  m

Vertical beam spread near dump  
at  $s = 642$  m



## Magnet parameters at 0.5 TeV CM

Name	L (m)	$dB_y/dx$ (T/m)	R (mm)
QD0	2.3381	-102.6	45
QF1	1.5	47.5	10
QEXF1	3.0	7.37	~90
QEXF1B	3.0	5.88	~90
QEXF4,4B	3.0	1.99	~100
QEXF5,5B	3.0	-1.17	~100
QEXF6	3.0	-1.76	~150
QEXF7	3.0	1.58	~150

Name	L (m)	B (T)	$\Theta$ (mrad)
BHEX1	2.0	-0.208	-0.5
BHEX3A,B,C	2.0	0.535	1.28
BHEX4A,B,C,D,E	2.0	-0.800	-1.92
BHEX5A,B,C	2.0	0.778	1.87
BYCHIC,M	3.0	0.834	3.0
BYENE,M	3.0	0.834	3.0
BYPOL,M	2.0	0.834	2.0

Name	L (m)	$d^2B_y/dx^2$ (T/m <sup>2</sup> )	R (mm)
SD0	3.3836	754.8	95
SF1	2.0	-344.9	130
SEXF1	2.0	-125.1	~105
SEXF2	2.0	-125.1	~100

The apertures are approximate.

They need to be specified more accurately based on electron and photon beam sizes for various parameter options.

The FD apertures may be reduced.