

Optics Status Update

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Calibration Status

- LHRS first iteration finished
- Fine tuning of the optics matrix
 - Redo the calibration using an original matrix up to the 2nd order
- Extended target 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

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

First Order Matrix

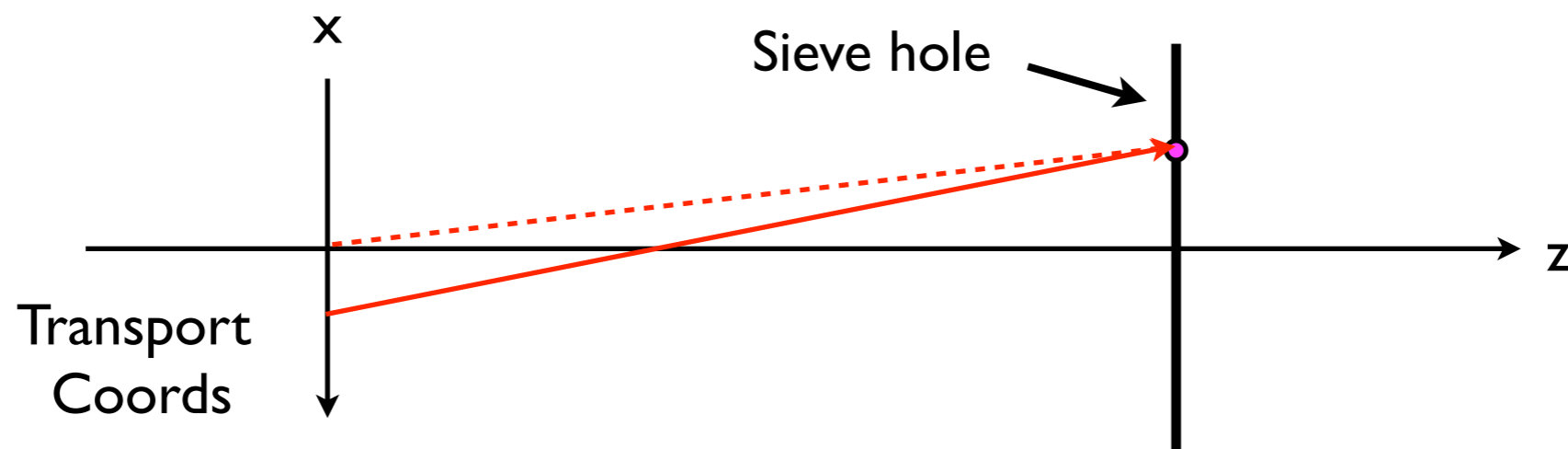
- Compare the const term with the beam position
- It seems have some relations between Beam x (in lab coords) and the offset of φ_{tg}

Septum	Field	T0000	P0000	Beam x/mm	Beam y/mm
484816	0T	3.307E-03	-3.823E-03	-0.828	2.343
484816	2.5T	6.507E-03	9.791E-04	-3.897	0.016
400016	L	7.918E-03	-4.854E-03	0.462	-3.295
400016	2.5T	8.342E-02	-7.575E-03	2.950	-2.186

Calibration

- Extended target correction:
 - x_{tg} is not reconstructed
 - assume x_{tg} to be 0
- x_{tg} will influence theta and delta reconstruction a bit

$$\theta_{\text{rec}} = \theta_{\text{matrix}} + x_{\text{tg}} \times C_{\theta} \qquad \delta_{\text{rec}} = \delta_{\text{matrix}} + \frac{x_{\text{tg}}}{C_{\delta}}$$



Ext Target Correction

Before Correction

Septum	Field	T0000	T1000	T0100	T0010	T0001
400016	L	7.379E-03	2.269E-02	-2.620E+00	4.959E-02	6.070E-02
		P0000	P1000	P0100	P0010	P0001
400016	L	5.573E-03	2.241E-02	-2.603E+00	4.349E-02	7.471E-02
		D0000	D1000	D0100	D0010	D0001
400016	L	1.872E-03	7.464E-02	-3.286E-02	-1.180E-02	5.992E-02

After Correction

Septum	Field	T0000	T1000	T0100	T0010	T0001
400016	L	5.572E-03	2.241E-02	-2.603E+00	4.349E-02	7.471E-02
		P0000	P1000	P0100	P0010	P0001
400016	L	5.573E-03	2.241E-02	-2.603E+00	4.349E-02	7.471E-02
		D0000	D1000	D0100	D0010	D0001
400016	L	1.238E-03	7.474E-02	-1.944E-02	-7.664E-03	4.602E-02

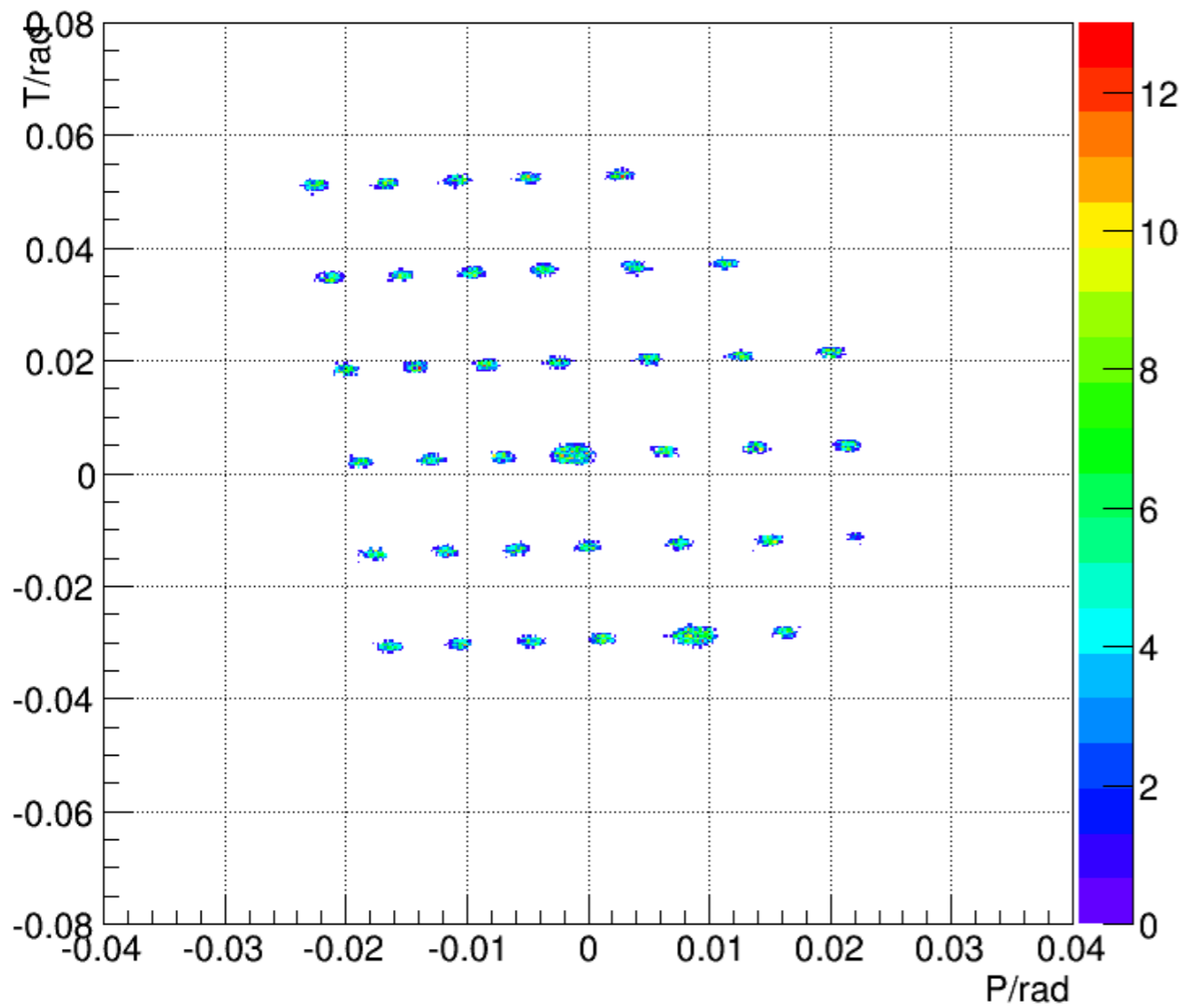
Status

- LHRS first iteration is finished
- Second iteration?
- Reconstruction need 2 part of input: optics matrix and a database of effective beam position fitted from simulation
- This part I finished the longitudinal and 484816, 2.5T, 90deg setting

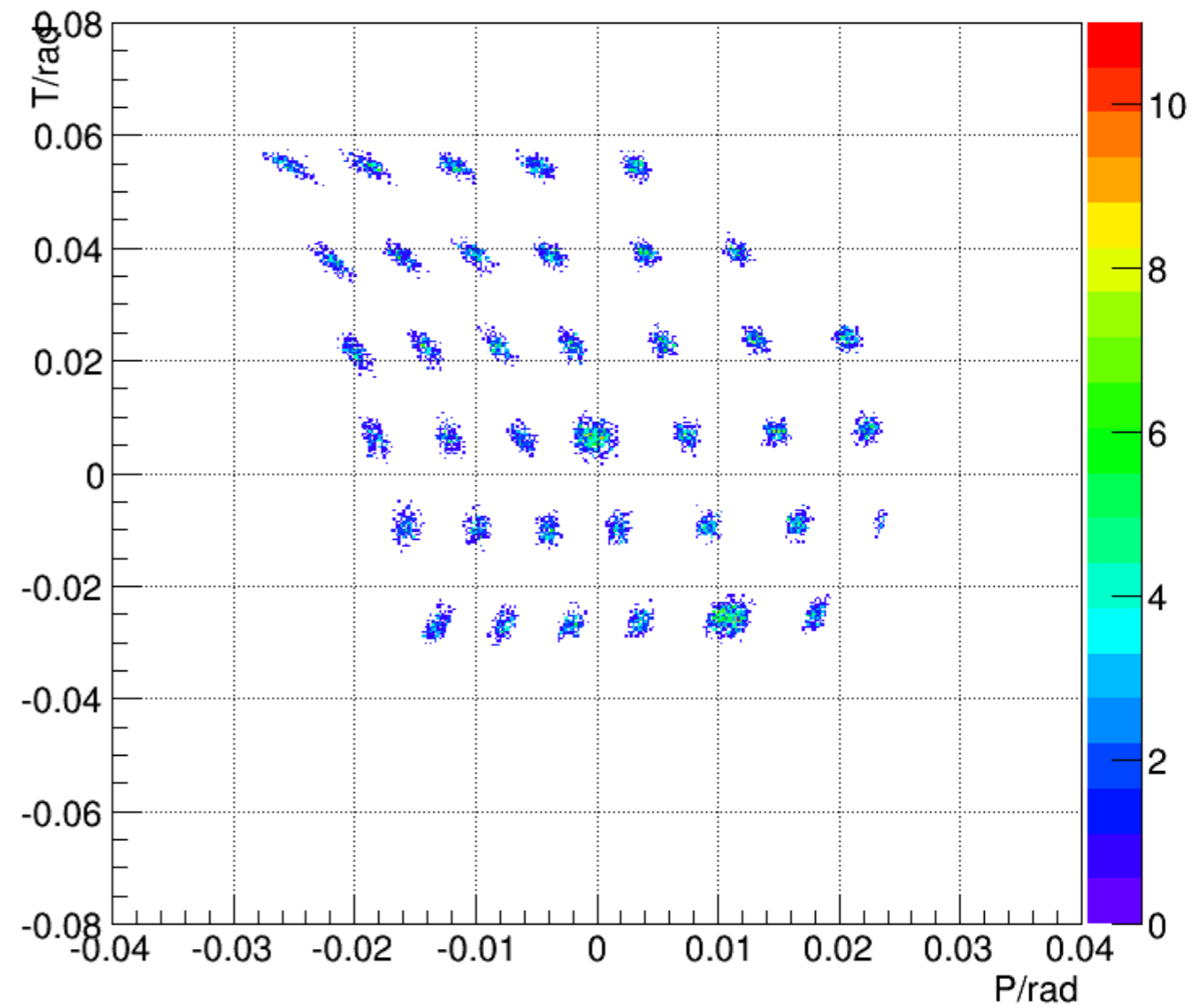
Status

- A reconstruction example for longitudinal settings
- Still need to tune

Init TP T vs P



Rec Th vs Ph



Status

- TODO:
 - RHRS
 - Any suggestion from this meeting