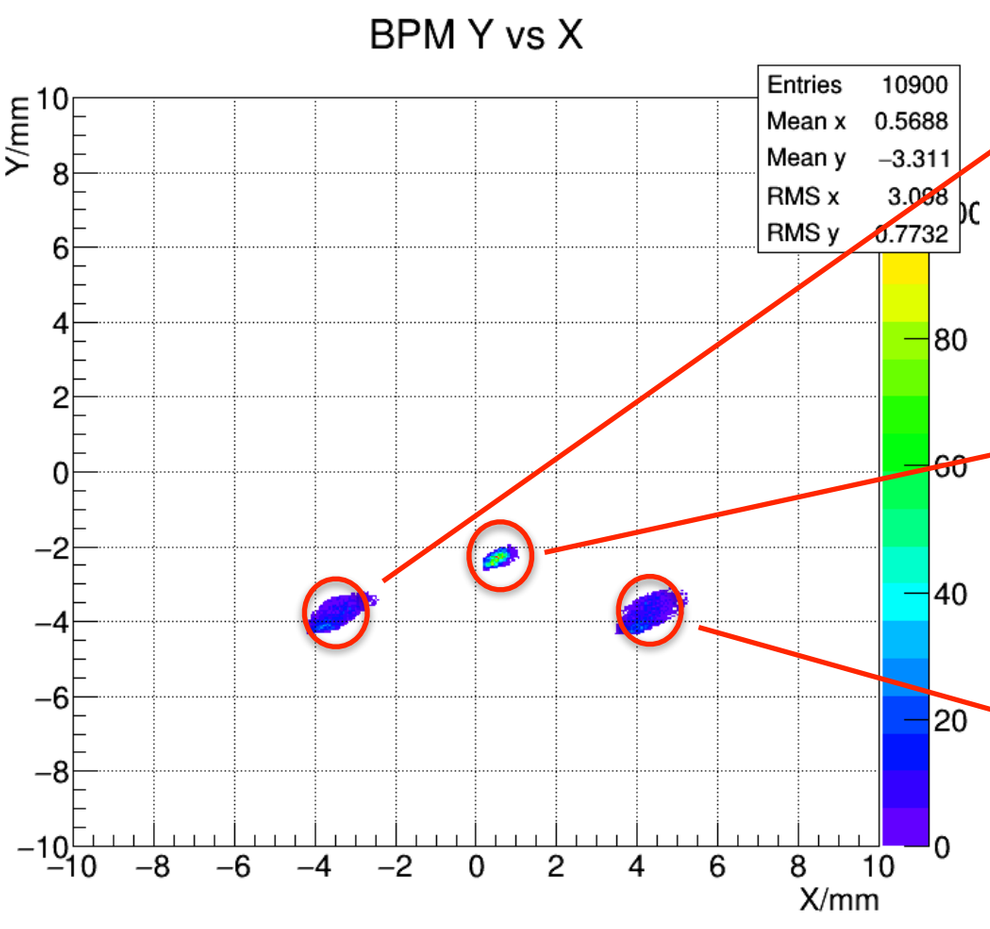
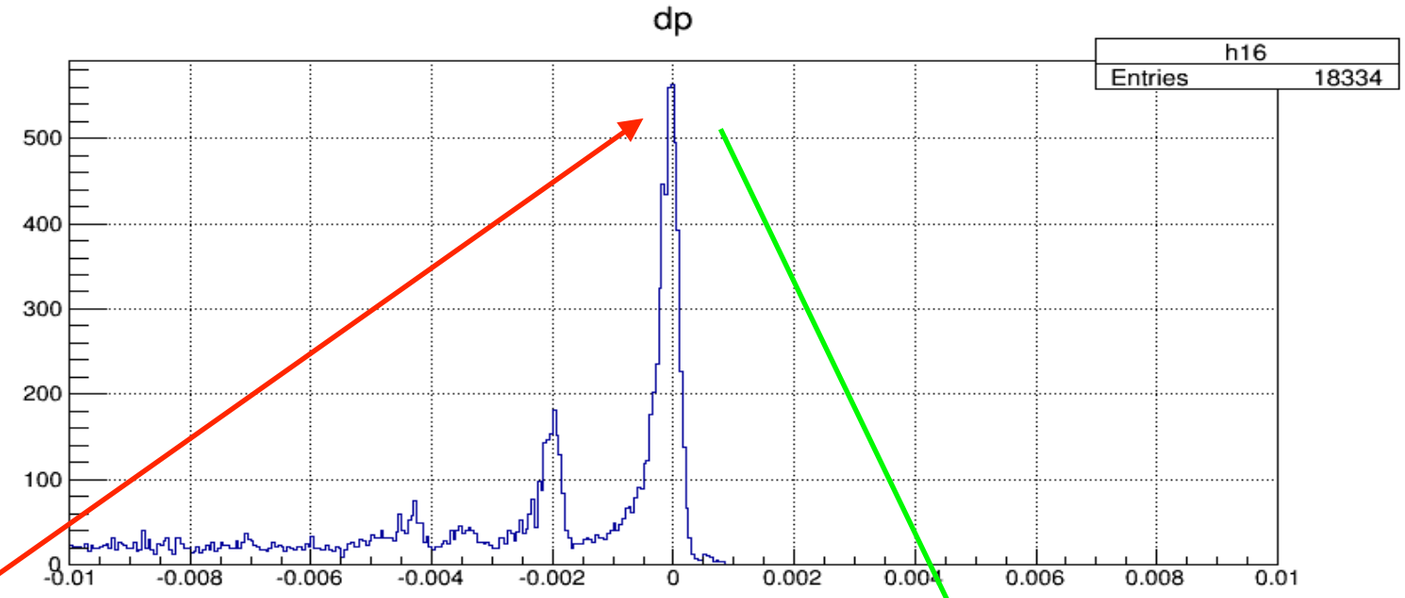
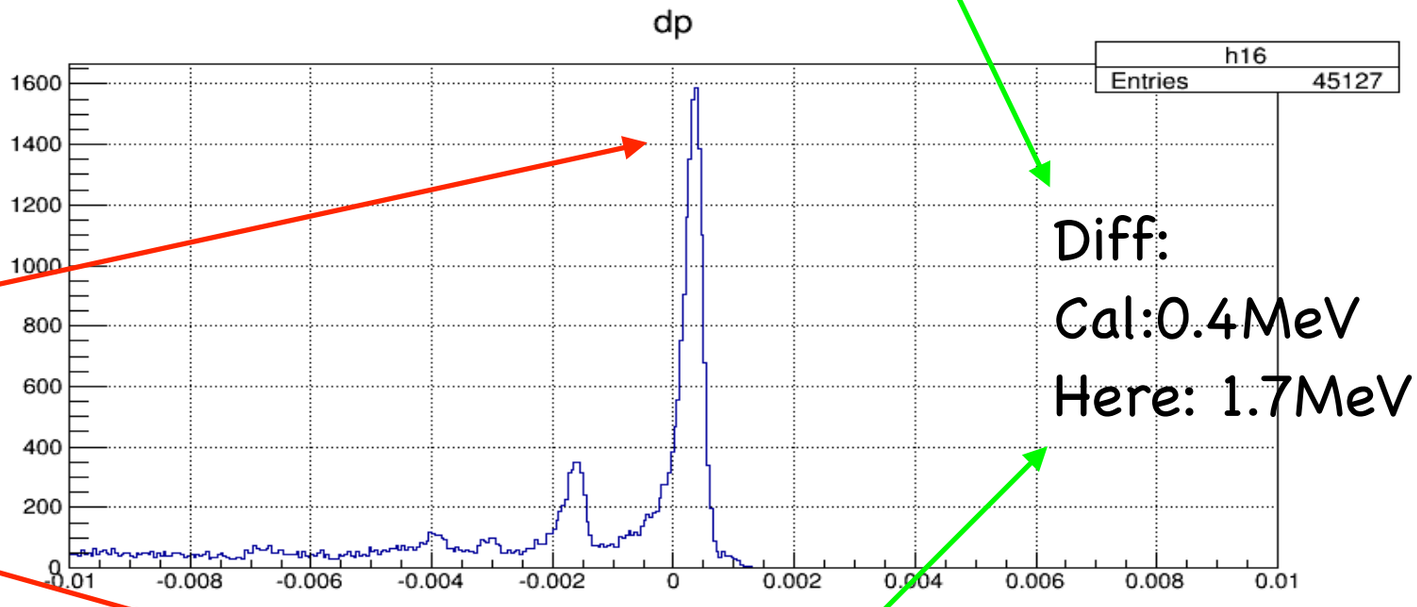
# Optics Status Update

Chao Gu

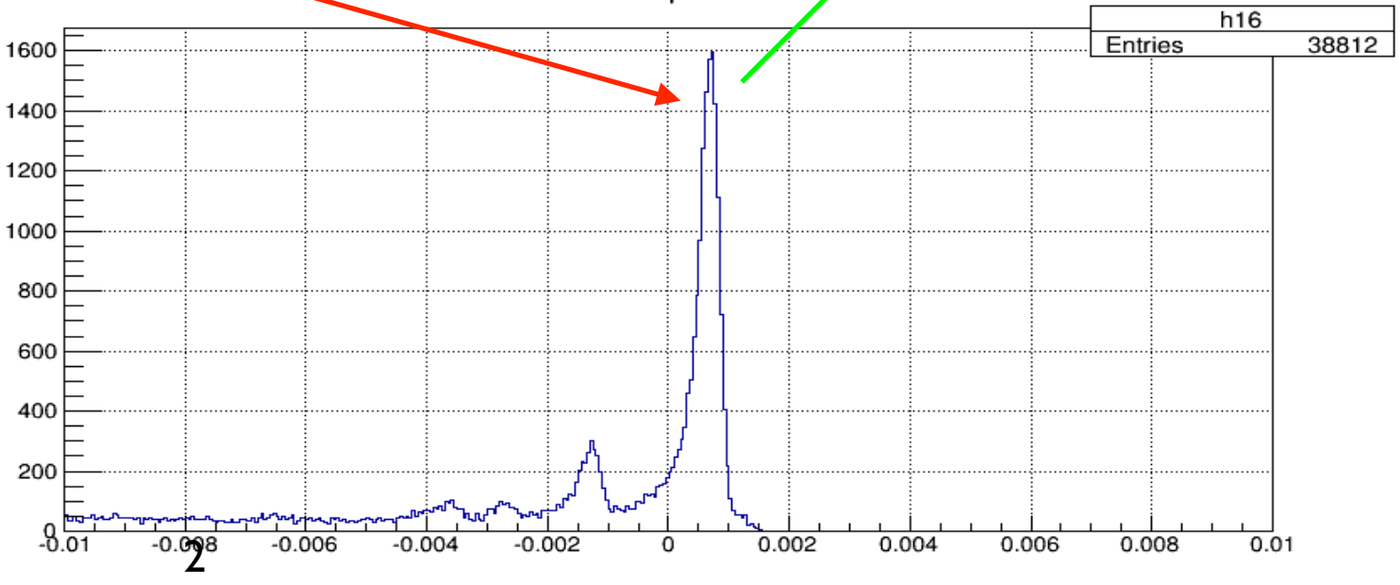
- Problem: horizontal beam position changes dp reconstruction




Diff:
Cal:0.4MeV
Here: 1.7MeV

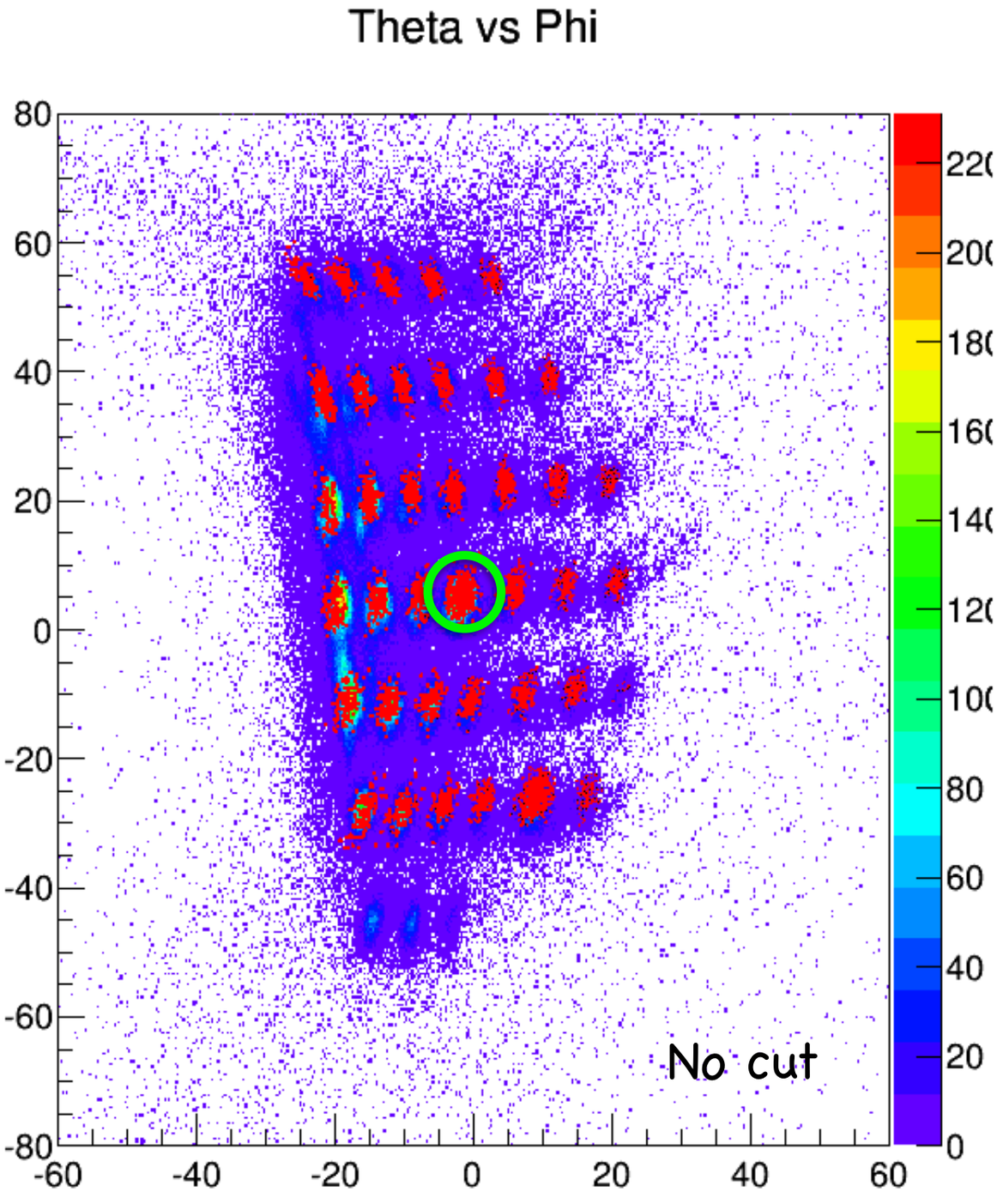


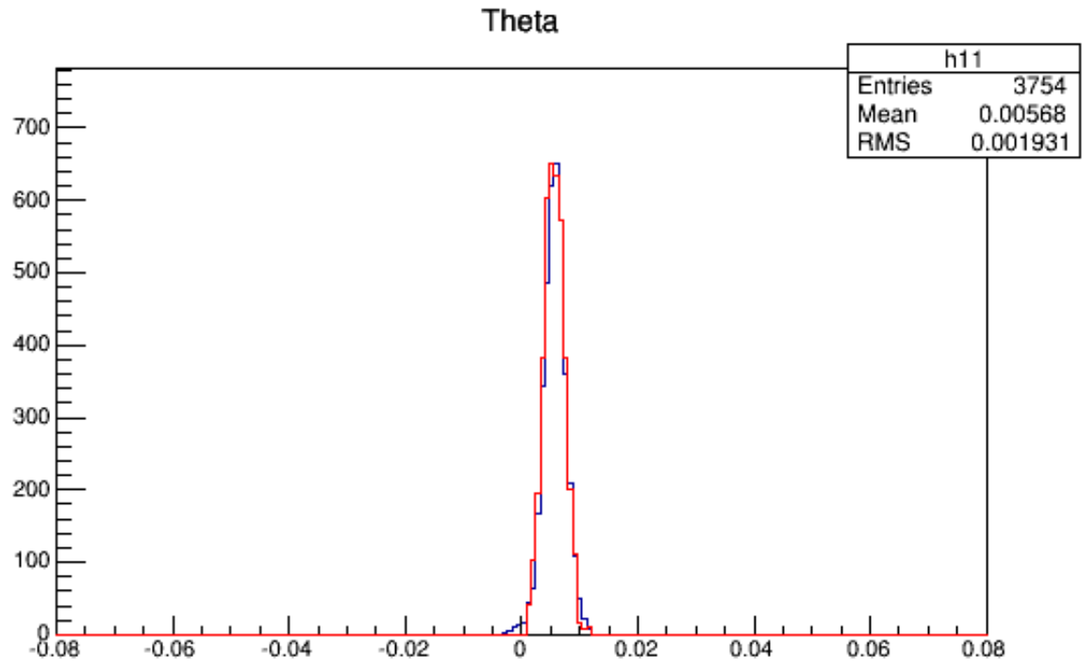

Run 5585
Run 5597

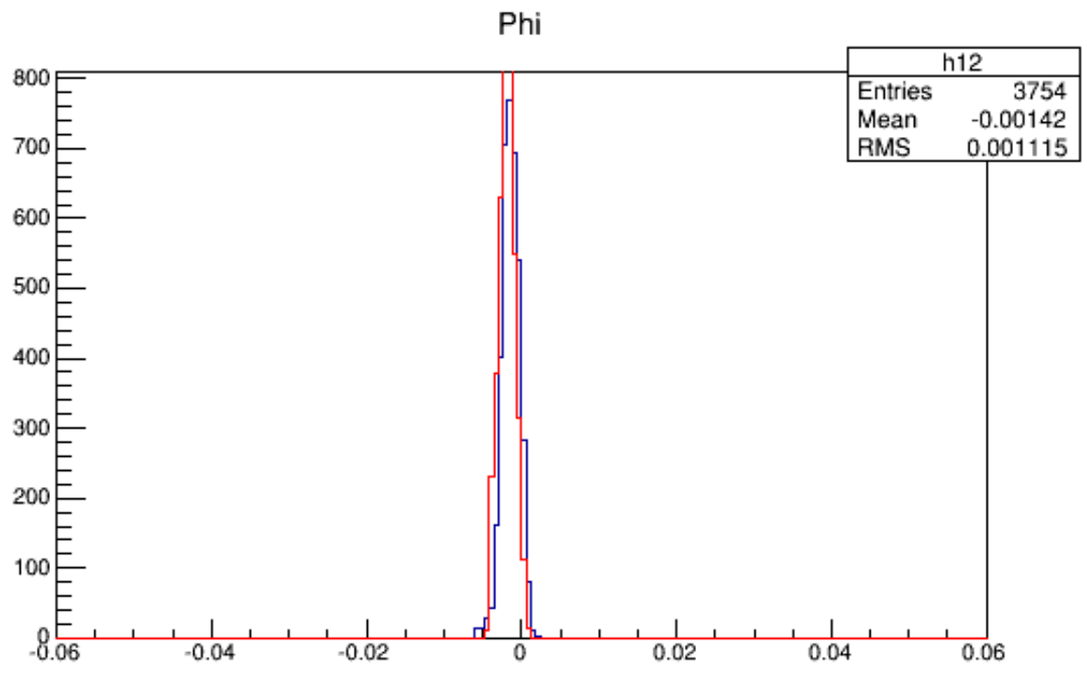
# Optics Status Update

- Fixed by adding a correction:
  - linear correction with BPM x and BPM y
  - applied to theta, phi and dp
- Once applied the correction, the simulation and the data could agree
  - Need to understand this correction
  - A first guess is the fit of the matrix element is not good enough

# Use correction



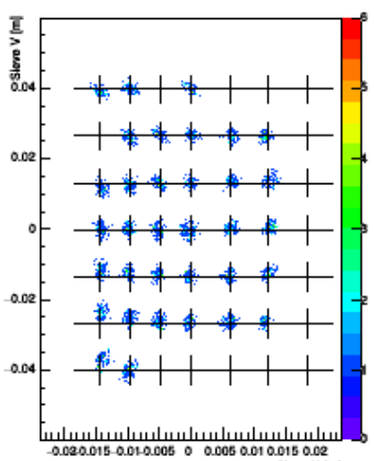



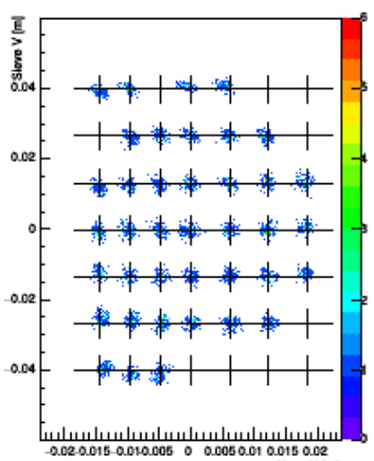

Applied beam cut,
target y cut and dp cut

No correction
Use dp scan together with
beam position scan to fit

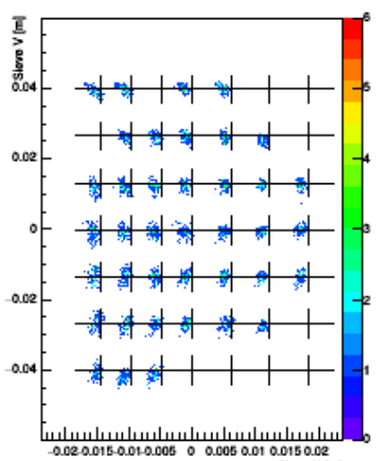
-3%, $y_{tg}$=0.4mm



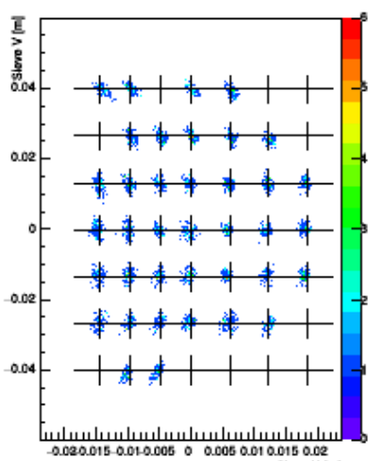

-1%, $y_{tg}$=3.7mm



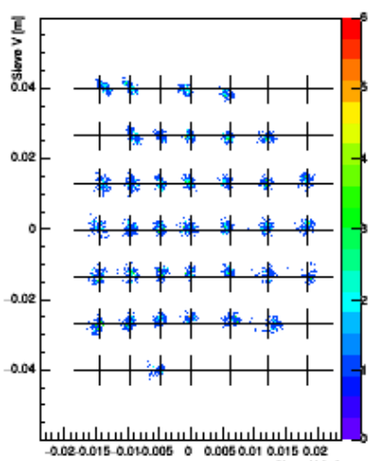

0%, $y_{tg}$=2.0mm



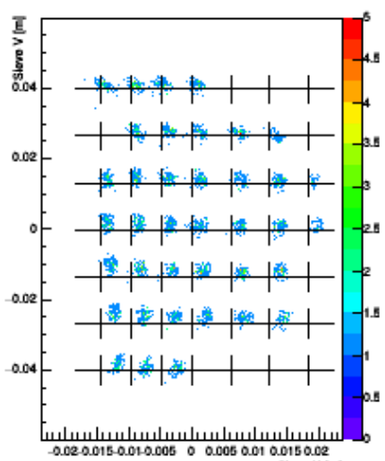

1%, $y_{tg}$=1.5mm



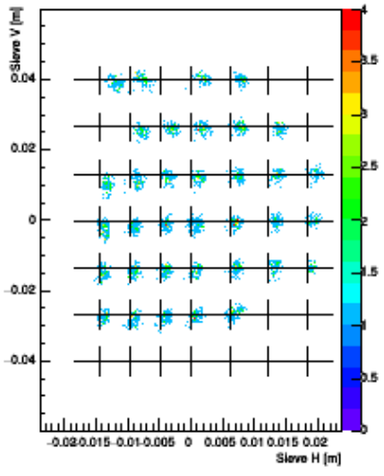

3%, $y_{tg}$=0.9mm



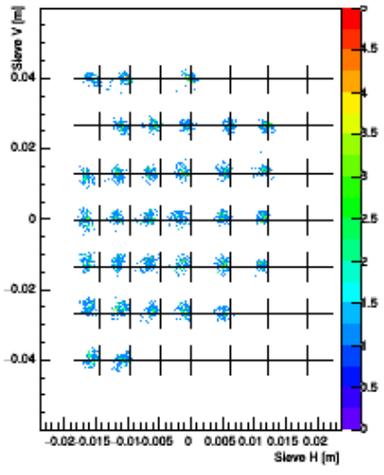

0%, $x_{tg}$=7.2mm



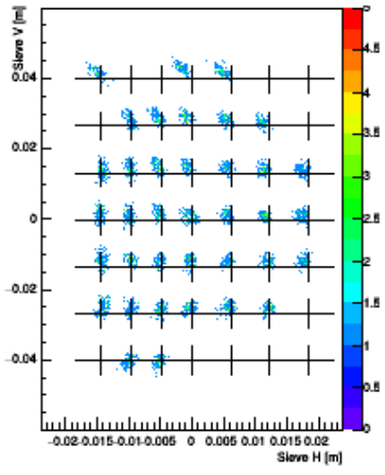

0%, $x_{tg}$=0.4mm




0%, $y_{tg}$=5.7mm

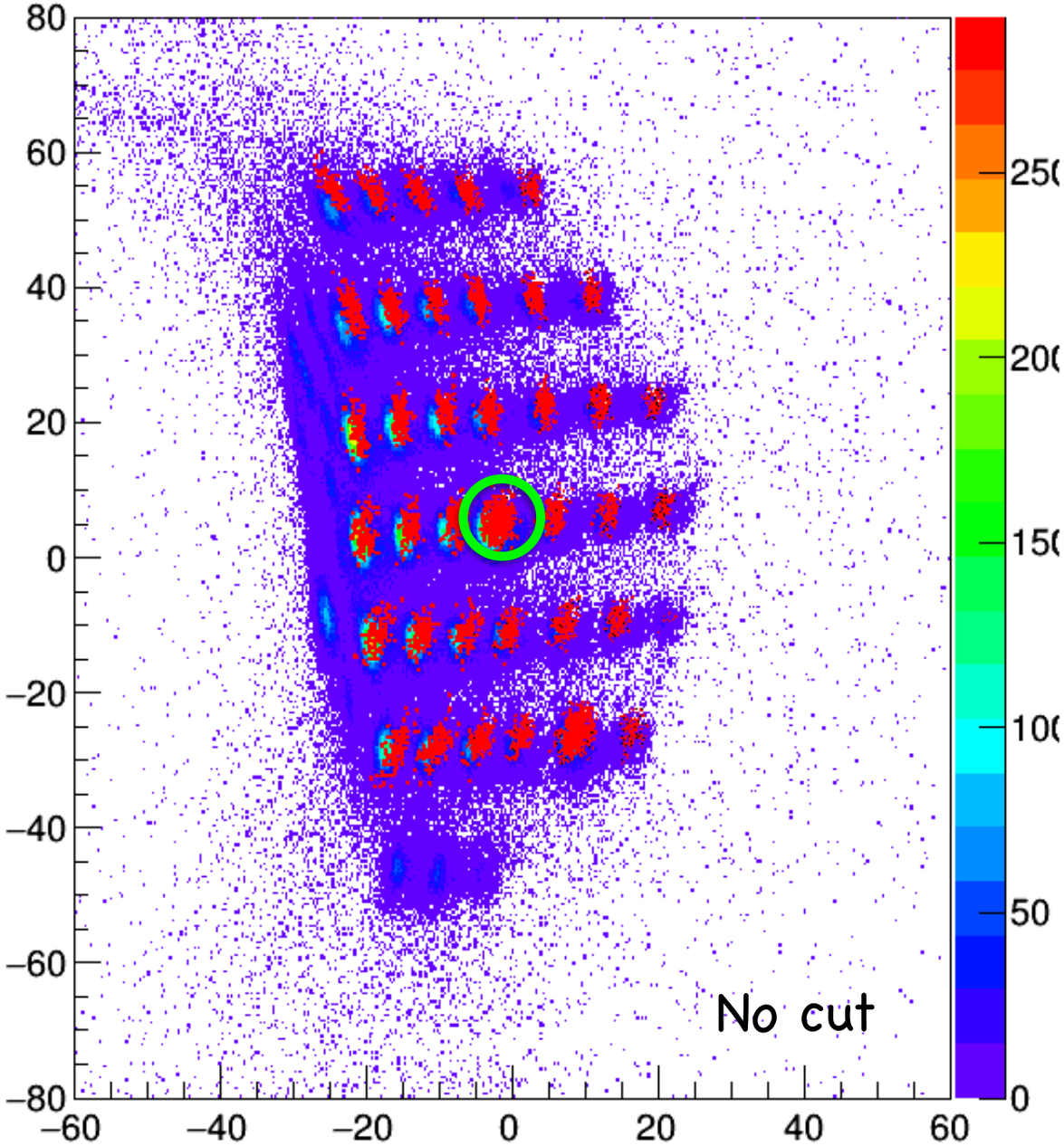


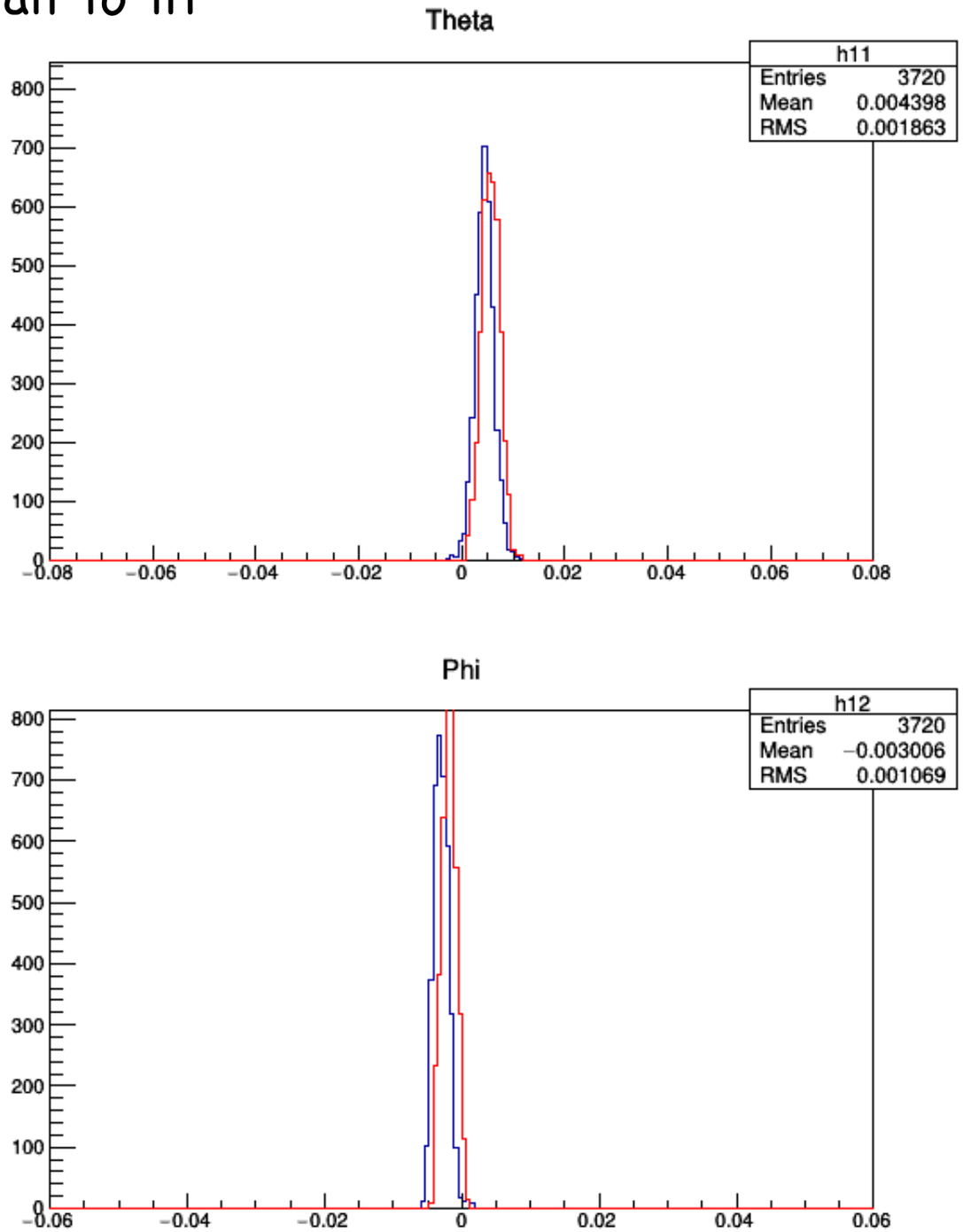

0%, $y_{tg}$=-1.9mm




After Calibration

No correction
Use dp scan together with
beam position scan to fit



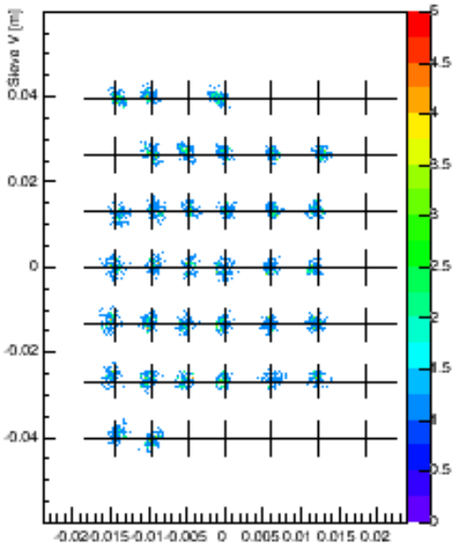




Applied beam cut,
target y cut and dp cut

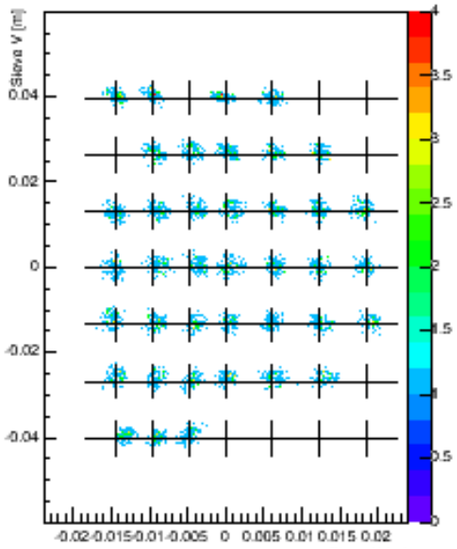
# Calibration

- Tried some other way to do the calibration
- Method 1:
  - Use central hole to decide the offset constant and then fix it
  - Use horizontal beam position scan to decide all the matrix related to y
  - Fit other matrix elements use dp scan runs

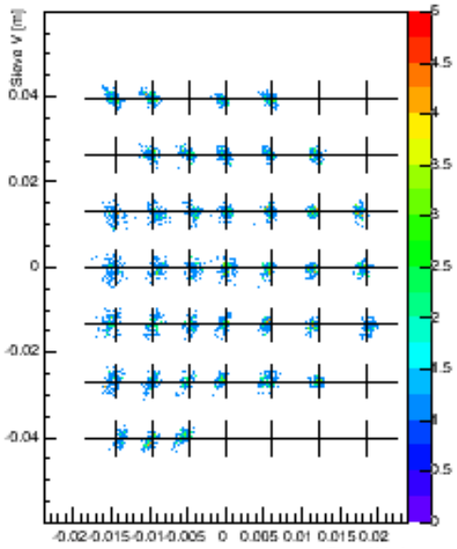
-3%, $y_{tg}$=0.4mm



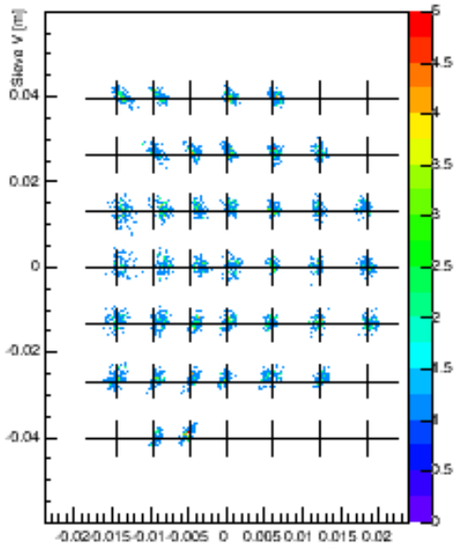
-1%, $y_{tg}$=3.7mm



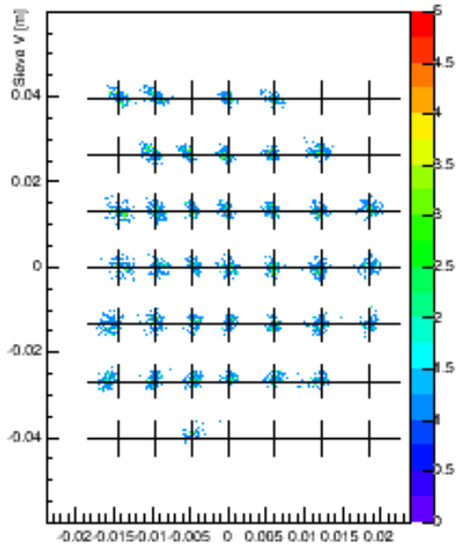
0%, $y_{tg}$=2.0mm

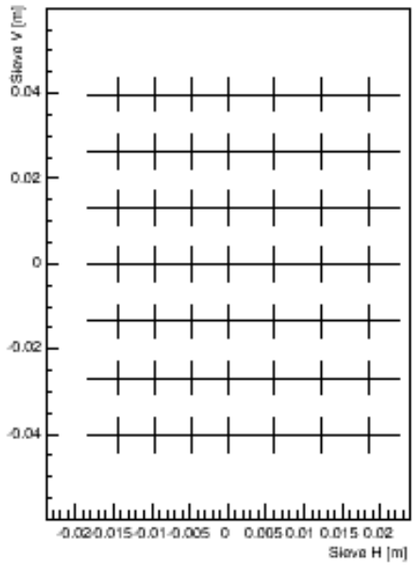


1%, $y_{tg}$=1.5mm

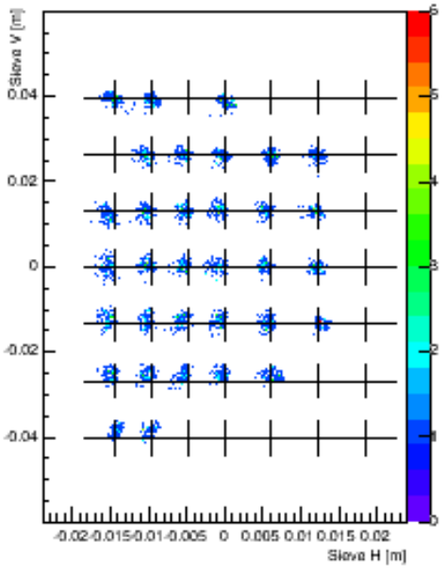


3%, $y_{tg}$=0.9mm

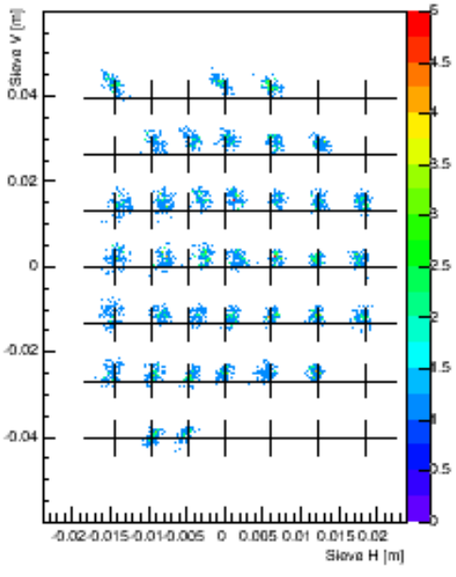





0%, $y_{tg}$=-1.9mm



0%, $y_{tg}$=5.7mm

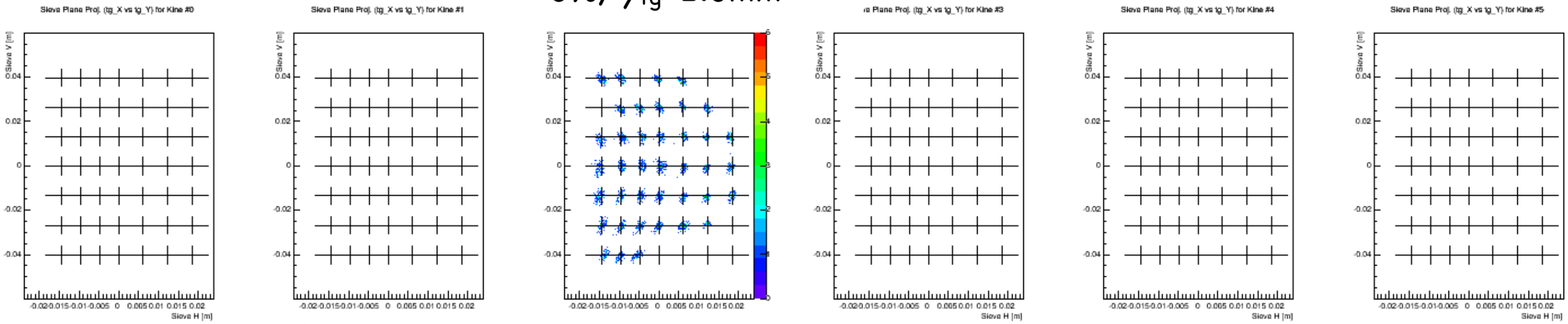


After Calibration

# Calibration

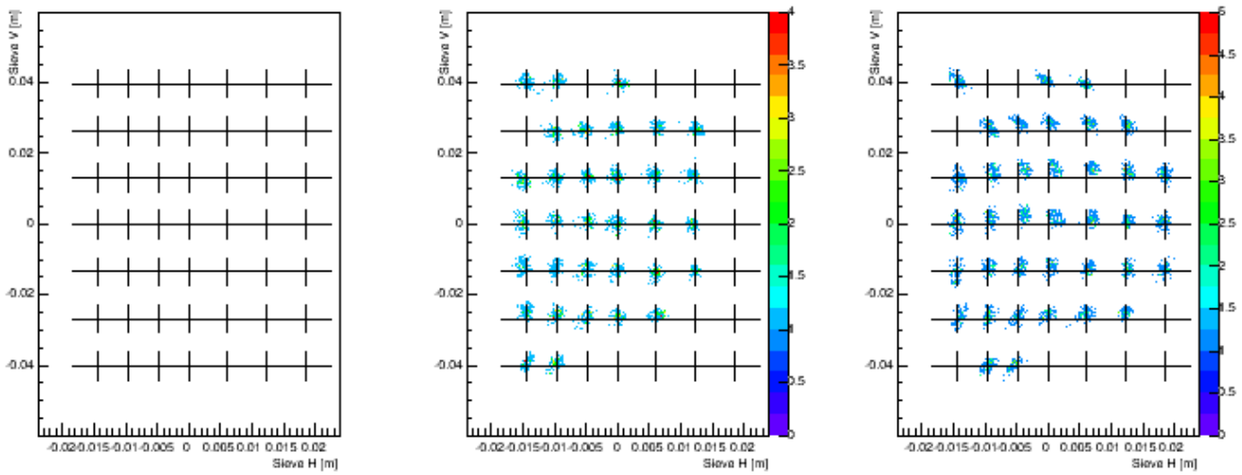
- Method 2:
  - Use the beam position scan data to decide the matrix elements which do not relate to $x_{fp}$
  - Use the delta scan data to decide the matrix elements related to $x_{fp}$
  - Do some iterations

0%, $y_{tg}$=2.0mm



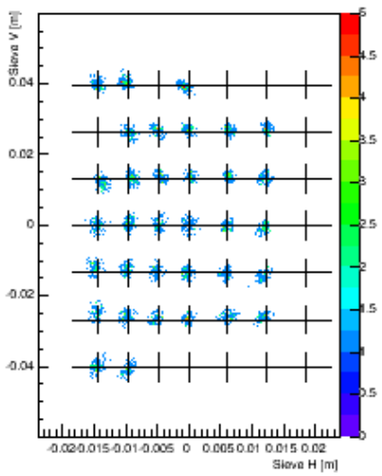

0%, $y_{tg}$=-1.9mm

0%, $y_{tg}$=5.7mm

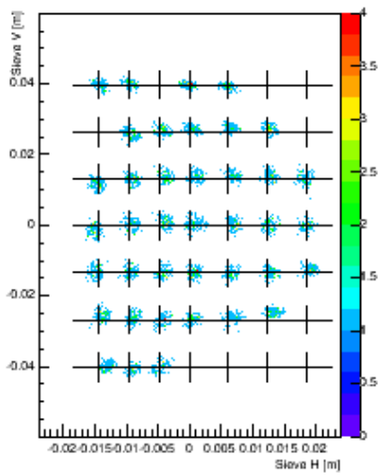



After Calibration

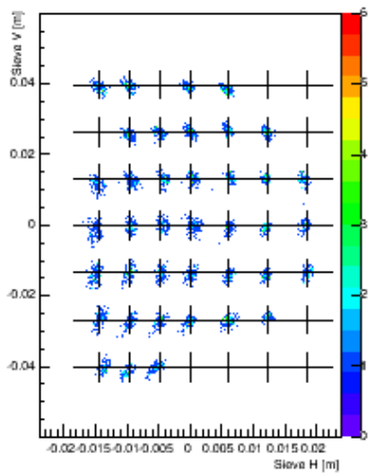
-3%



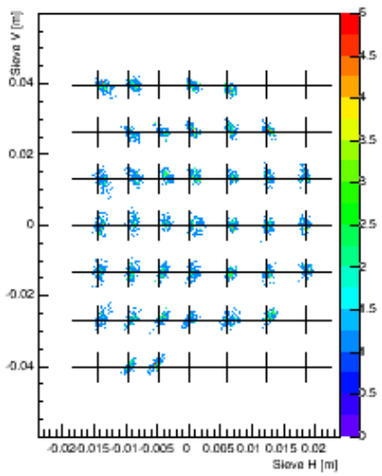

-1%



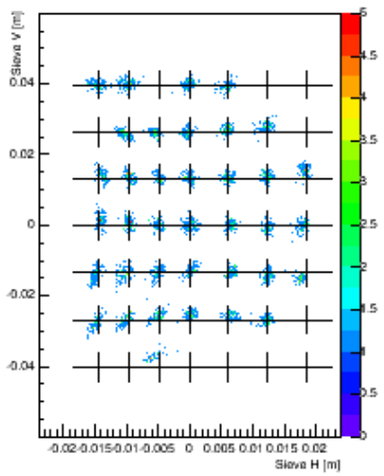

0%

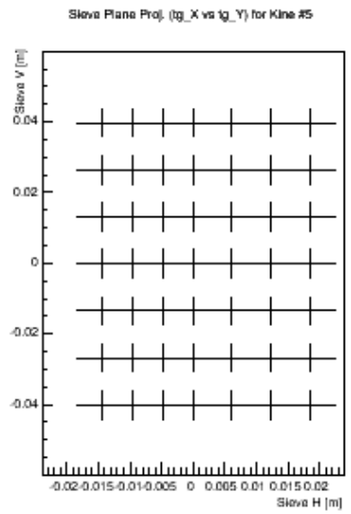


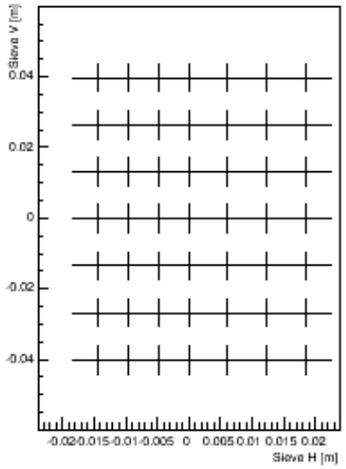

1%

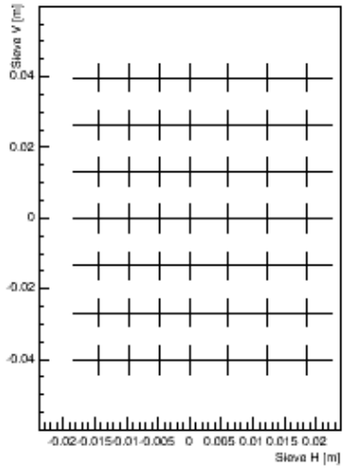


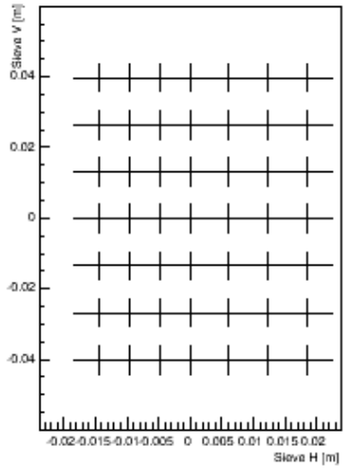

3%




After Calibration

# Conclusion

- Both methods are not very good even with adjusting the fitting order of the matrix element
- Need to check more different fit procedures to directly include this "correction" into the fitting