

Optics Status Update

Chao Gu

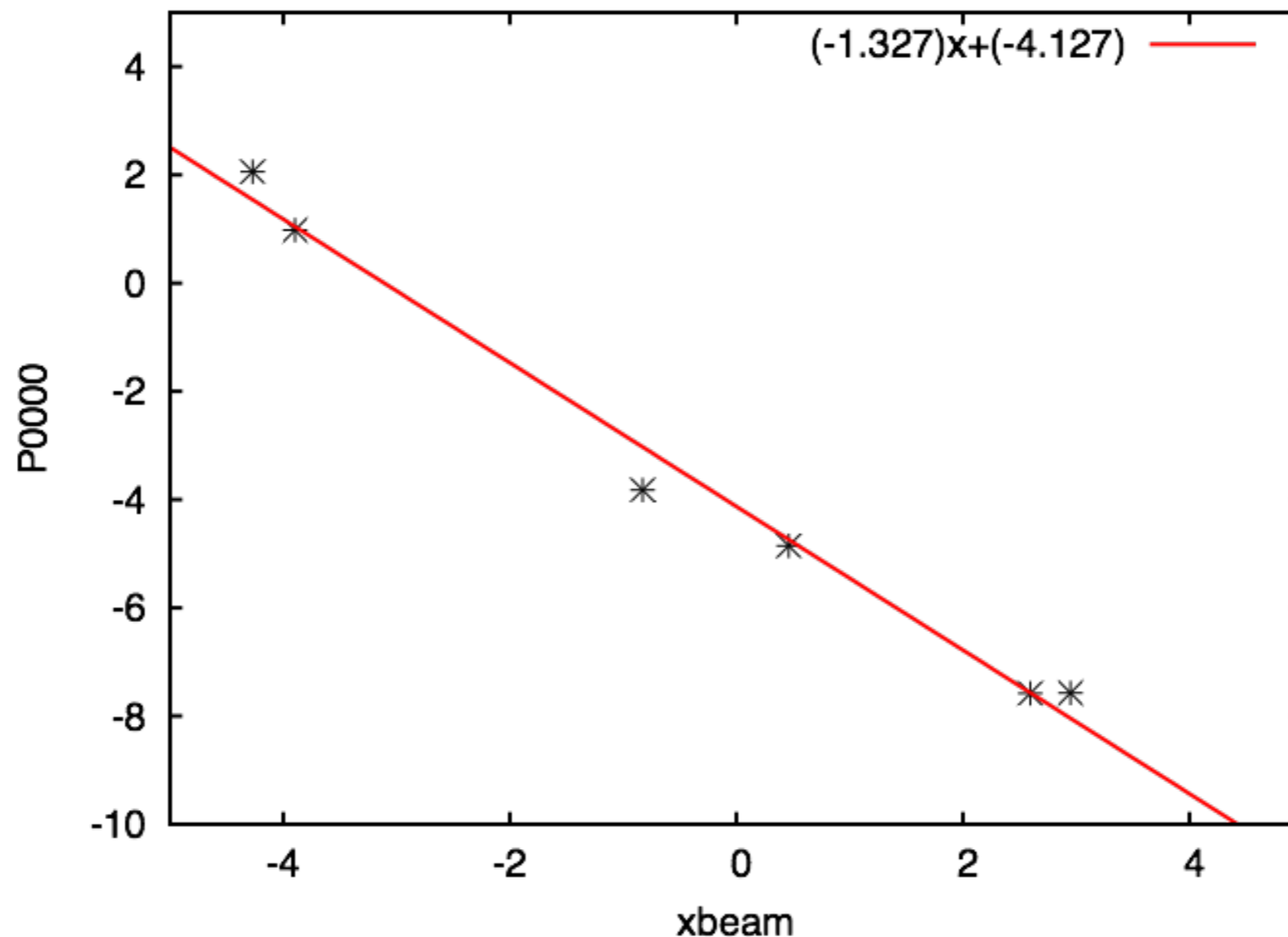
Calibration Status

- Confusing relations between the offset of φ_{tg} and beam position
- The reference angle (calculated from sieve hole position and beam position) changed due to the BPM readout
- Check with focus plane variables

E/GeV	Septum	Field/T	P ₀₀₀₀ /mrad	X _{beam} /mm
2.254	484816	0.0	-3.823	-0.828
2.254	484816	2.5	0.979	-3.897
2.254	403216	2.5	2.058	-4.270
2.254	400016	L	-4.854	0.462
1.706	400016	2.5	-7.575	2.950
1.158	400016	2.5	-7.579	2.594

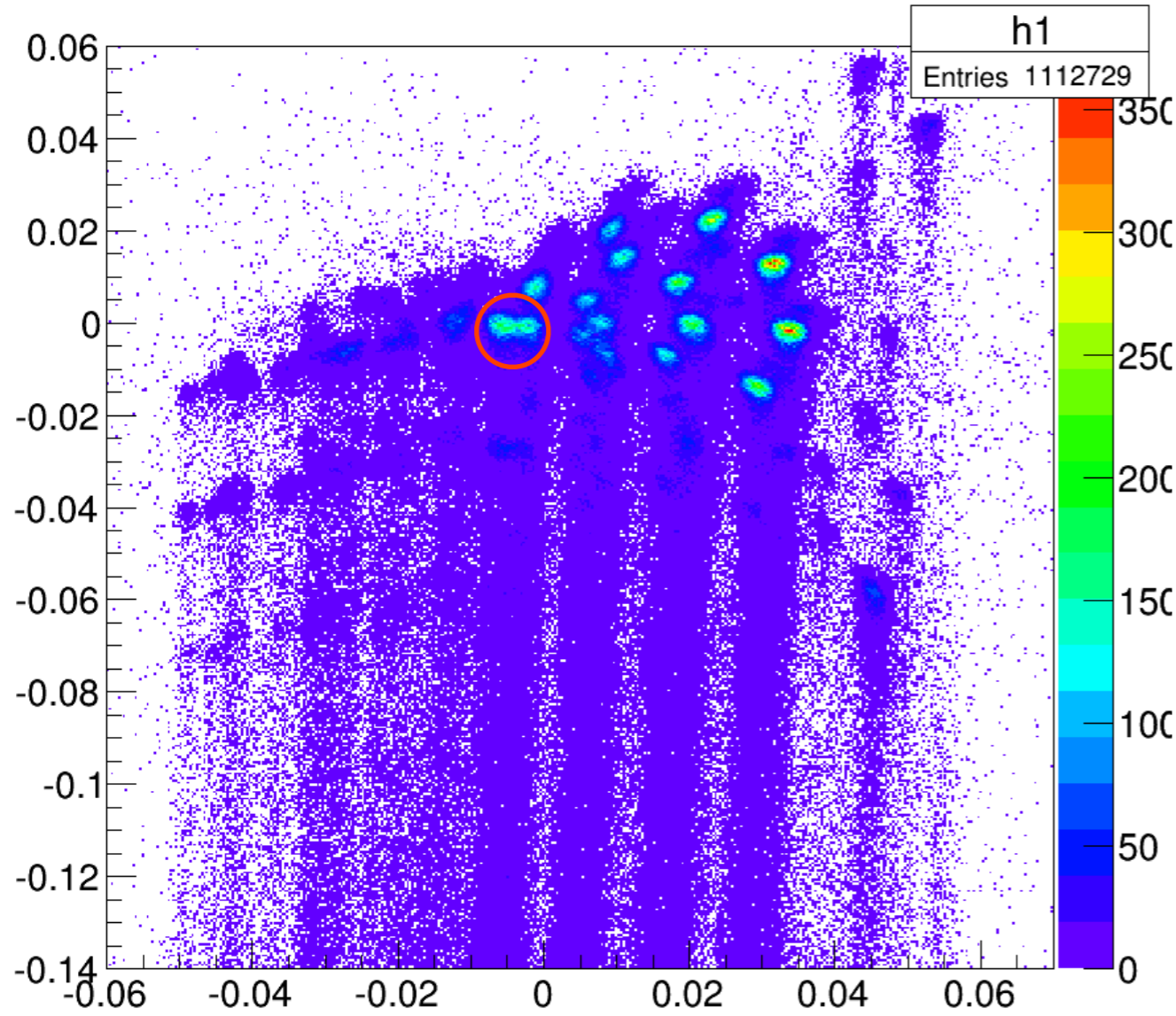
Calibration Status

- Fitting result suggests that 1mm difference of beam x will give 1.327 mrad offset of phi
- Notice: the distance between sieve plate and target center is 800mm and $1\text{mm}/800\text{mm}\sim 1.25\text{mrad}$



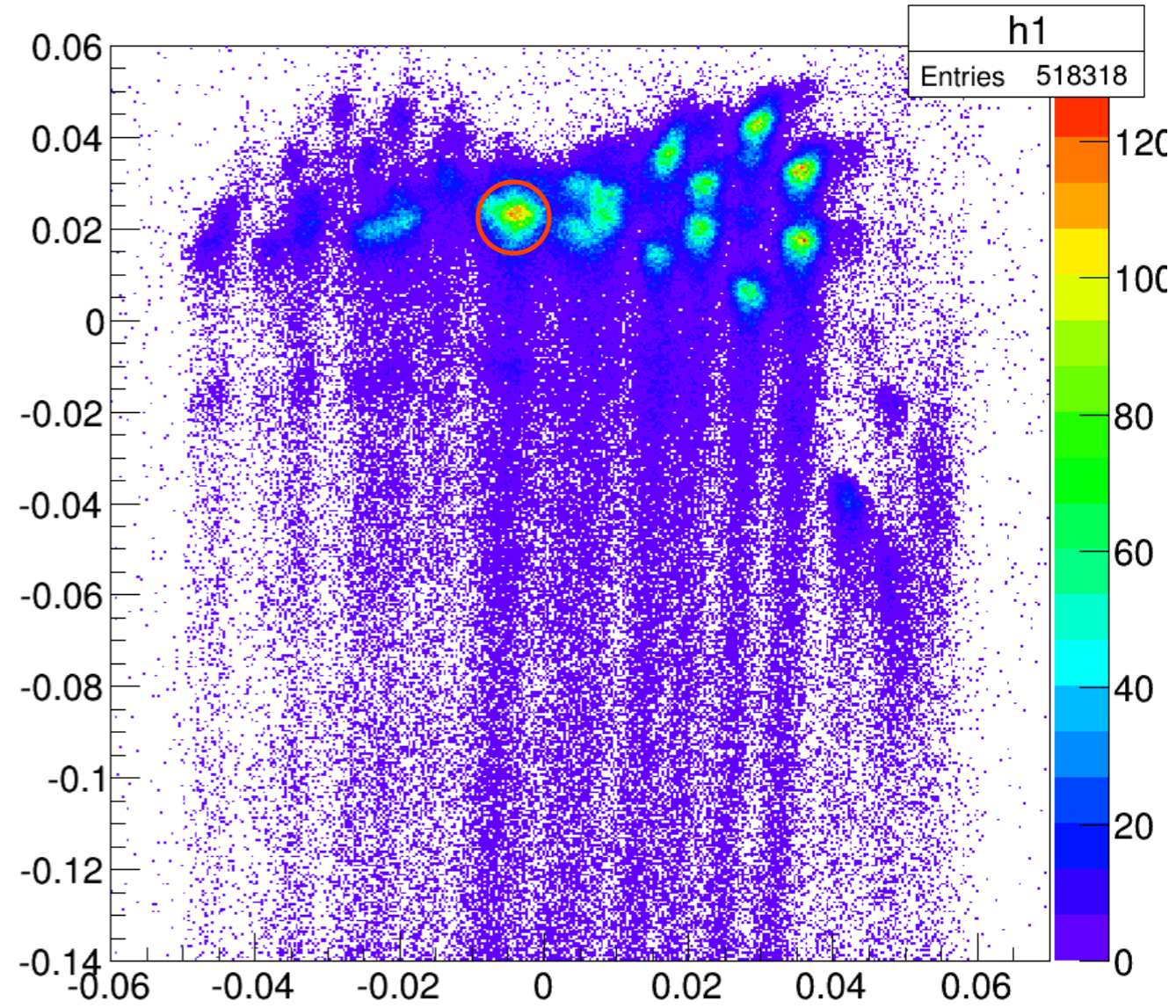
Focus Plane Plots

Fp x vs. Fp y



run 2928
2.5T, 90deg, 484816
central hole: $Y_{fp} = -3.81\text{mm}$

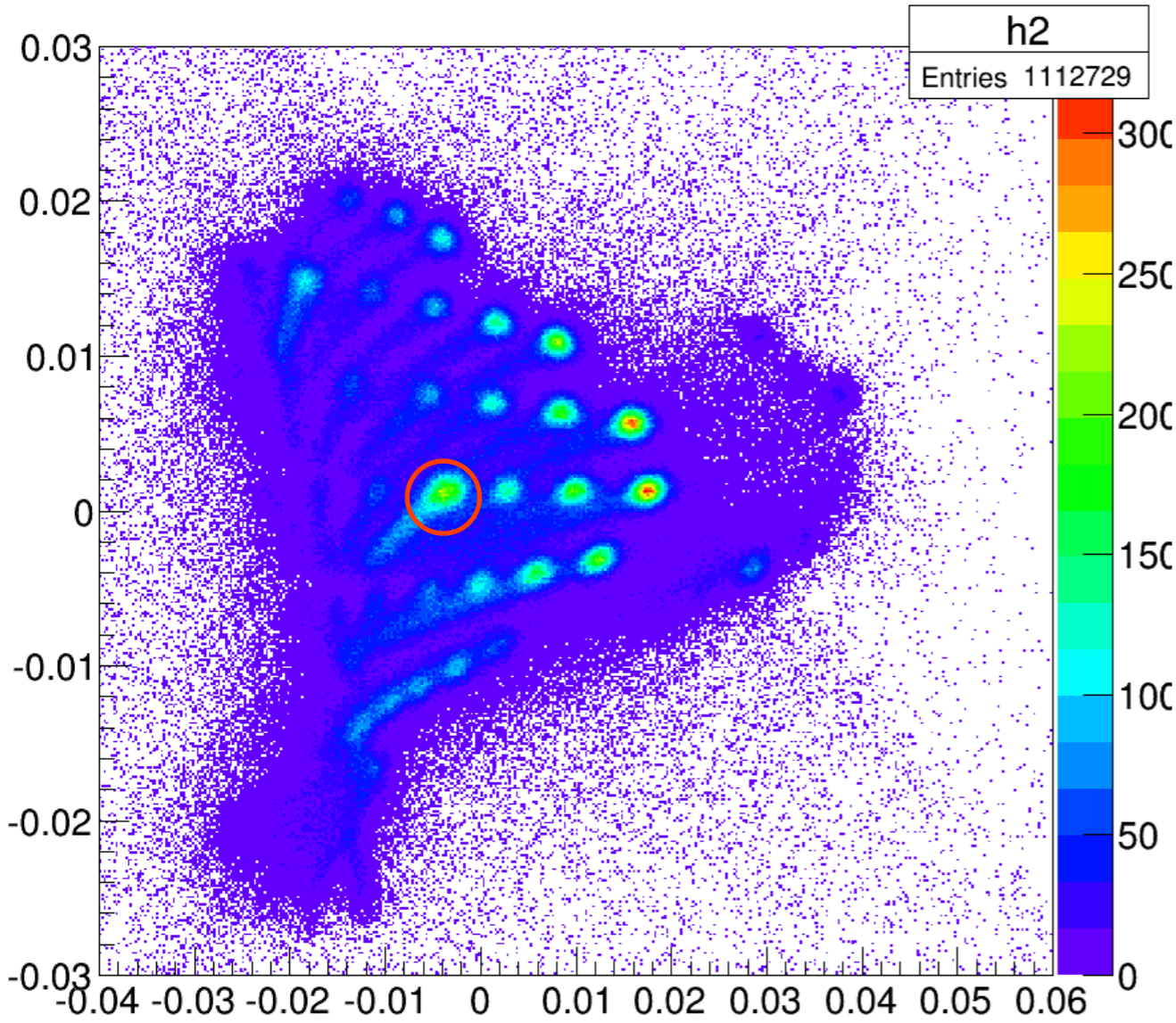
Fp x vs. Fp y



run 4172
2.5T, 90deg, 400016
central hole: $Y_{fp} = -3.18\text{mm}$

Focus Plane Plots

Fp th vs. Fp ph

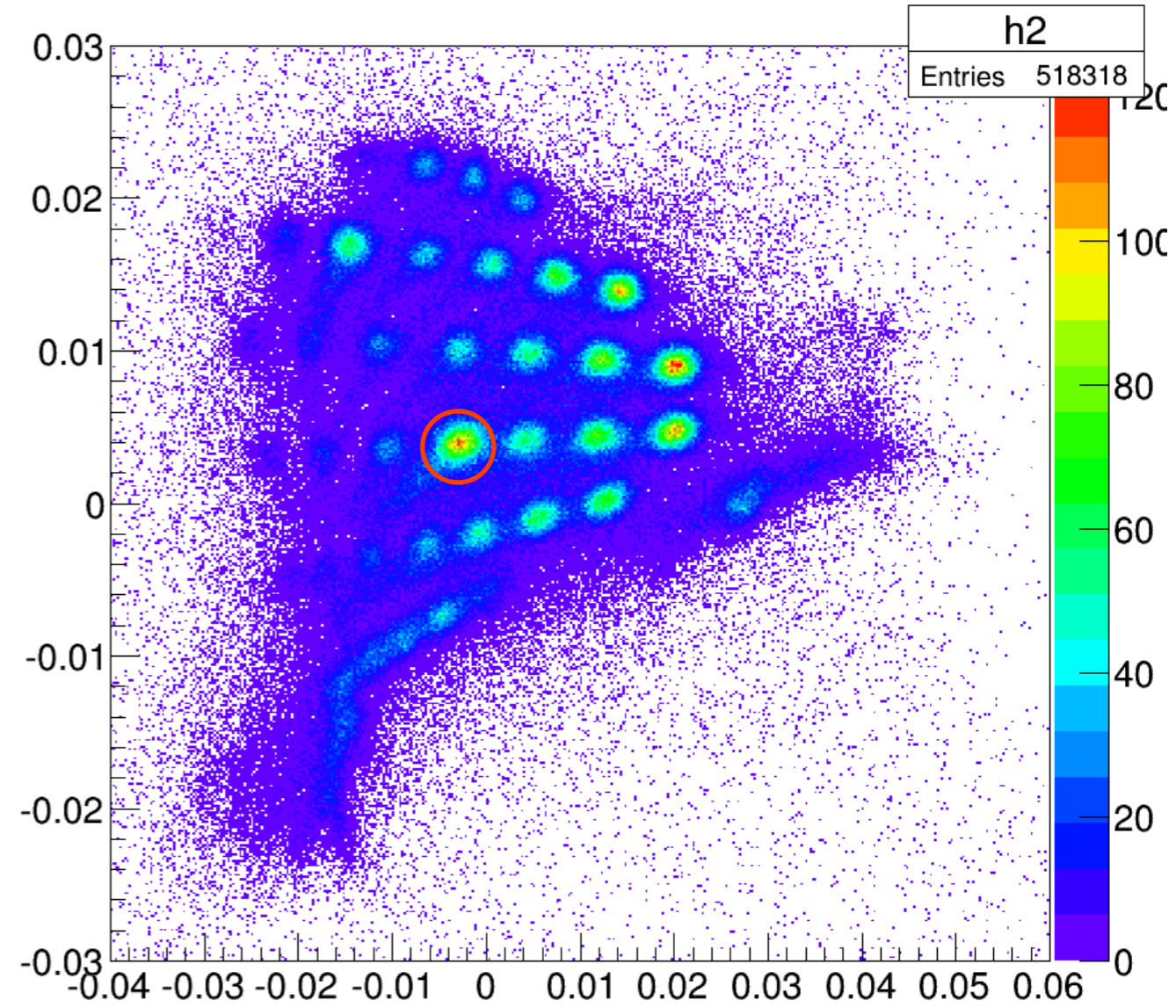


run 2928

2.5T, 90deg, 484816

central hole: $P_{fp} = -3.19\text{mrad}$

Fp th vs. Fp ph



run 4172

2.5T, 90deg, 400016

central hole: $P_{fp} = -2.43\text{mrad}$

Calibration Status

- The offset should not be linear with the beam position, something is wrong
- Ideally the focus plane variables of the central hole should be linear with the beam position
- Possible reason?

central hole



Run#	E/GeV	Septum	Field/T	P ₀₀₀₀ /mrad	X _{beam} /mm	P _{fp} /mrad	Y _{fp} /mm
3185	2.254	484816	0.0	-3.823	-0.607	-6.192	-7.854
2928	2.254	484816	2.5	0.979	-3.775	-3.190	-3.810
5585	2.254	400016	L	-4.854	0.333	-3.594	-4.821
4172	1.706	400016	2.5	-7.575	2.194	-2.430	-3.180

Status

- LHRS first iteration
- Reconstruction need 2 part of input
 - optics matrix (1st iteration)
 - database for effective beam position
 - fit from simulation
 - finished for LHRS
- Test and fix bugs in the reconstruction script with 5T longitudinal setting

Status

- Database structure:
 - 3 different septa settings
 - 5 different field settings (include gep)

E	Field	Septa	Analyzer	DB	Field DB
2.2GeV	0T 90deg	484816	20120301		1330000000
2.2GeV	2.5T 90deg	484816	20120307		1331050000
2.2GeV	5T 6deg	484816			1331340000
2.2GeV	0T 6deg	484816	20120314		1331660000->1330000000
2.2GeV	2.5T 90deg	484816	20120315->20120307		1331770000->1331050000
2.2GeV	2.5T 90deg	403216	20120328		
1.7GeV	2.5T 90deg	400016	20120411		
1.7GeV	5T 6deg	400016			1334690000->1331340000
1.1GeV	2.5T 90deg	400016			1334900000->1331050000
1.1GeV	5T 6deg	400016			1335800000->1331340000
2.2GeV	5T 0deg	400016	20120503		1336020000
2.2GeV	5T 90deg	400016	20120510->20120411		1336620000
3.3GeV	5T 90deg	400016			1337020000

Status

- TODO:
 - RHRS
 - Any suggestions from this meeting

Backups

First Order Matrix

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

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

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

First Order Matrix

- Initial matrix generated by SNAKE

Septum	Field	T0000	T1000	T0100	T0010	T0001
484816	0T	3.307E-03	2.022E-02	-2.791E+00	-2.696E-01	4.739E-01
484816	2.5T	6.507E-03	2.697E-02	-2.759E+00	-3.013E-01	5.954E-01
400016	L	7.918E-03	2.209E-02	-2.742E+00	-3.787E-02	3.091E-01
400016	2.5T	8.342E-02	3.970E-02	-2.694E+00	9.871E-02	8.813E-02
		P0000	P1000	P0100	P0010	P0001
484816	0T	-3.823E-03	5.487E-03	-1.103E-02	-6.911E-01	3.876E-01
484816	2.5T	9.791E-04	2.412E-03	4.762E-02	-6.882E-01	3.463E-01
400016	L	-4.854E-03	1.392E-02	1.899E-01	-6.950E-01	3.592E-01
400016	2.5T	-7.575E-03	1.985E-02	2.284E-01	-7.076E-01	3.869E-01