

Match Focal Plane

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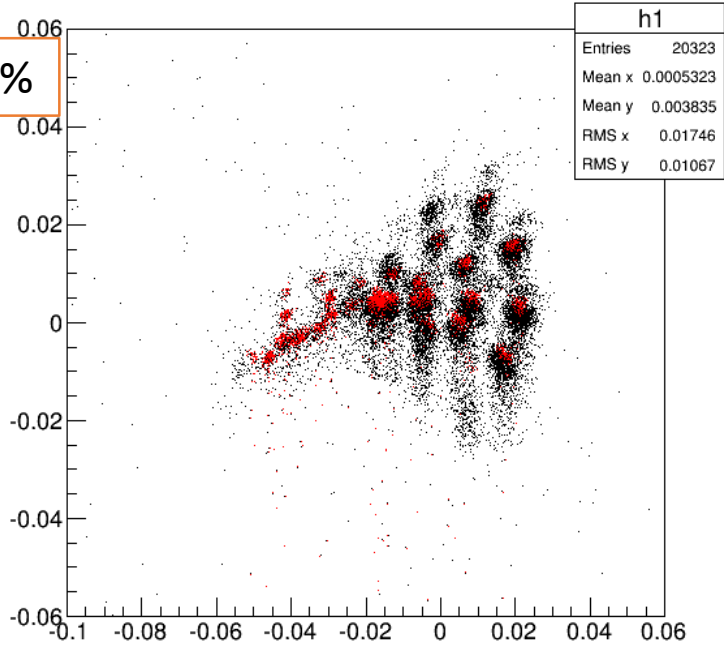
5/6/2014

Focal Plane Comparison

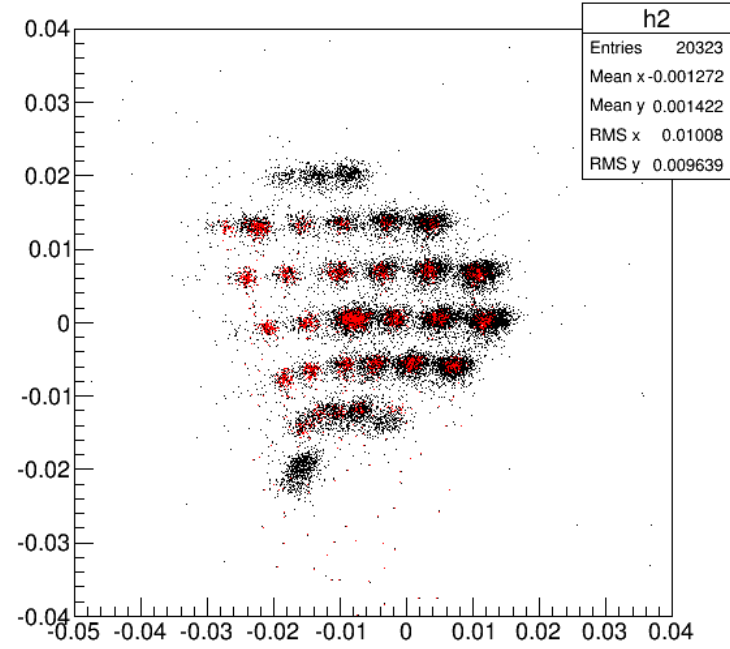
- 2.254 GeV, 0T, 484816 good septum
- Optics runs
 - Delta scan
 - Beam scan
- All match well with virtual plane corrections on forward transport function

dp=0%

x vs y



θ vs ϕ

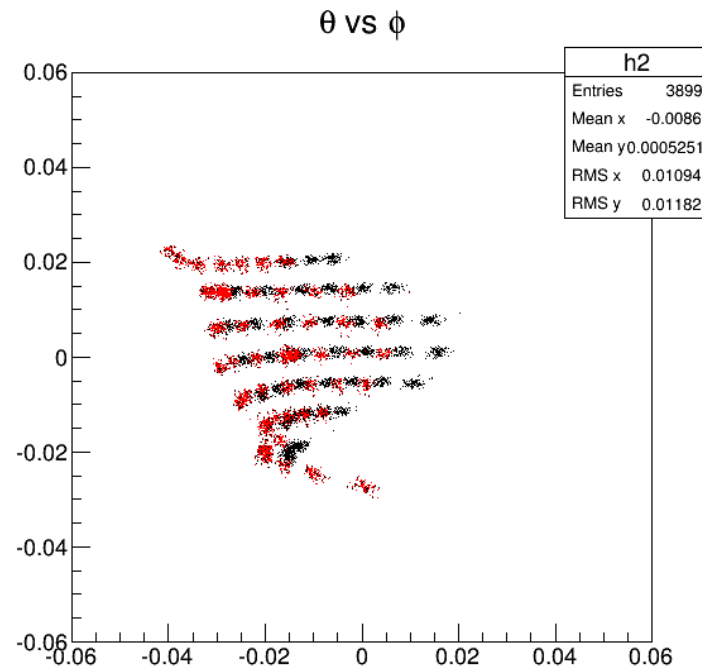
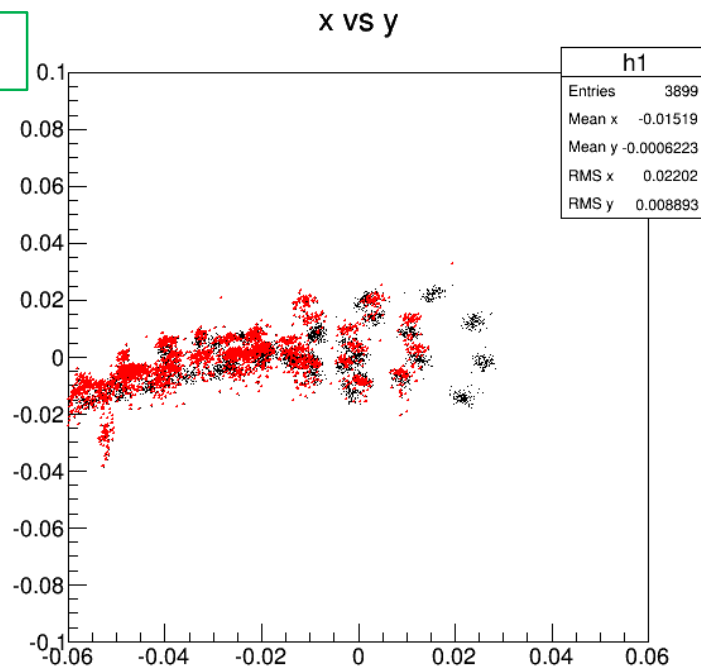


Data: black
Simu: red

Target Field Runs

- 2.253GeV, 2.5T Trans, 484816 good septum
- Delta Scan

0%

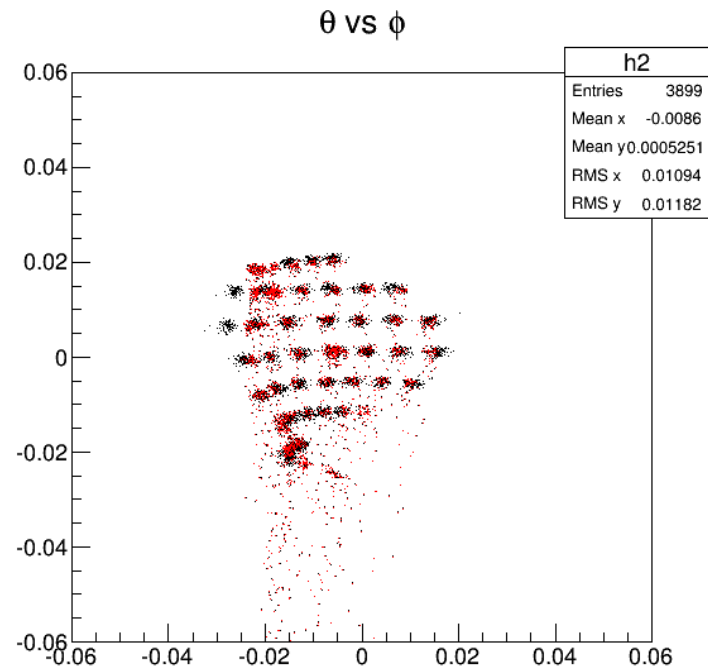
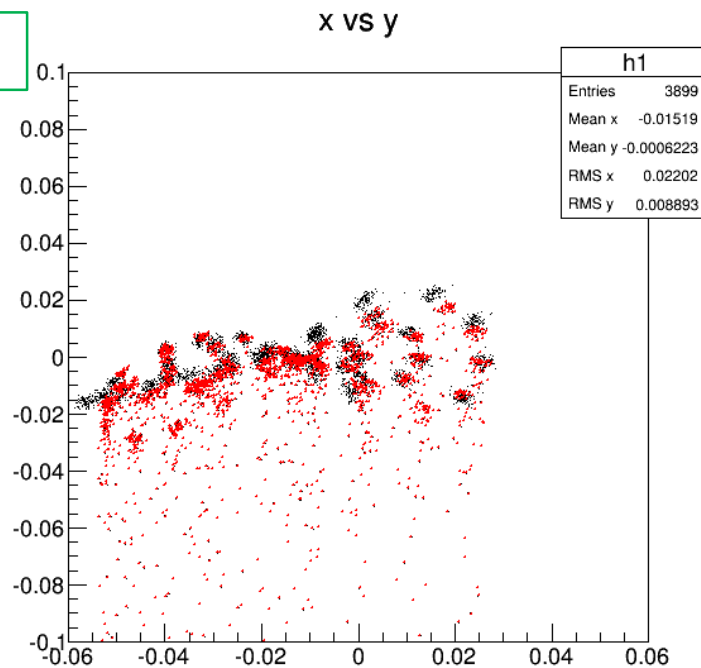


Target Field Runs

- Delta Scan
- 2.253GeV, 2.5T Trans, good septum

#2928 (-3.7, 0.8)mm

0%



Move beam position to (2, -3) to match data

Center Hole at Focal Plane

- Look into this discrepancy starting from central hole

Uncertainty of Focal Plane Measurement

- Optics first order matrix (fp = tg)
 - $y = -0.11y_0 - 1.97\phi_0$
 - $\phi = 0.45y_0 - 1.06\phi_0$

Source	Uncertainty (mm/mr)
Beamx $\sim y_0$	2
Survey of sieve hole position	0.15
	$y \sim 5.2$ $\phi \sim 1.8$
VDC resolution	$y \sim 0.5$ $\phi \sim 0.6$
Sum	$y \sim 5.2$ $\phi \sim 1.9$

Uncertainty of Focal Plane Measurement

- Optics first order matrix (fp = tg)
 - $x = -2.5x_0 - 0.05\theta_0 + 1.3\delta$
 - $\theta = -0.2x_0 - 0.4\theta_0 + 2.3\delta$

Source	Uncertainty (mm/mr)
Beamy $\sim x_0$	2
δ	0.2
Survey of sieve hole position	0.15
	$x \sim 5.0$ $\theta \sim 1.5$
VDC resolution	$x \sim 0.5$ $\theta \sim 0.6$
Sum	$x \sim 5.0$ $\theta \sim 1.6$

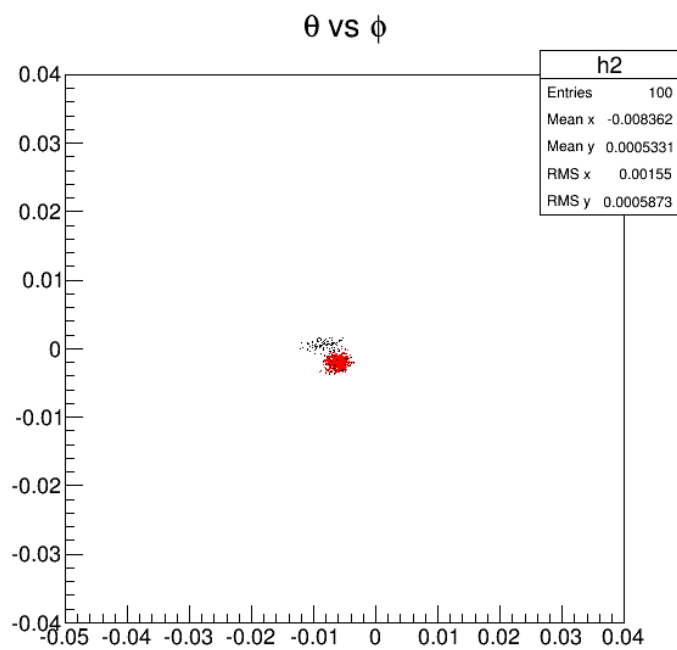
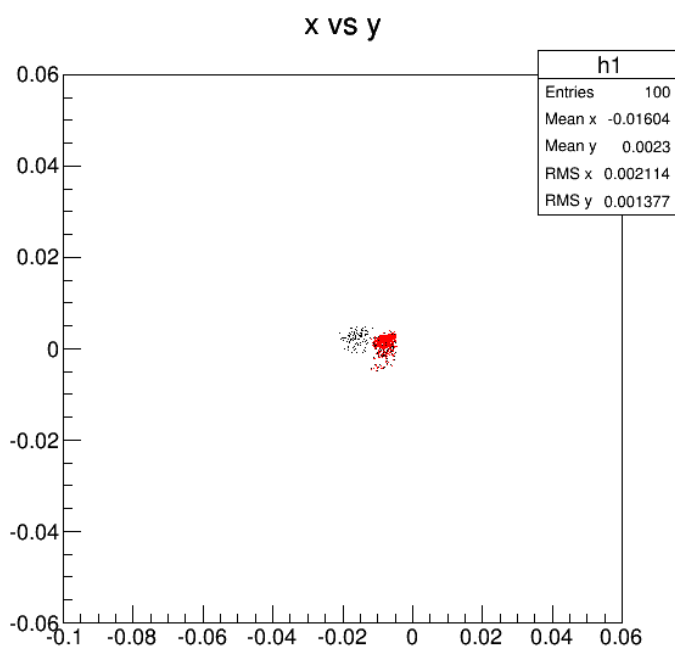
Center Hole at Focal Plane

#3185

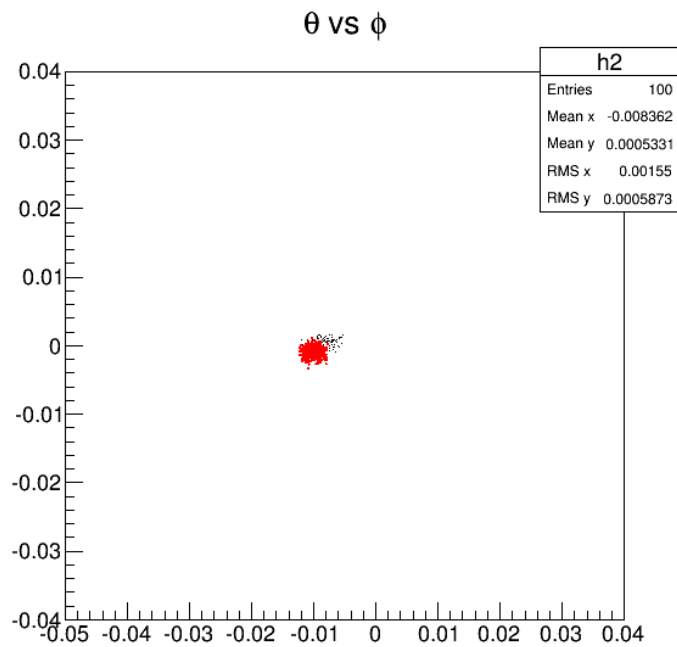
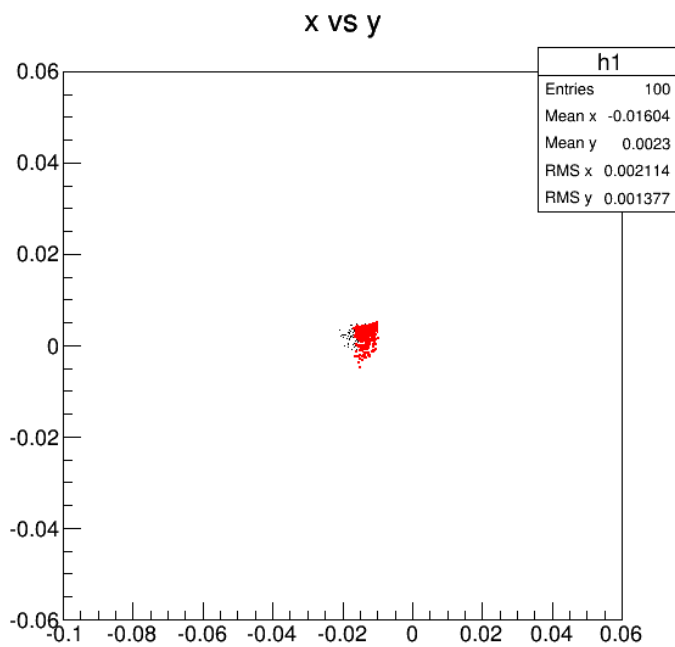
		Sieve center hole			
Fp:		X(mm)	θ (mrad)	Y(mm)	ϕ (mrad)
data		2.3	0.5	-16.0	-8.3
SNAKE	(-0.7, 2.2)	2.1	-2.0	-8.0	-6.3
	(-4.0, 2.2)	-0.2	-2.5	-16.0	-11.7
	(-3.0, 2.2)	0.3	-2.2	-13.0	-10.0
	(-3.0, 1.0)	-2.3	-2.0	-13.3	-10.2
Change dipole	(-3.0, 1.0)	2.7	-0.9	-13.2	-10.0

Conclusion: the differences between data and simulation are within uncertainties

Before



After



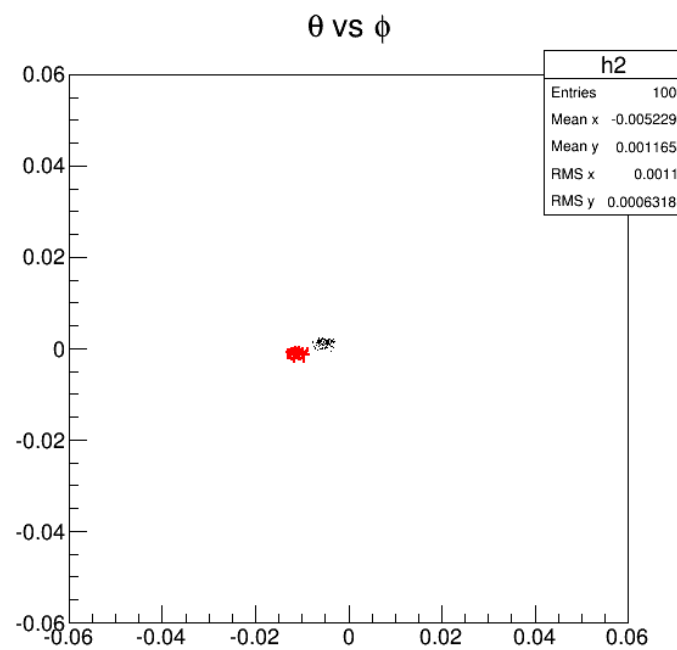
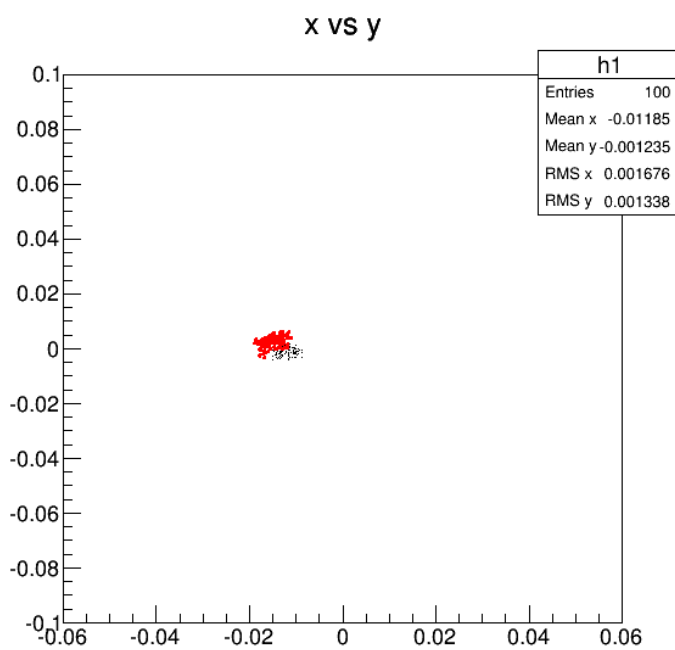
Center Hole at Focal Plane

#2928

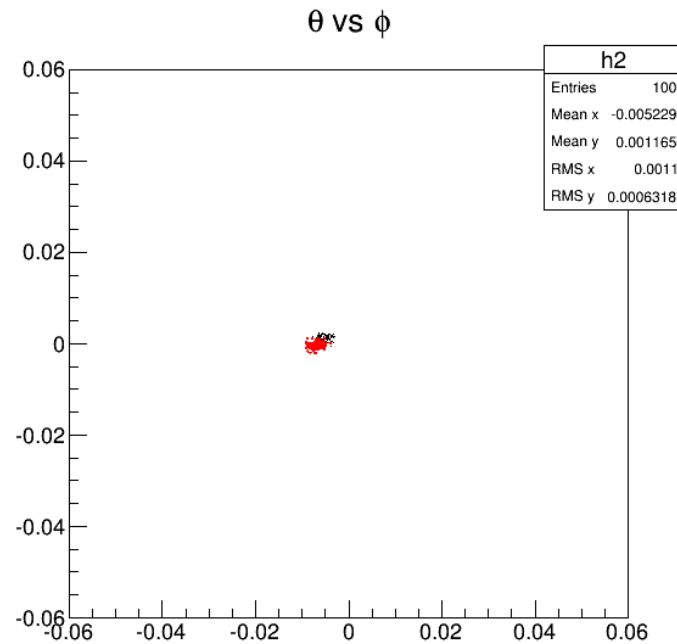
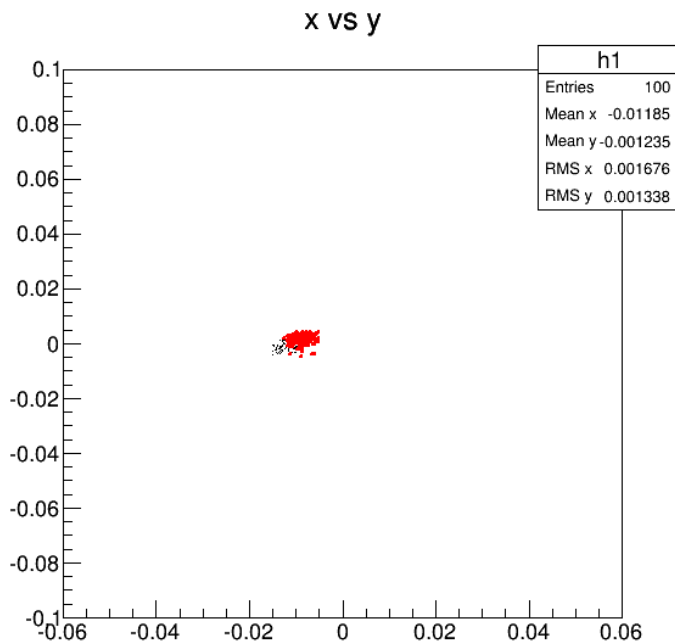
		Sieve center hole			
Fp:		X(mm)	θ (mrad)	Y(mm)	ϕ (mrad)
data		-1.4	1.2	-12.6	-5.3
SNAKE	(-3.7, -0.8)	3.2	-1.2	-14.9	-11.1
	(-3.0, -0.8)	4.0	-1.1	-13.4	-10.1
	(-3.7, -2.0)	0.0	-1.0	-15.4	-11.8
	(-1.0, -2.0)	1.6	-0.5	-9.1	-7.0

Conclusion: the differences between data and simulation are around/within uncertainties

Before



After



Conclusion

- 2.254 GeV, 0T, 484816 good septum
- $(-0.7, 2.2) \rightarrow (-3.0, 1.0)$
- 2.253 GeV, 2.5T Trans, 484816 good septum
- $(-3.7, -0.8) \rightarrow (-1.0, -2.0)$
- They are around/within beam calibration uncertainties
- The differences between data and simulation of central hole are within uncertainties
- Todo:
- Fit all other holes to make them match data