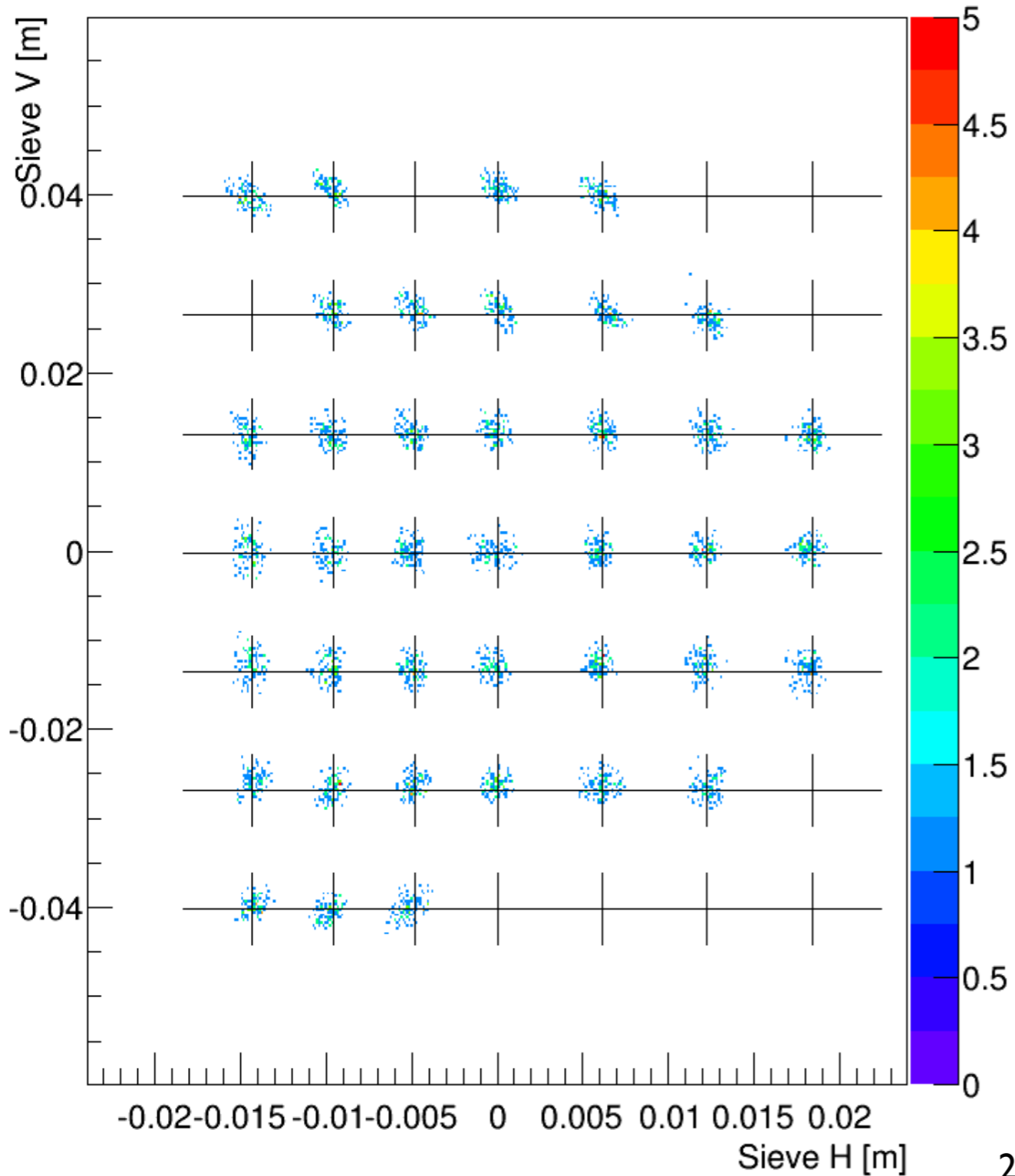


# Optics Status Update

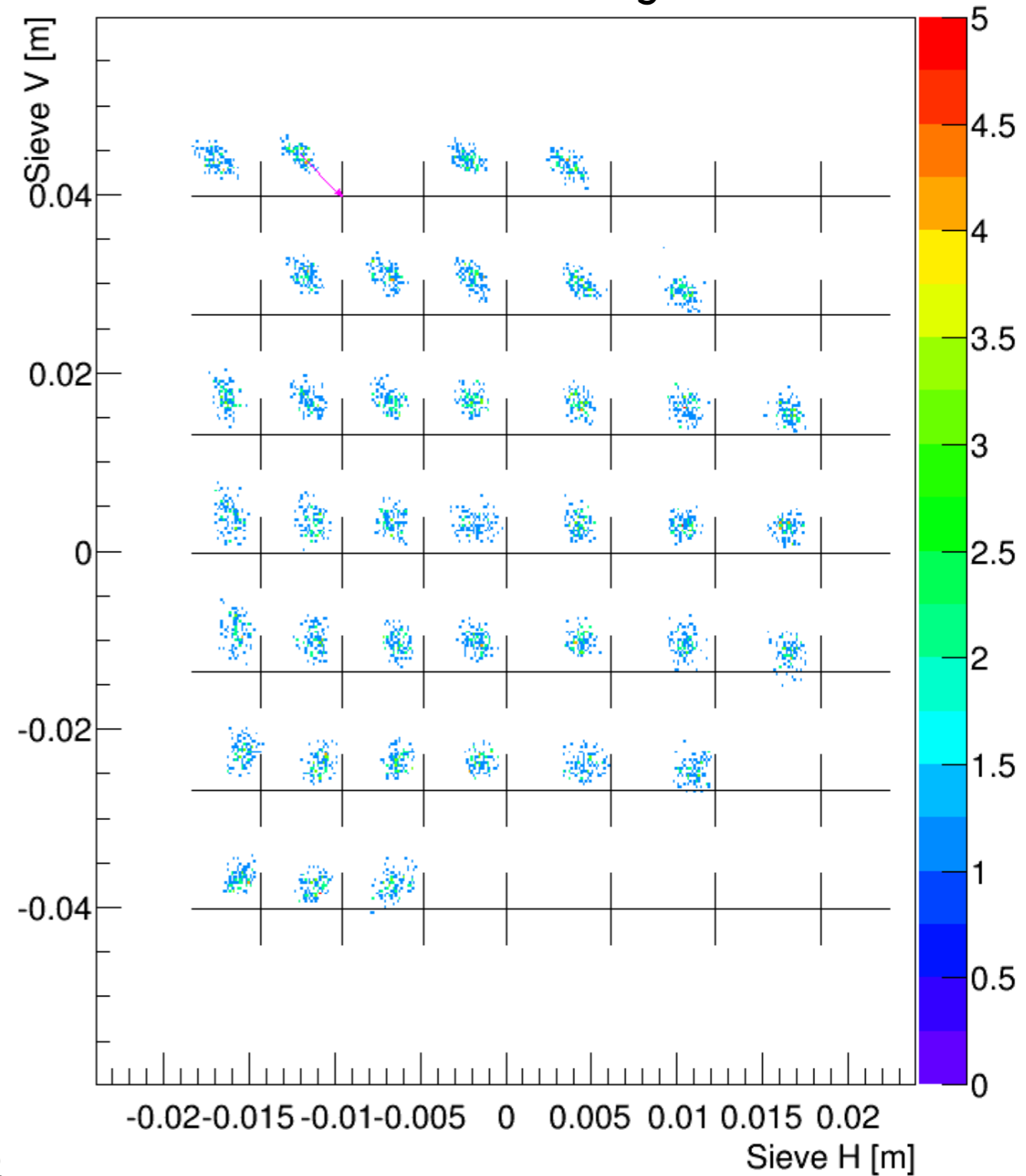
Chao Gu

# Offset Problem

2.254GeV 5.0T 0deg matrix  
same data



2.254GeV 5.0T 0deg matrix  
1.706GeV 2.5T 90deg data



# Optics Status Update

- It is useful to do a fully check of the relations between the reconstructed kinematics and the beam position since we do not have enough constraints (1.706GeV, 2.5T):
  - Delta scan runs 4187 (-3%), 4189 (-2%), 4200 (-1%), 4172 (0%), 4174 (1%), 4176 (2%), 4178 (3%)
  - Beam position scans 4205 (vertical), 4207 (horizontal)
- Check if the reconstructed kinematics correlate to the beam position with all of these runs
  - If so, fit a linear correction

# First Order Matrix

$$\theta_{tg} = T_{0000} + T_{1000} x + T_{0100} \theta + T_{0010} y + T_{0001} \varphi$$

$$\varphi_{tg} = P_{0000} + P_{1000} x + P_{0100} \theta + P_{0010} y + P_{0001} \varphi$$

Septum	Field	T0000	T1000	T0100	T0010	T0001
484816	0T	3.119E-03	2.581E-02	-2.805E+00	-5.824E-02	8.464E-02
484816	2.5T	6.303E-03	2.561E-02	-2.680E+00	-5.120E-02	1.067E-01
400016	L	7.379E-03	2.269E-02	-2.620E+00	4.959E-02	6.070E-02
400016	2.5T	8.034E-03	2.098E-02	-2.657E+00	9.005E-02	3.869E-02
		P0000	P1000	P0100	P0010	P0001
484816	0T	-3.632E-03	2.235E-03	-2.085E-02	-8.448E-01	6.860E-01
484816	2.5T	1.649E-03	2.364E-03	-9.419E-03	-8.901E-01	7.511E-01
400016	L	-4.621E-03	4.567E-03	6.878E-02	-8.697E-01	7.019E-01
400016	2.5T	-7.208E-03	1.008E-03	8.706E-02	-8.791E-01	7.267E-01

# Optics Status Update

- Fit result (2.254GeV, longitudinal):
  - $\varphi = \varphi_{\text{matrix}} - 0.377 \times Y_{\text{tg}} - 0.667e-3$
- Fit result (1.706GeV, transverse):
  - $\varphi = \varphi_{\text{matrix}} - 0.247 \times Y_{\text{tg}} + 1.96e-3$
- After apply the correction, the constant term has been corrected, two matrix could be used to replay both data set

# Optics Status Update

- Check the other settings

Backups

# Optics Status Update

	$X_{tg}/\text{mm}$	$Y_{tg}/\text{mm}$	$T_{cal}$	$T_{rec}$	$T_{cal}-T_{rec}$
5592	4.60E-03	4.28E-04	-5.67E-03	-5.79E-03	1.20E-04
5594	3.76E-03	3.68E-03	-4.65E-03	-5.99E-03	1.34E-03
5585	2.57E-03	1.99E-03	-3.11E-03	-4.59E-03	1.48E-03
5588	3.09E-03	1.41E-03	-3.84E-03	-4.11E-03	2.70E-04
5590	4.18E-03	8.95E-04	-5.10E-03	-5.10E-03	0.00E+00
5595, U	4.56E-04	4.10E-03	-7.10E-04	4.25E-04	-1.14E-03
5595, D	7.24E-03	4.69E-03	-9.05E-03	-1.08E-02	1.75E-03
5597, L	4.42E-03	-1.88E-03	-5.66E-03	-6.36E-03	7.00E-04
5597, R	3.78E-03	5.71E-03	-4.27E-03	-2.71E-03	-1.56E-03

Theta



# Optics Status Update

	$X_{tg}/\text{mm}$	$Y_{tg}/\text{mm}$	$P_{cal}$	$P_{rec}$	$P_{cal}-P_{rec}$
5592	4.60E-03	4.28E-04	-6.72E-04	-2.80E-04	-3.92E-04
5594	3.76E-03	3.68E-03	-4.51E-03	-4.83E-03	3.20E-04
5585	2.57E-03	1.99E-03	-2.61E-03	-3.40E-03	7.90E-04
5588	3.09E-03	1.41E-03	-1.78E-03	-2.37E-03	5.90E-04
5590	4.18E-03	8.95E-04	-1.22E-03	-2.02E-03	8.00E-04
5595, U	4.56E-04	4.10E-03	-4.94E-03	-2.94E-03	-2.00E-03
5595, D	7.24E-03	4.69E-03	-5.67E-03	-4.02E-03	-1.65E-03
5597, L	4.42E-03	-1.88E-03	2.53E-03	5.20E-04	2.01E-03
5597, R	3.78E-03	5.71E-03	-7.19E-03	-6.95E-03	-2.40E-04

Phi

# Optics Status Update

	$X_{tg}/\text{mm}$	$Y_{tg}/\text{mm}$	$dp_{cal}$	$dp_{rec}$	$dp_{cal}-dp_{rec}$
5592	4.60E-03	4.28E-04	-2.97E-02	-2.91E-02	-6.00E-04
5594	3.76E-03	3.68E-03	-9.98E-03	-9.75E-03	-2.33E-04
5585	2.57E-03	1.99E-03	1.33E-04	3.55E-04	-2.22E-04
5588	3.09E-03	1.41E-03	1.04E-02	1.07E-02	-2.70E-04
5590	4.18E-03	8.95E-04	3.11E-02	3.14E-02	-2.50E-04
5595, U	4.56E-04	4.10E-03	1.93E-04	8.18E-04	-6.25E-04
5595, D	7.24E-03	4.69E-03	1.49E-04	-3.90E-04	5.39E-04
5597, L	4.42E-03	-1.88E-03	-8.48E-05	-5.56E-05	-2.92E-05
5597, R	3.78E-03	5.71E-03	-1.92E-05	6.98E-04	-7.18E-04

dp