# Optics Status Update

Chao Gu

Longitudinal Optics

- Settings:

  - Beam energy 2.254GeV

  - 5T Target Field at 0deg

  - Septum coil turns is 40-00-16

- Optics settings:

  - Full delta scan on left arm (-3%, -1%, 0%, 1%, 3%)
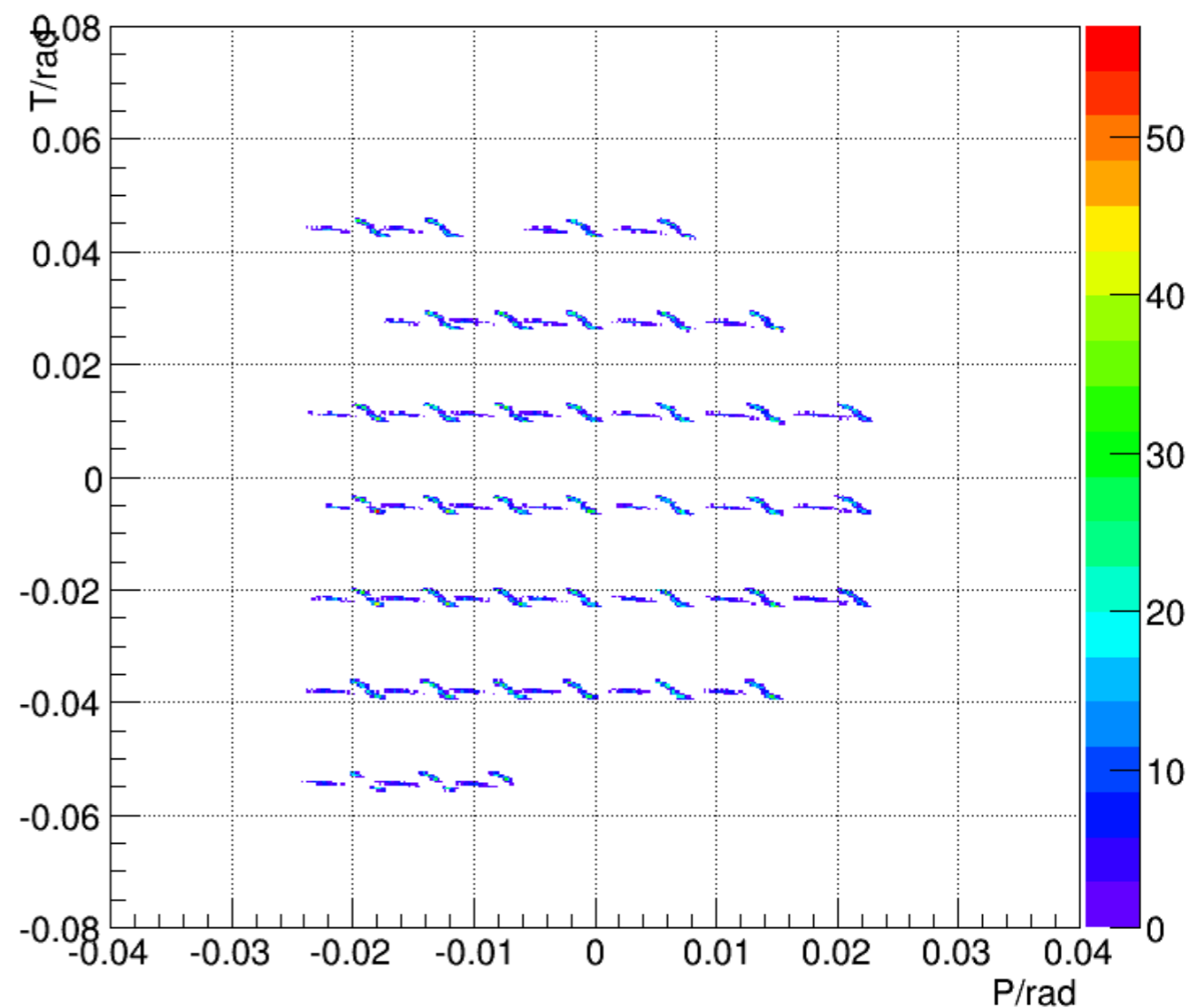
  - Only have 0% on right arm

Calibration

- Beam positions are slightly different between different runs

- Use an event by event simulation to calculate the effective theta and phi angle
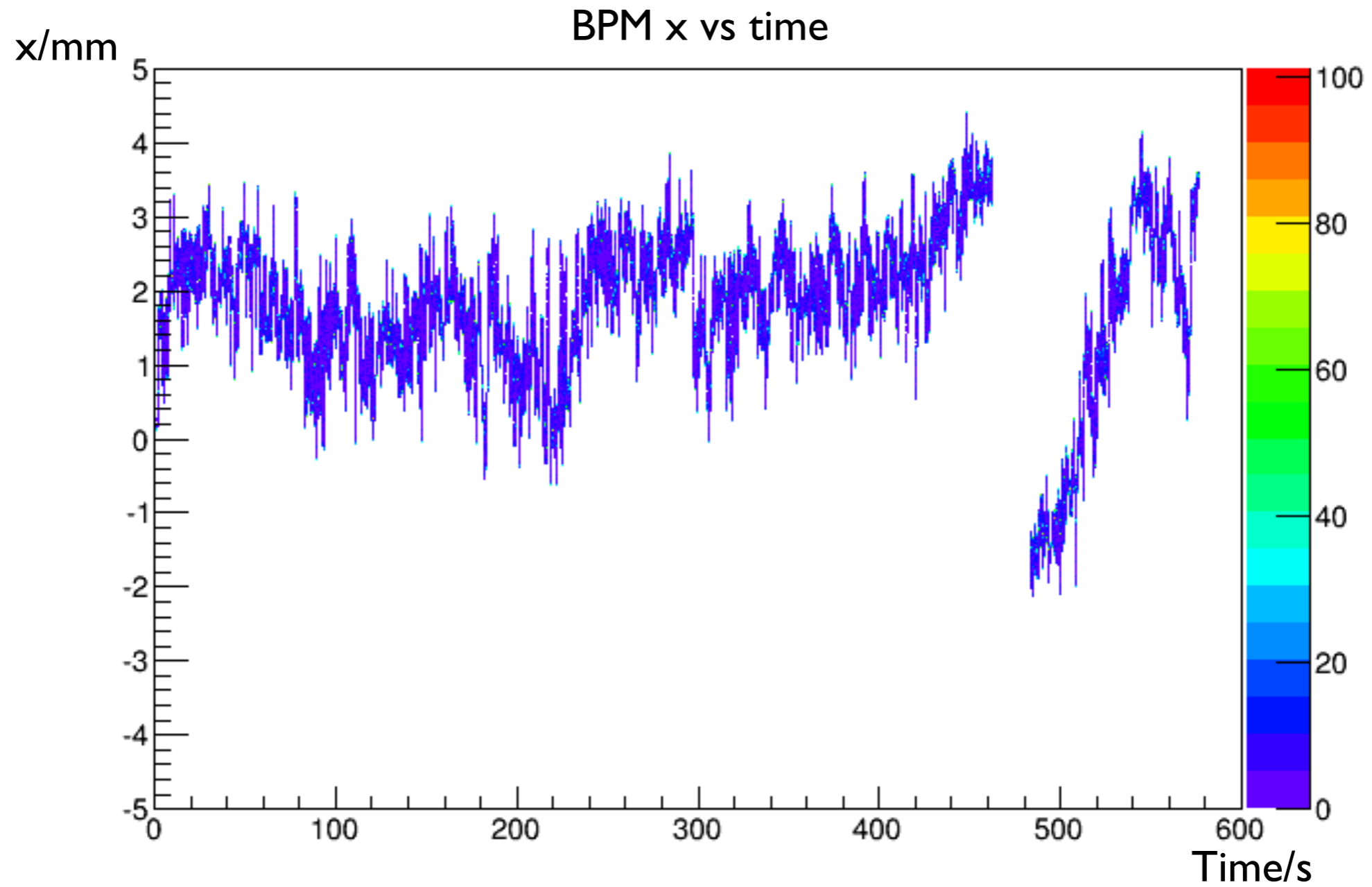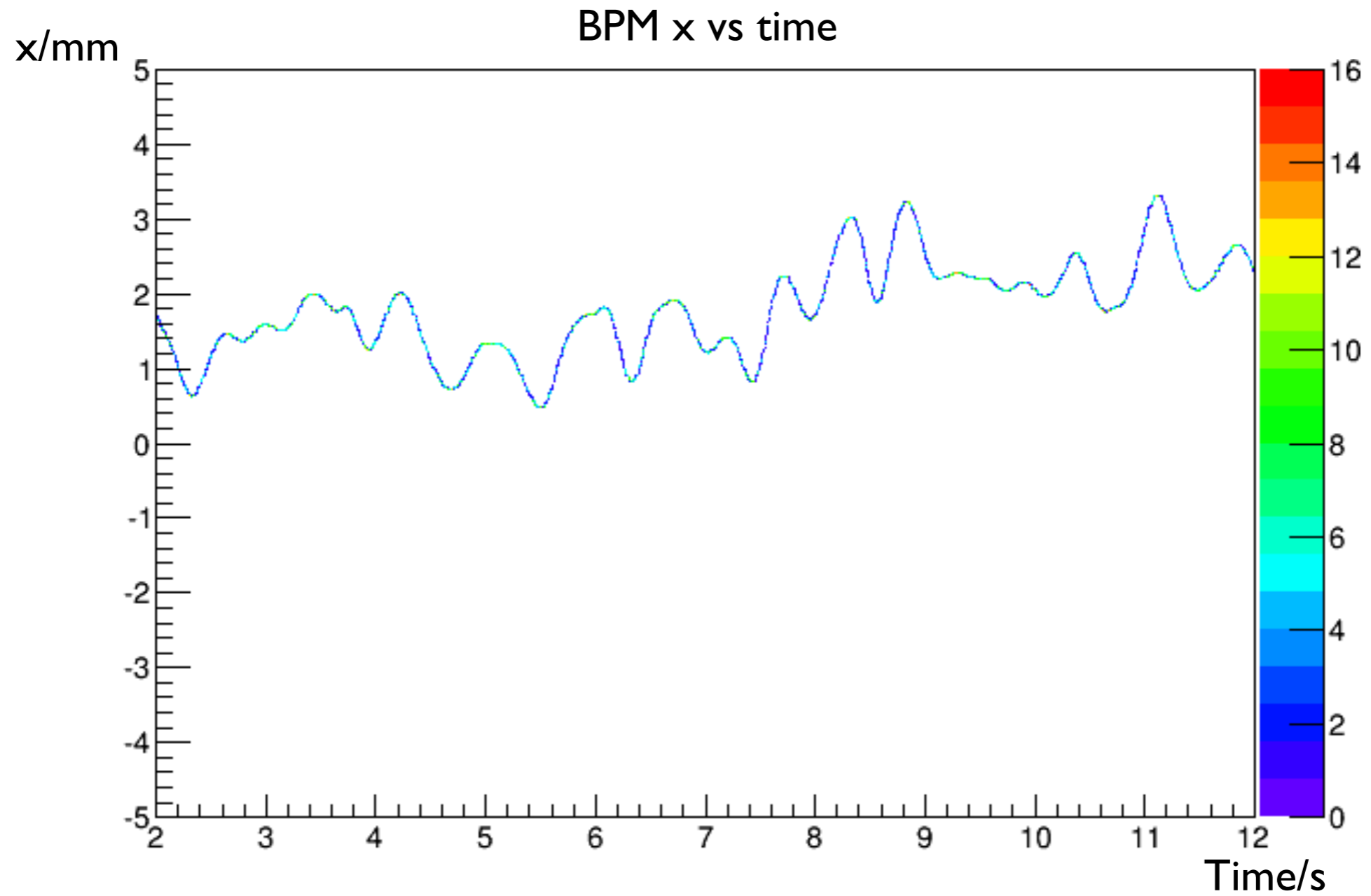
BPM Y vs X
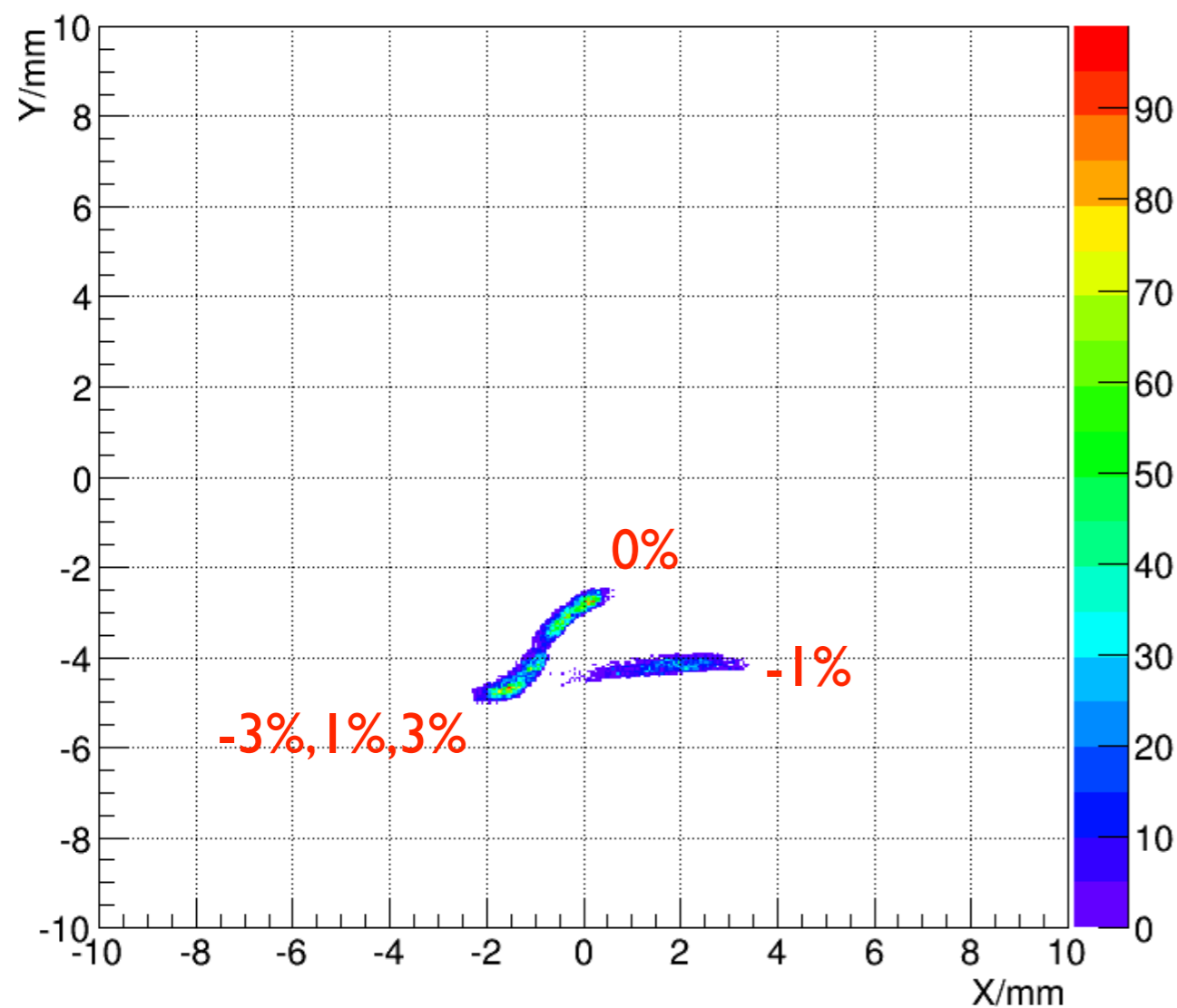
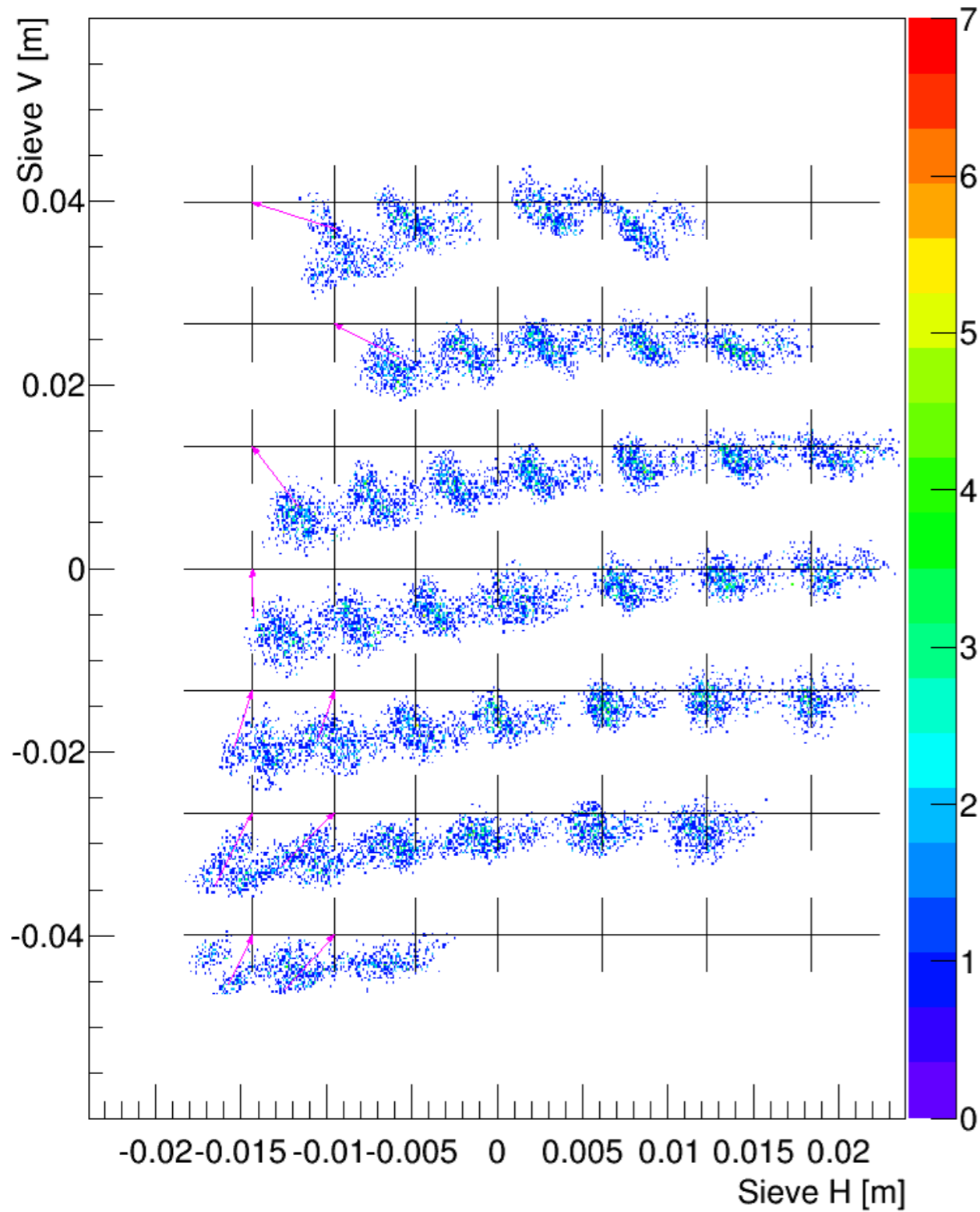Effective Angle

Calibration

- Check Beam positions

Calibration
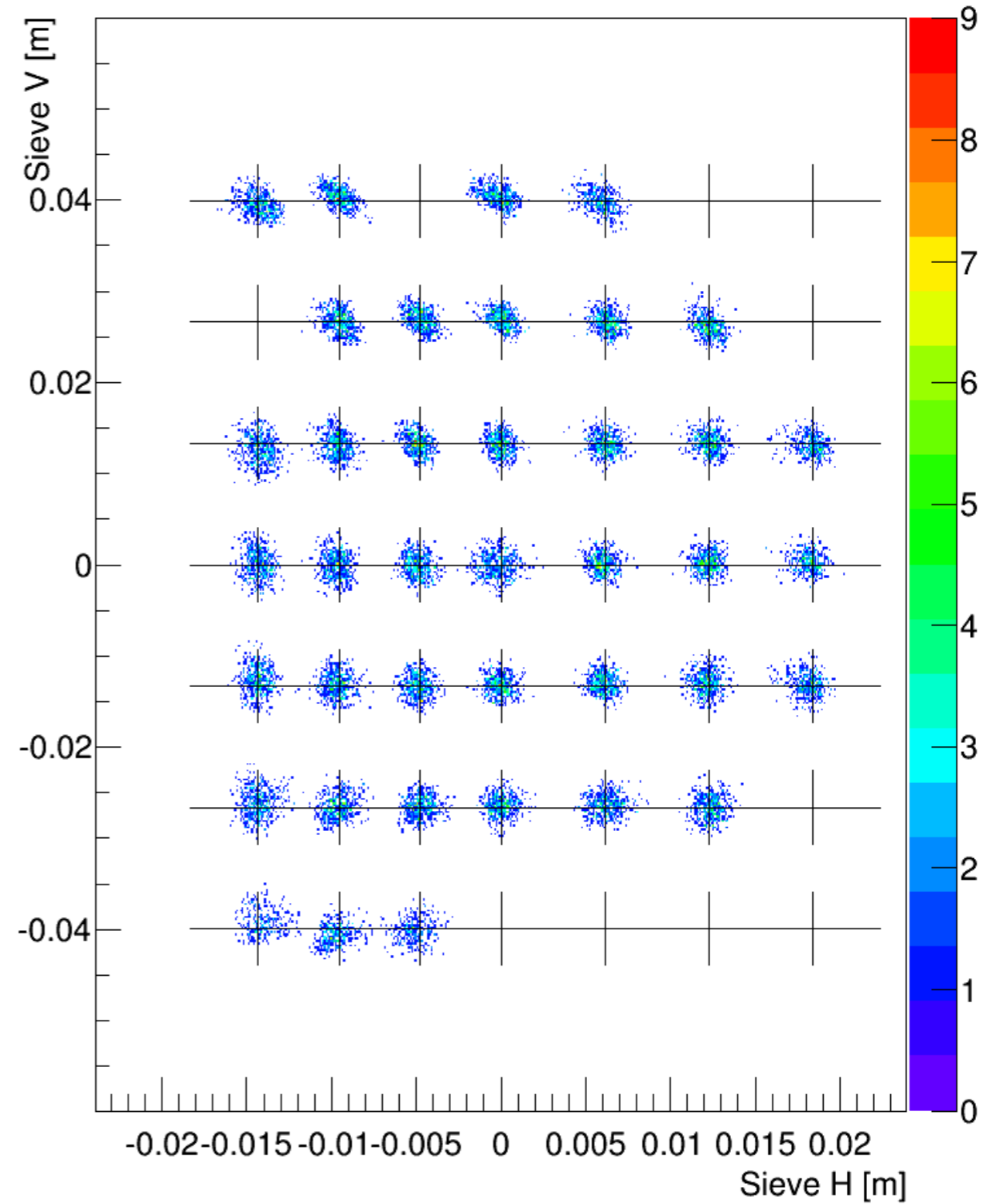
- First 10 seconds

BPM x vs time

Calibration
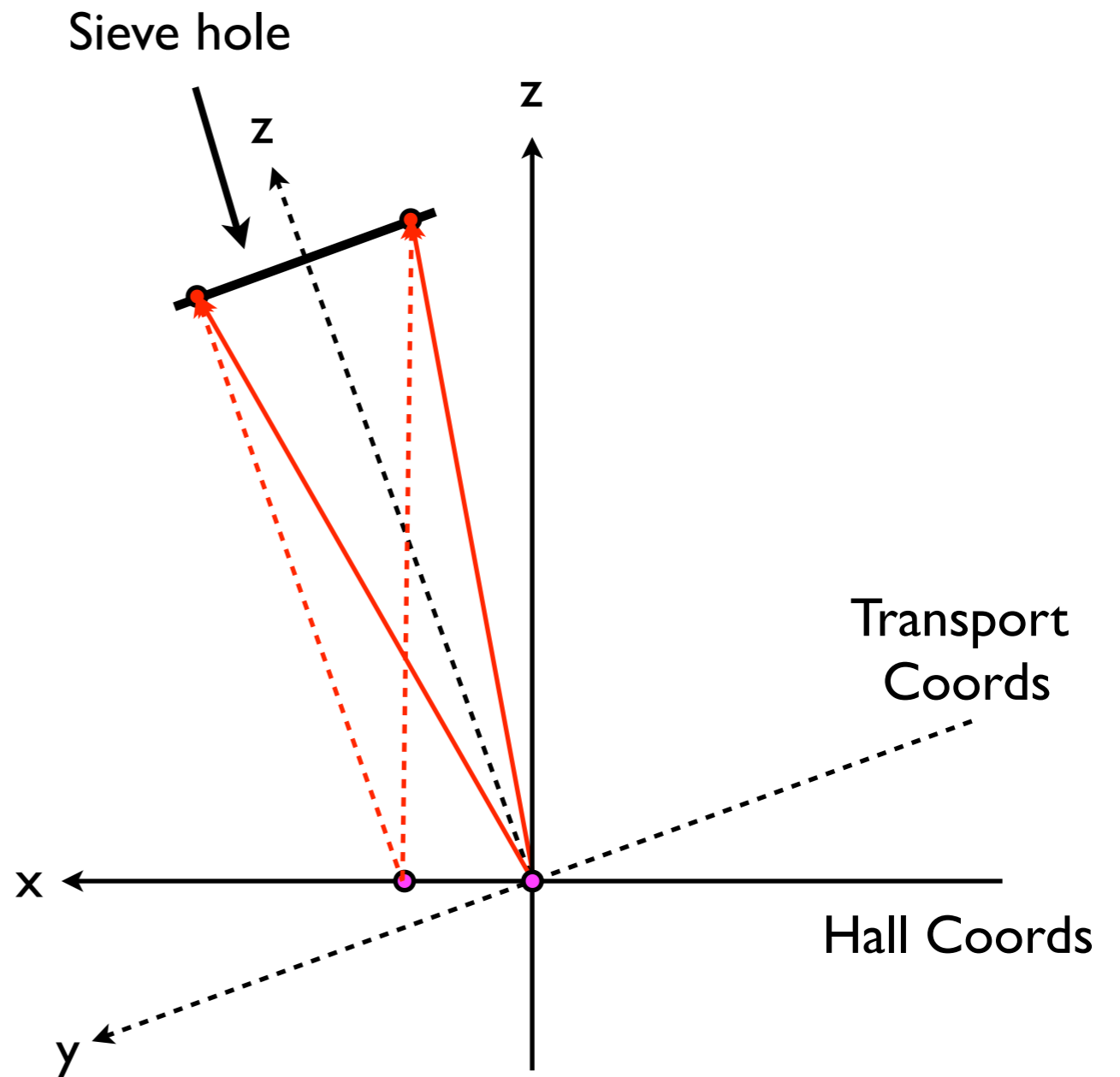

Before Calibration

After Calibration

Matrix Calibration

- Analyzer use the reconstruction matrix to calculate scattering angle in transportation frame

- Matrix elements calibrated by the open angle of 2 different sieve holes respect to the scattering point

- Beam position uncertainty will slightly influence this calibration

Sieve hole

z

z

Transport Coords

x

Hall Coords

y

Matrix Calibration

- Can be calculate by geometry relations

- Simulate with different beam positions and calculate the open angle
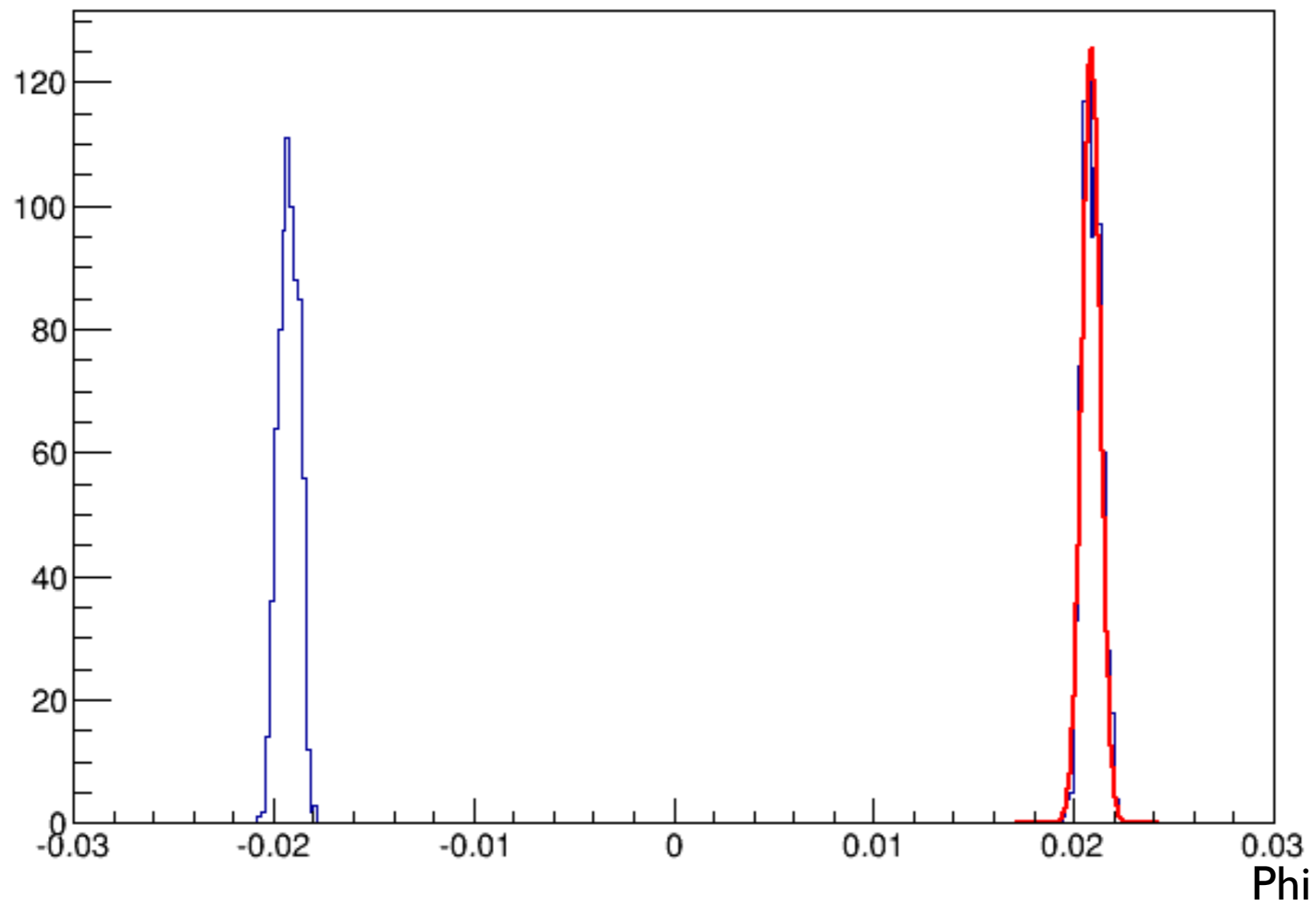
Matrix Calibration

- Can be calculate by geometry relations

- Simulate with different beam positions and calculate the open angle

- The influence from the beam position is small:

Beam x	-4mm	-2mm	0mm	2mm	4mm
phi diff	40.2209	40.2208	40.1795	40.2453	40.2764

Beam y	-4mm	-2mm	0mm	2mm	4mm
theta diff	98.1695	98.1668	98.1158	98.1599	98.1662

Angle diff in mrad

1st Order Matrix

- Compare the 1st order matrix between 2 situations: with and without target field:

	T0000	T1000	T0100	T0010	T0001
No Field	1.868E-03	2.007E-02	-2.756E+00	-2.443E-01	4.421E-01
With Field	7.332E-03	2.198E-02	-2.747E+00	-4.090E-01	3.171E-01
	P0000	P1000	P0100	P0010	P0001
No Field	-6.095E-04	5.408E-03	-2.096E-03	-6.777E-01	3.508E-01
With Field	-4.322E-03	1.389E-03	1.861E-01	-7.074E-01	3.832E-01

Optics Status

- Continue to finish optics calibration of different septum settings