



Uniform Beam Simulation - Vertical Scan

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Summary of Datasets

Two sets (each containing 4 datasets):

1. For Uniform proton X, Gaussian proton Y
2. For Gaussian proton X, Uniform proton Y

Path to the “golden files” : /pnfs/numix/persistent/users/sganguly/goldenfiles_uniformX_gaussianY

For Uniform proton X, Gaussian proton Y

Dataset#	POT/file	Horn Current	NJobs	Seeds
1a	1M	200kA	1000	10,000
1b	100k	200kA	10000	10,000
2a	1M	200kA	1000	20,000
2b	100k	200kA	10000	80,000
3	1M	180kA	1000	10,000
4	100k	180kA	10000	20,000

Missing 1 file,
999 files in dir

All 10000 files in dir

All 1000 files in dir

All 1000 files in dir

All 10000 files in dir

Summary of Datasets

Two sets (each containing 4 datasets):

1. For Uniform proton X, Gaussian proton Y
2. For Gaussian proton X, Uniform proton Y

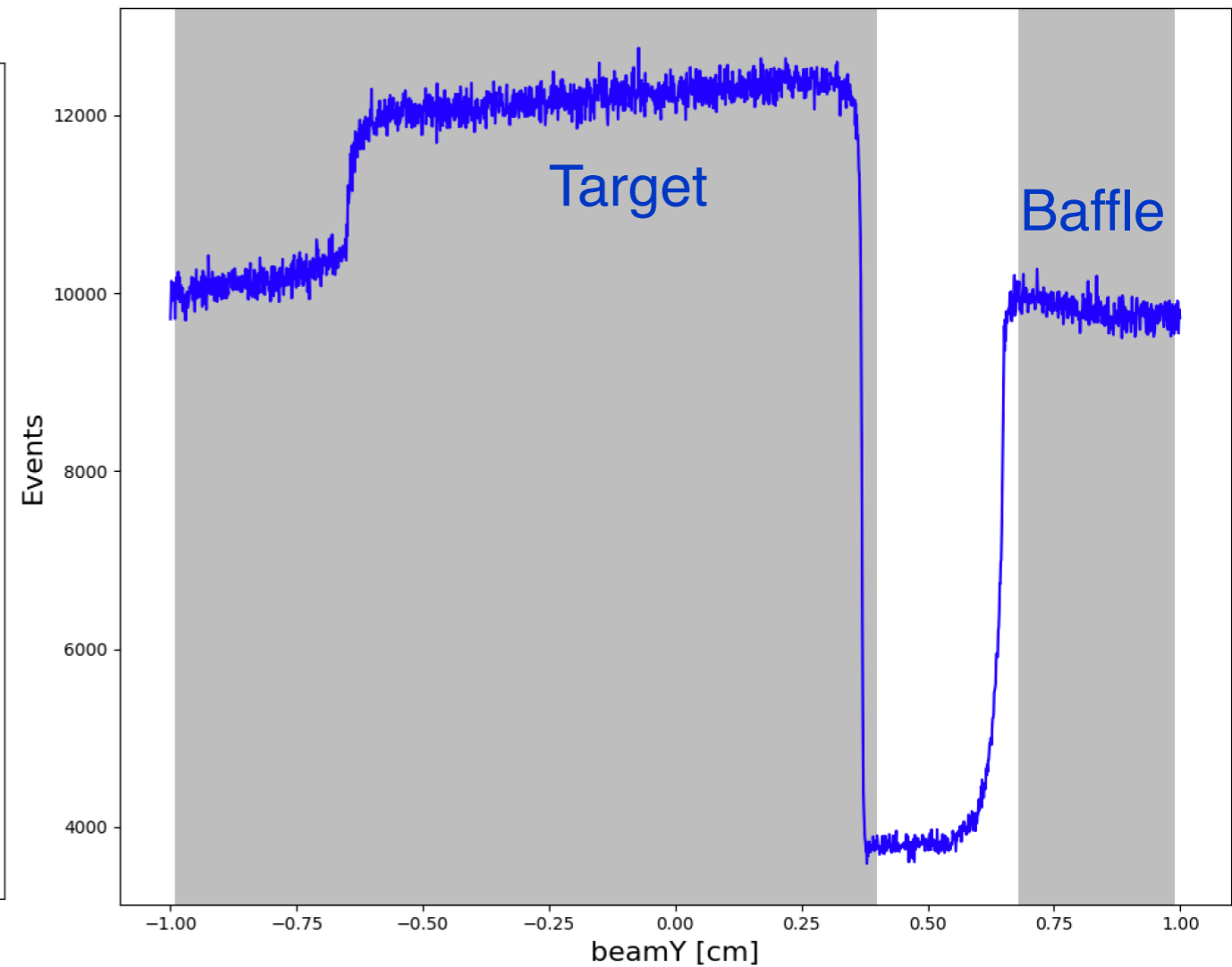
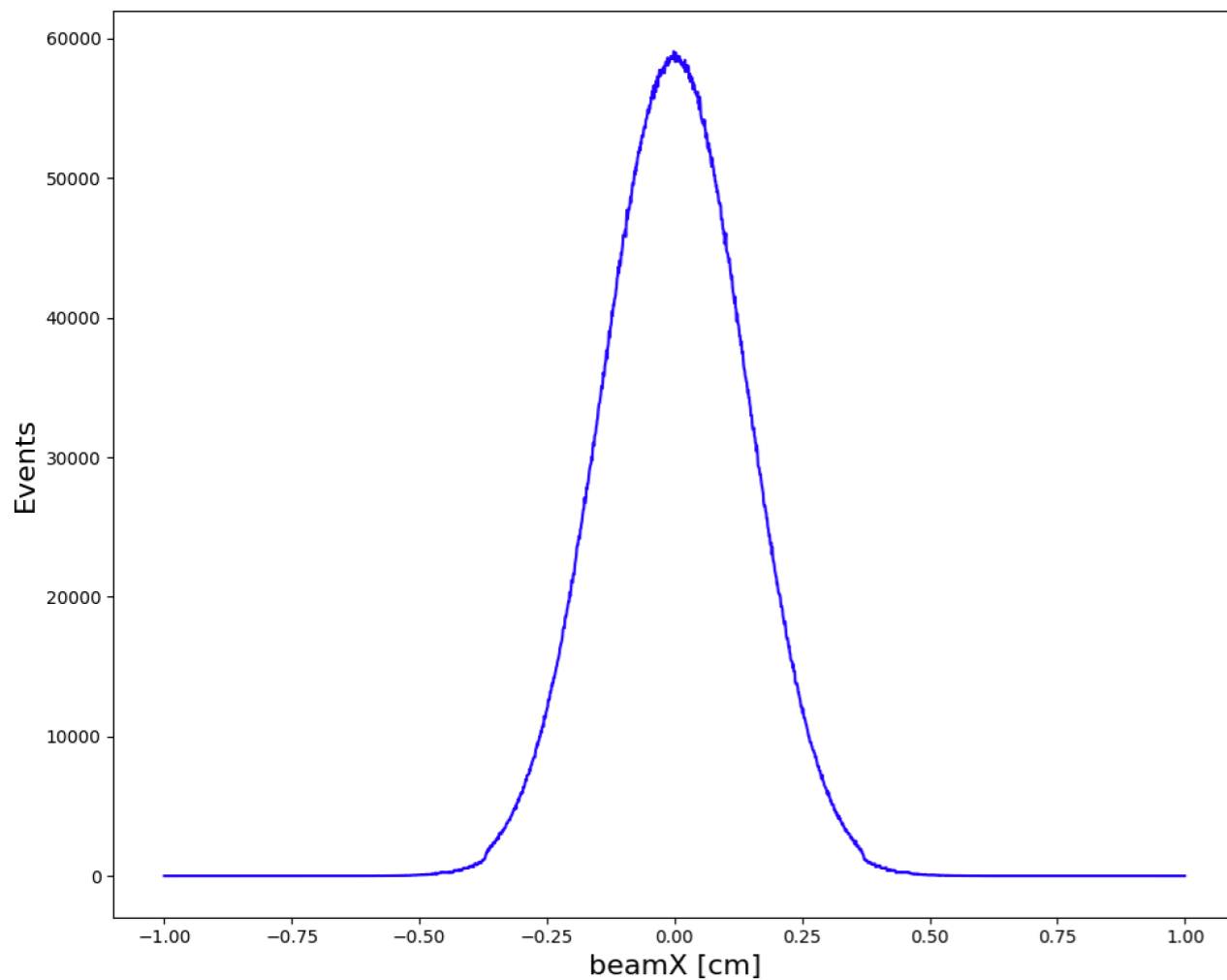
Path to the “golden files” : /pnfs/numix/persistent/users/sganguly/goldenfiles_uniformY_gaussianX

For Gaussian proton X, Uniform proton Y

	Dataset#	POT/file	Horn Current	NJobs	Seeds
All 10000 files in dir	1	100k	200kA	10000	10,000
All 10000 files in dir	2	100k	200kA	10000	20,000
All 10000 files in dir	3	100k	180kA	10000	10,000
All 10000 files in dir	4	100k	180kA	10000	20,000

Vertical Scan

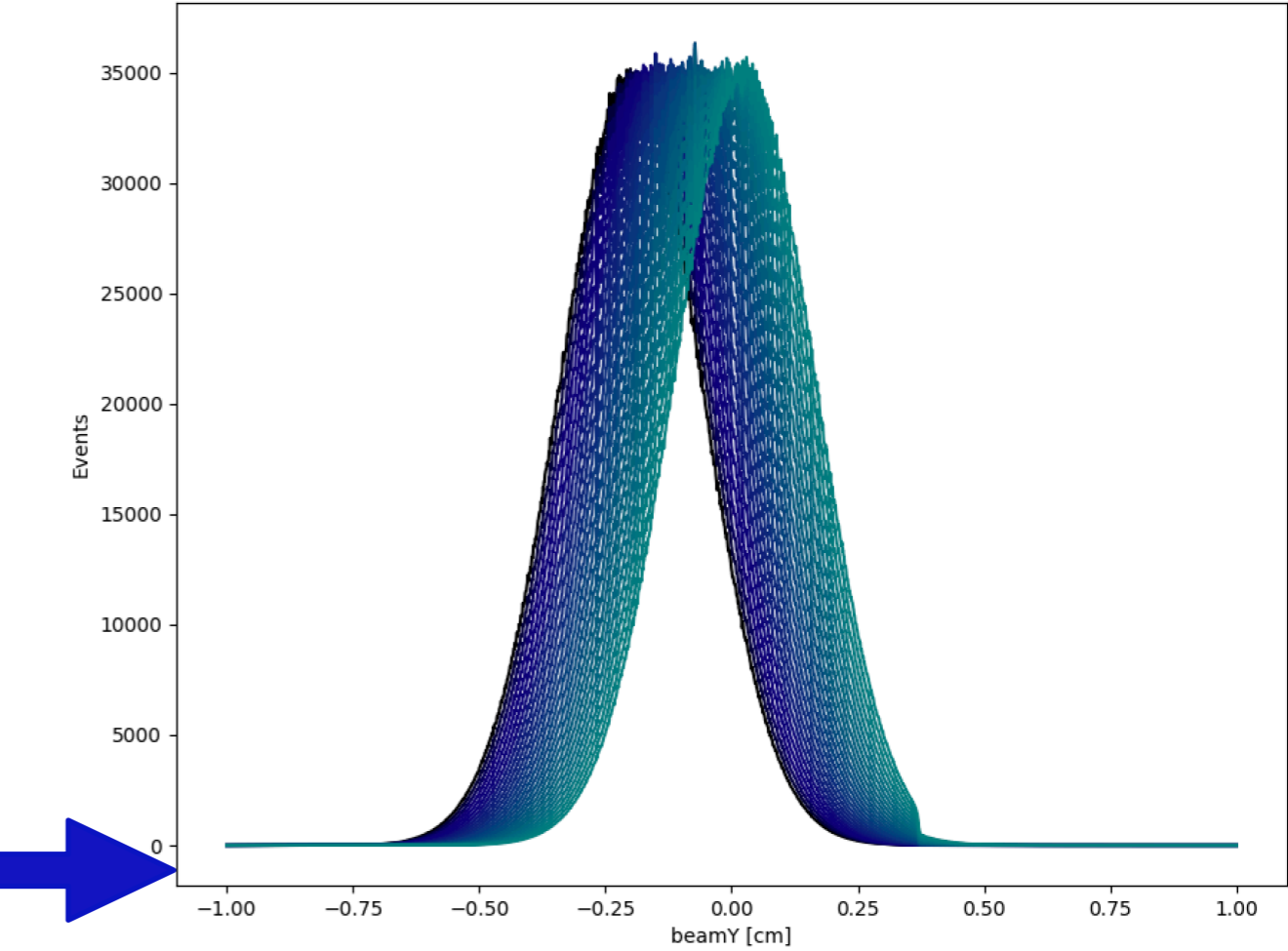
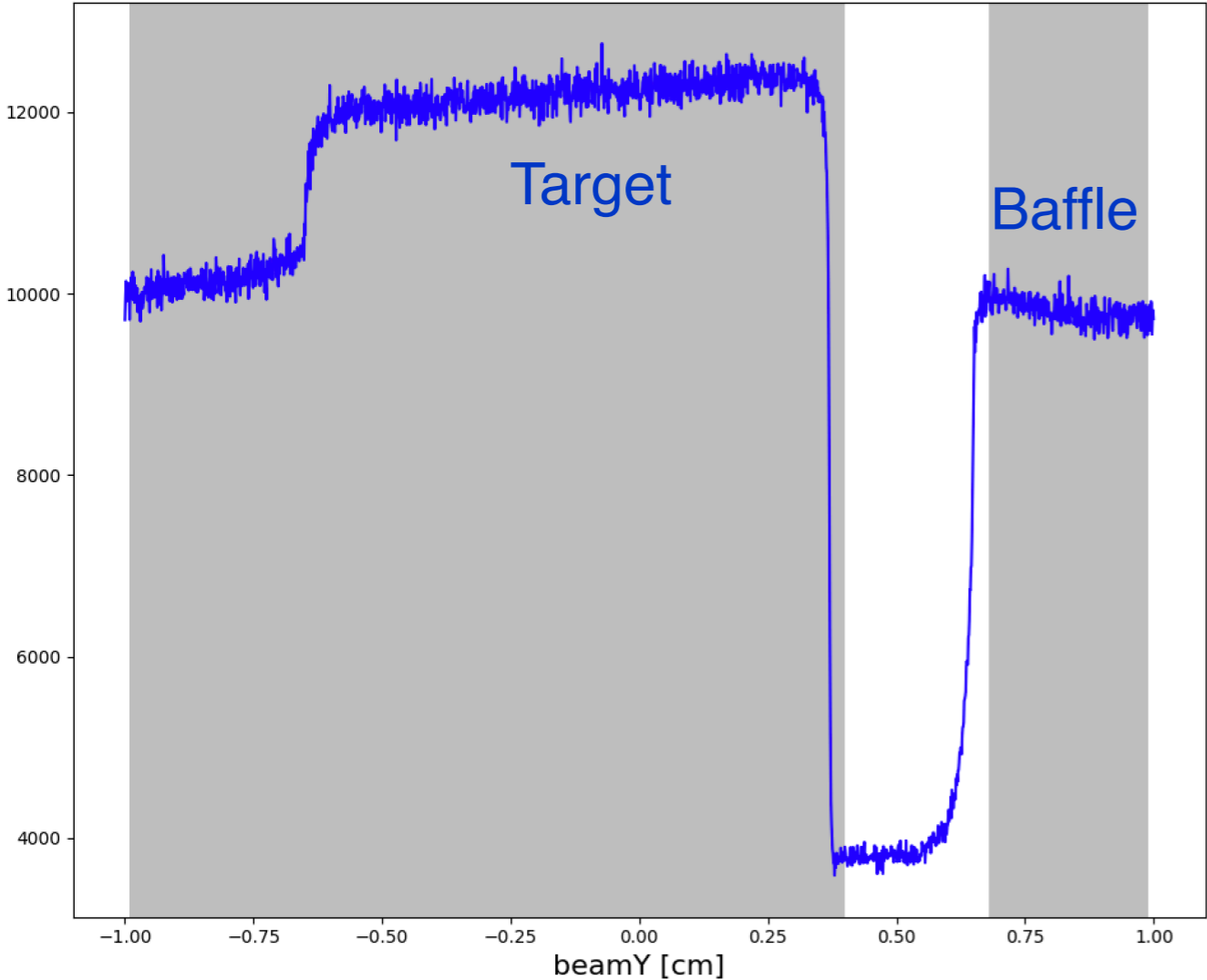
- From dataset with 200kA horn current, seed = 10000 to seed = 10999
- Files each containing 100K POT where proton X is gaussian and proton Y is uniform
- Distributions shown here are using all 1000 files



Vertical Scan

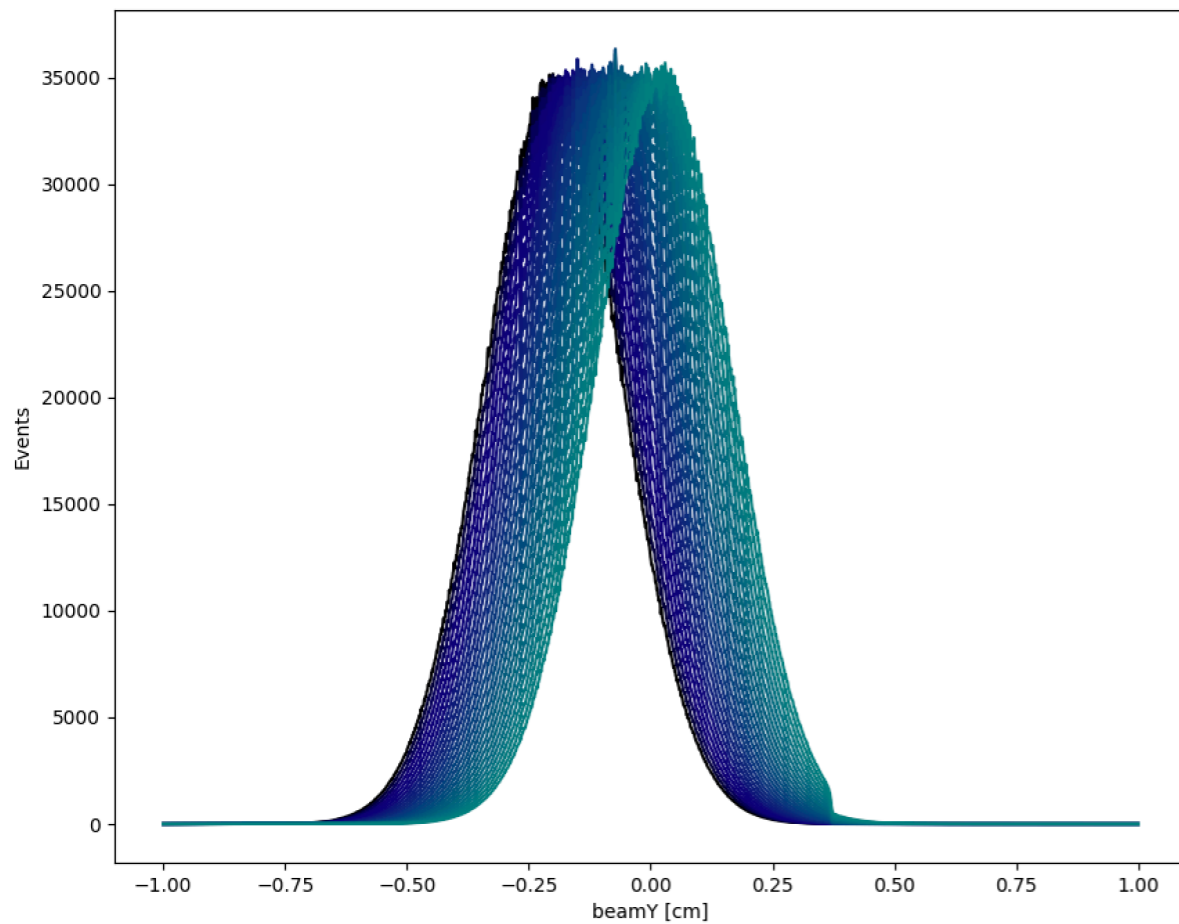
Calculate gaussian weight for each proton along beam Y position

Apply weight on every measurement : $w_i = \frac{1}{\sqrt{(2\pi)\sigma}} e^{-\frac{(y_i - \mu)^2}{2\sigma^2}}$

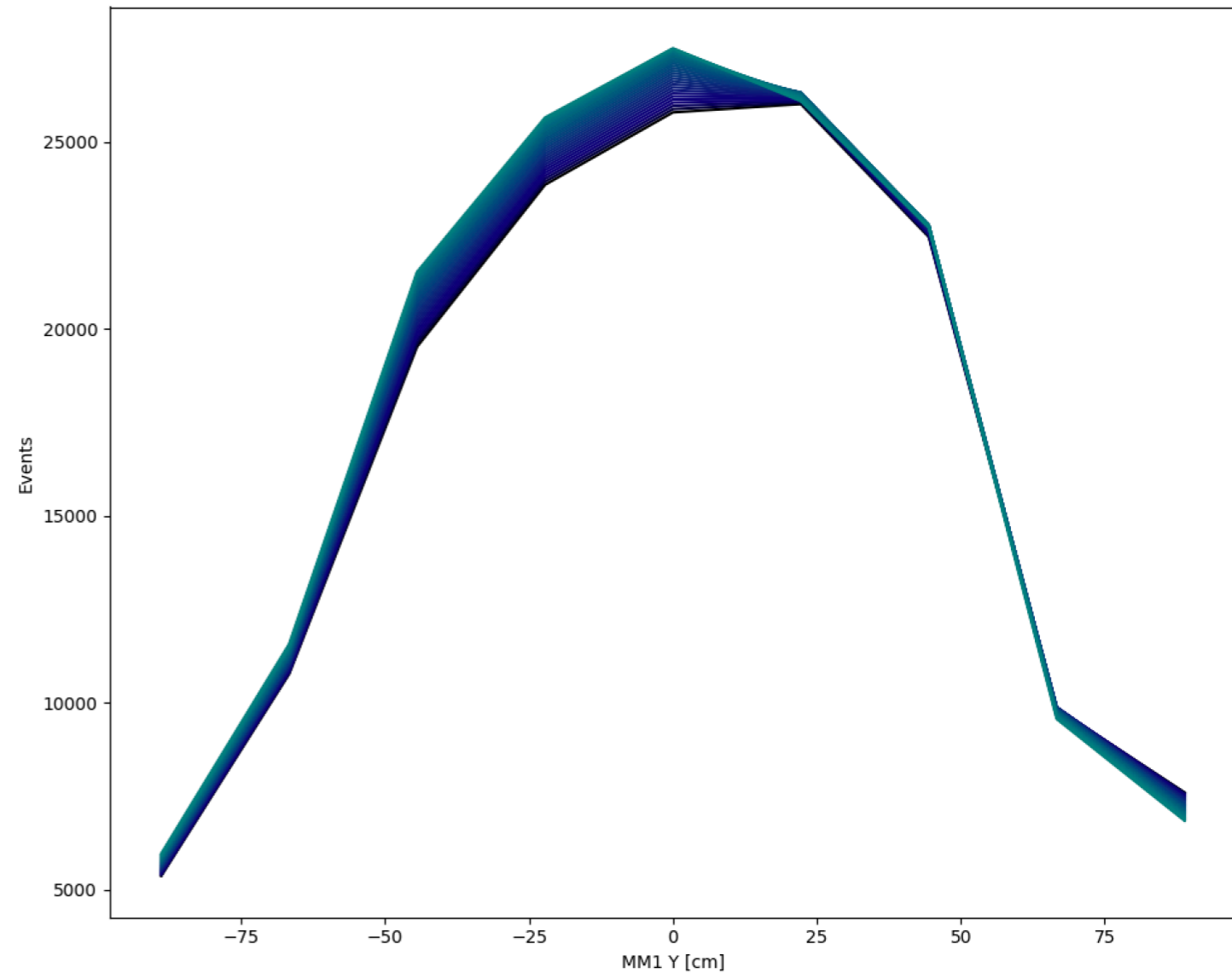


- Create gaussian distributions from the uniform beam position distribution
- Requires creating one sample with uniform distribution with large statistics
- Gaussians can be generated off of the uniform sample
- Does not require running on grid for each gaussian sample

Weighted vertical proton beam position distributions for each of 30 Gaussian beam selections & corresponding muon beam distribution along vertical axis of Muon Monitor 1

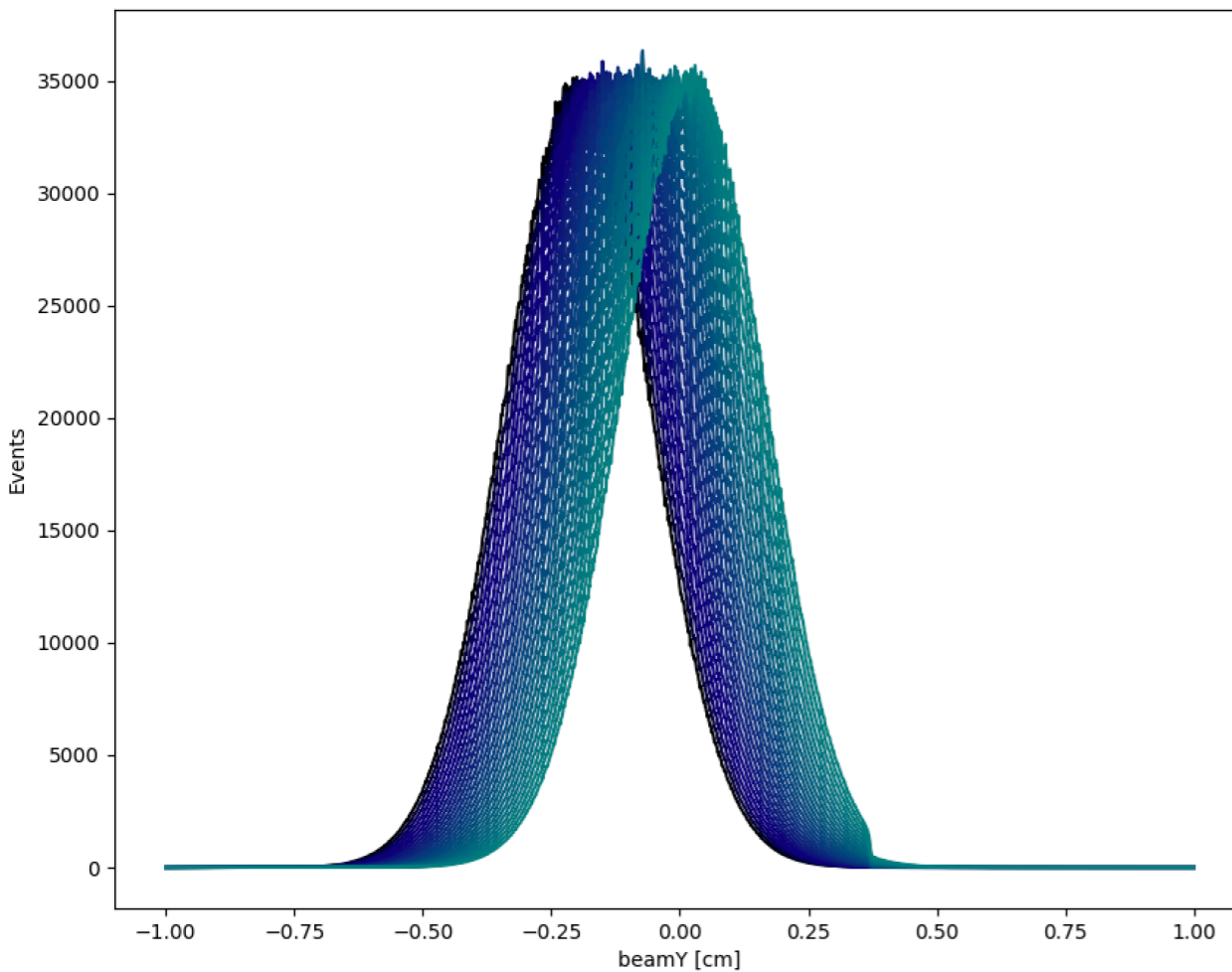


Vertical Proton Beam position

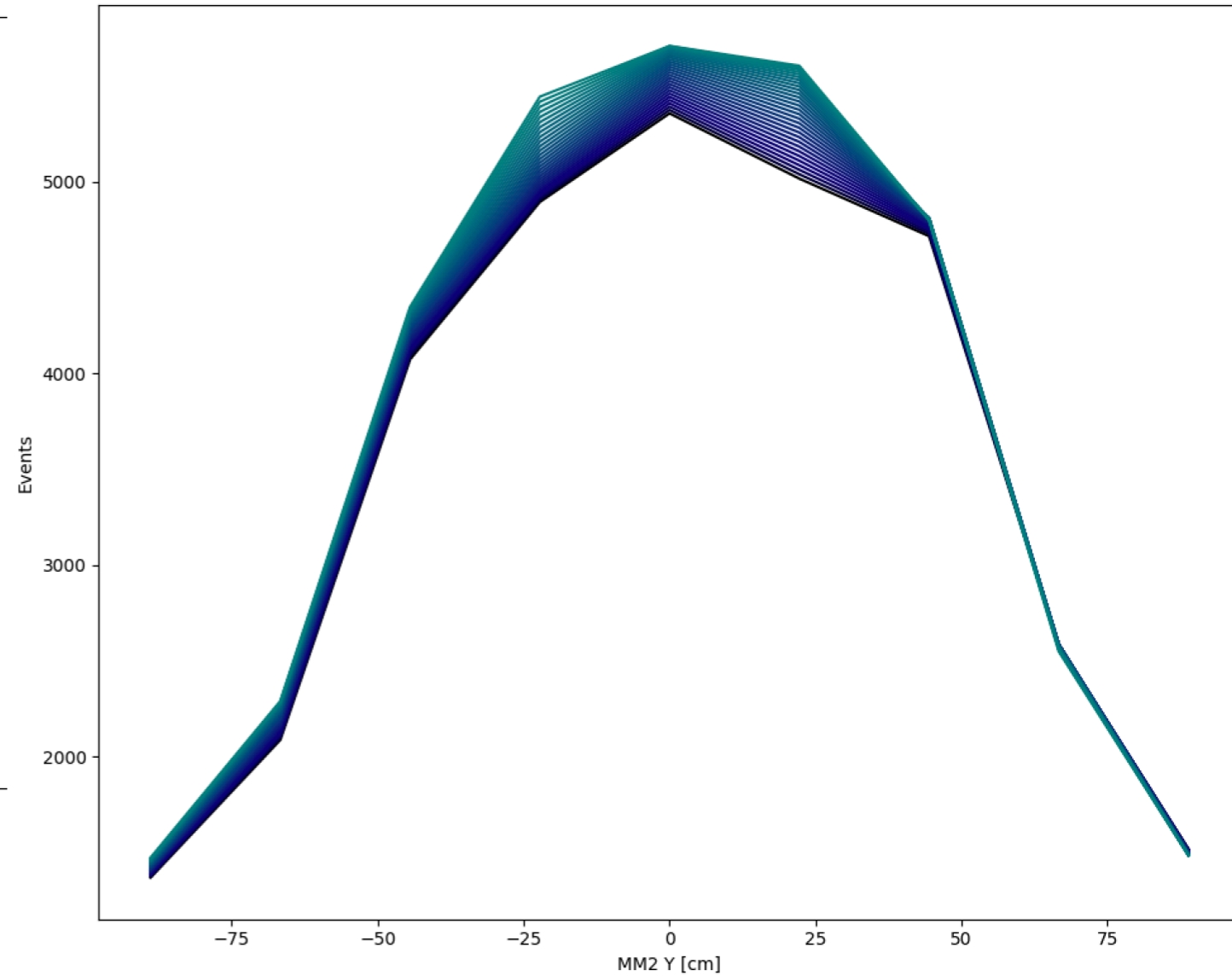


Vertical muon beam distribution at MM1

Weighted vertical proton beam position distributions for each of 30 Gaussian beam selections & corresponding muon beam distribution along vertical axis of Muon Monitor 2

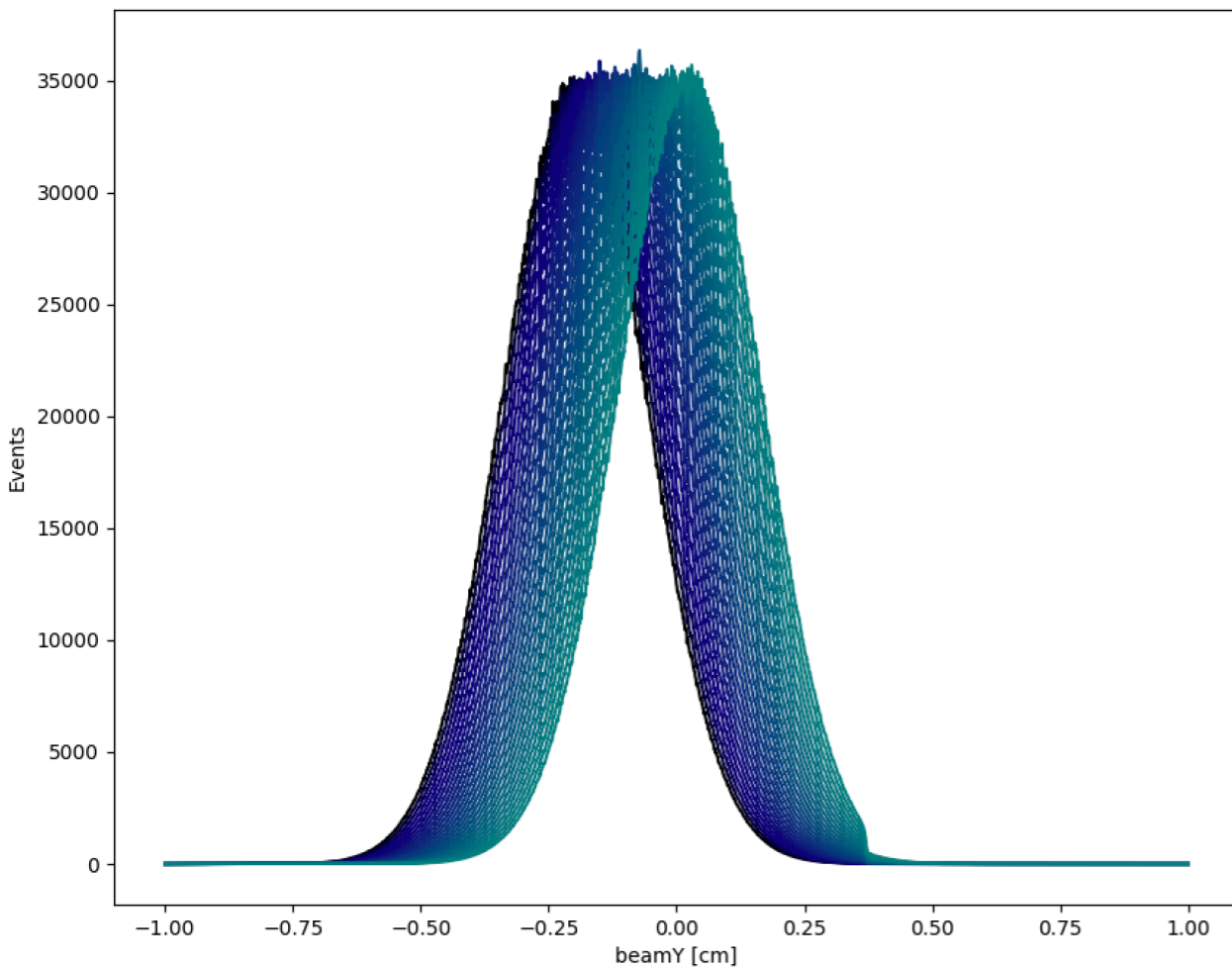


Vertical Proton Beam distribution

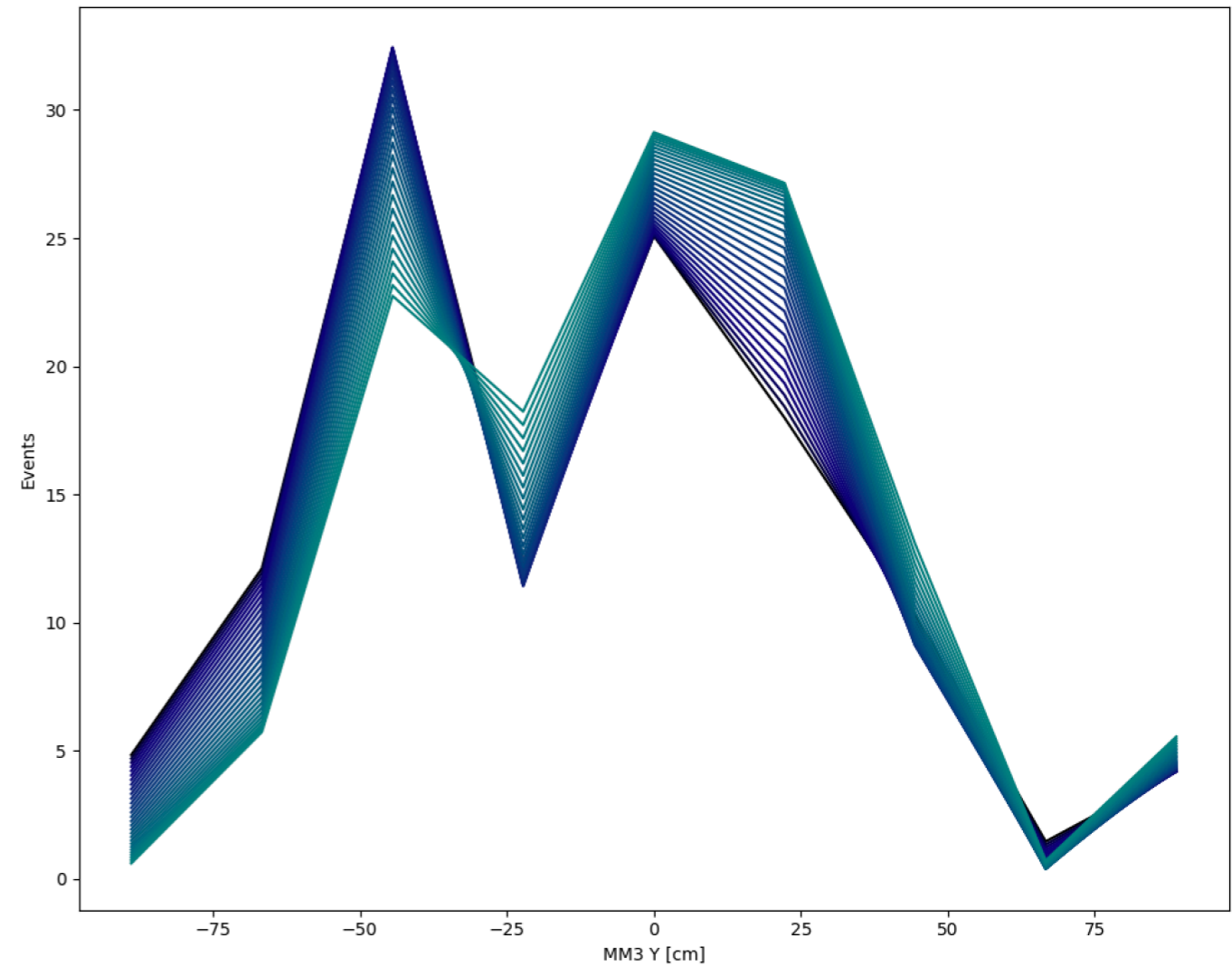


Vertical muon beam distribution at MM2

Weighted vertical proton beam position distributions for each of 30 Gaussian beam selections & corresponding muon beam distribution along vertical axis of Muon Monitor 3



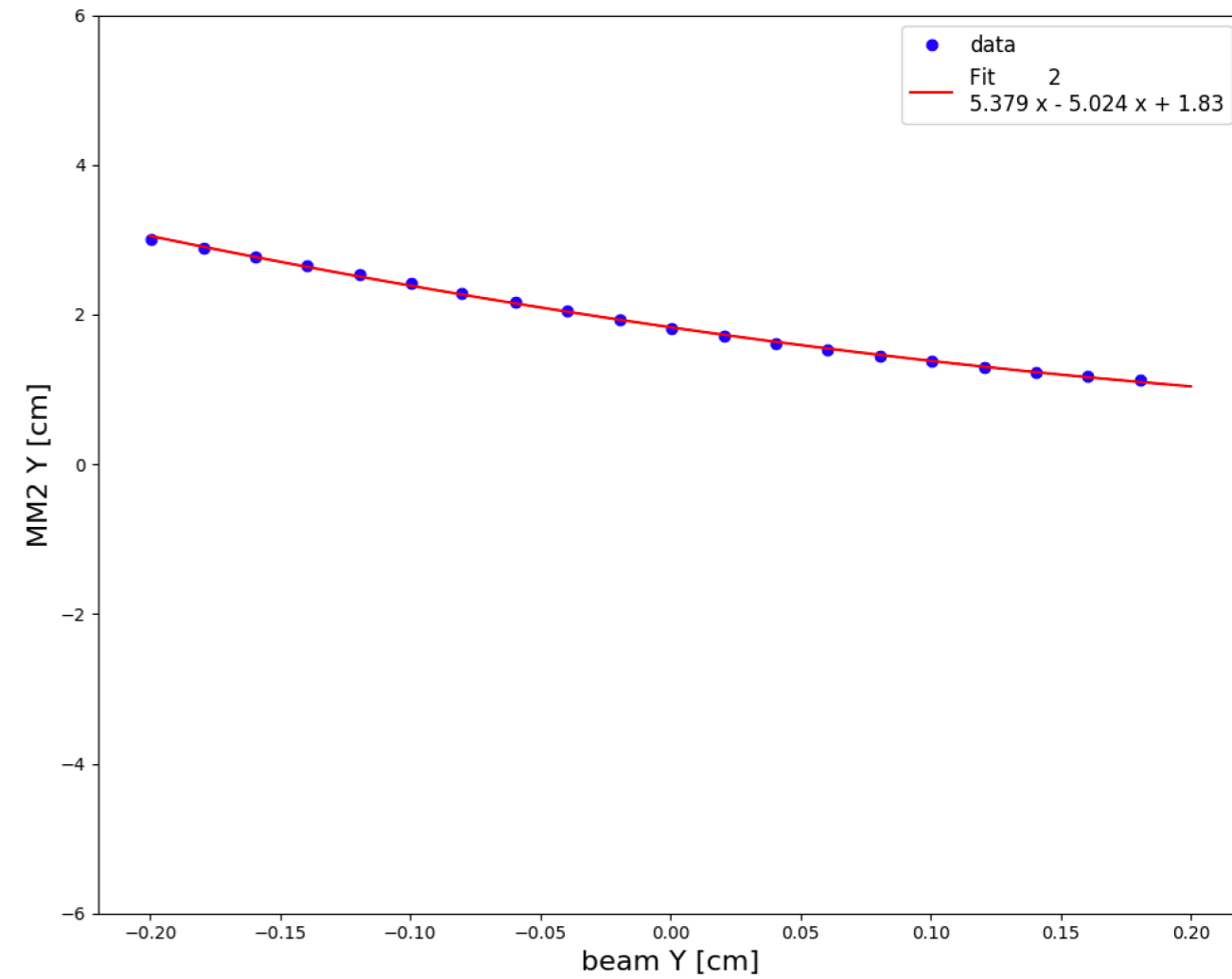
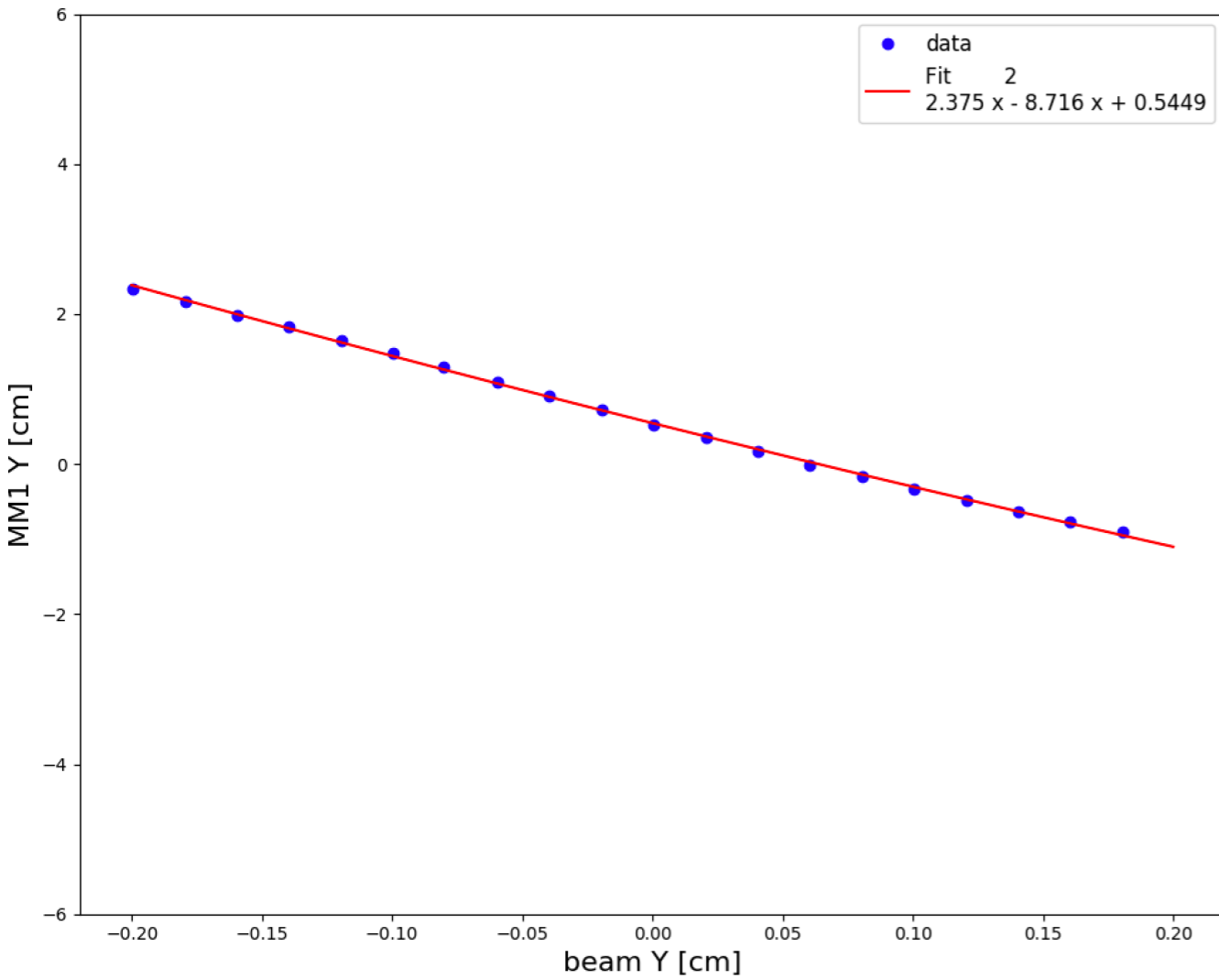
Vertical Proton Beam distribution



Vertical muon beam distribution at MM3

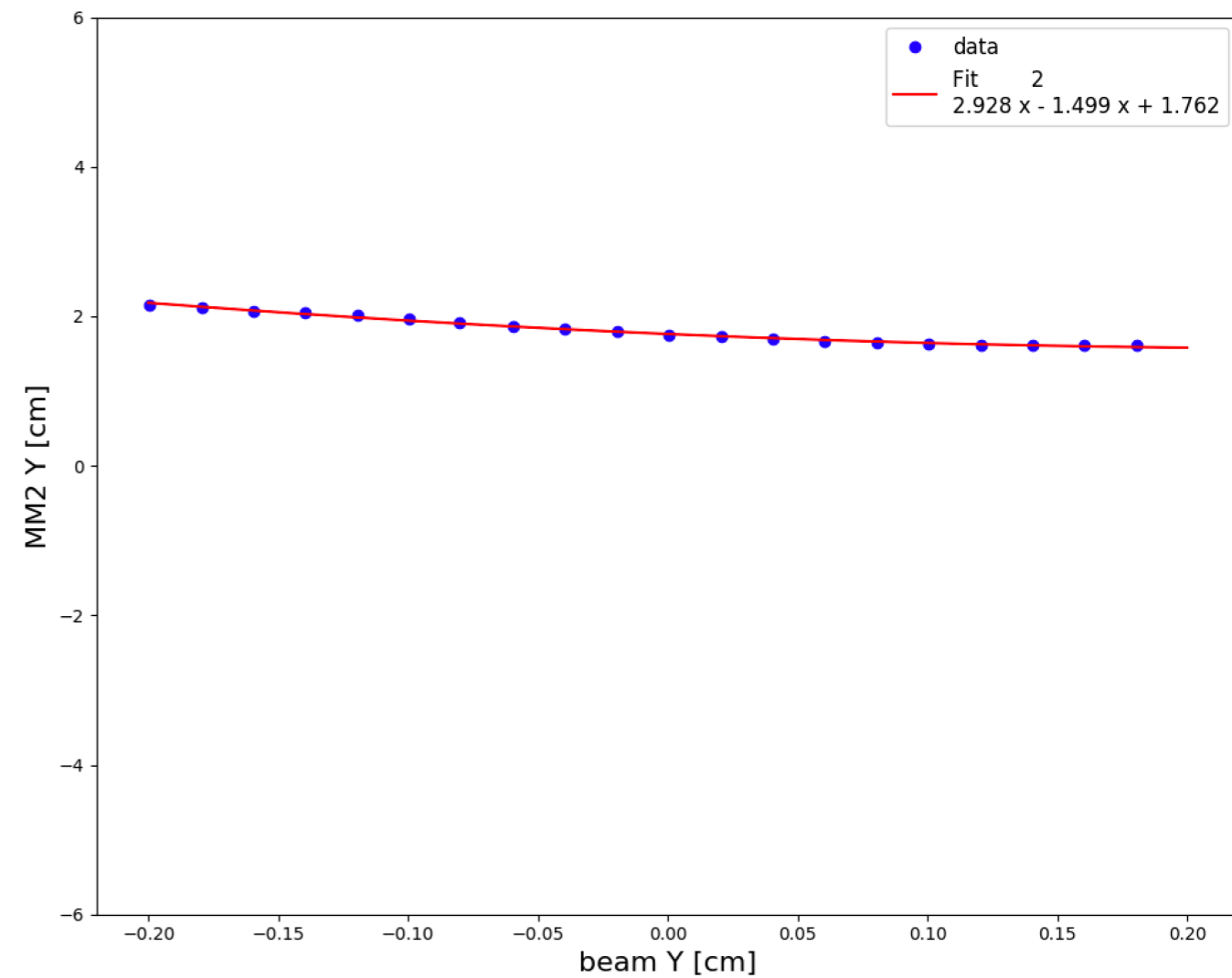
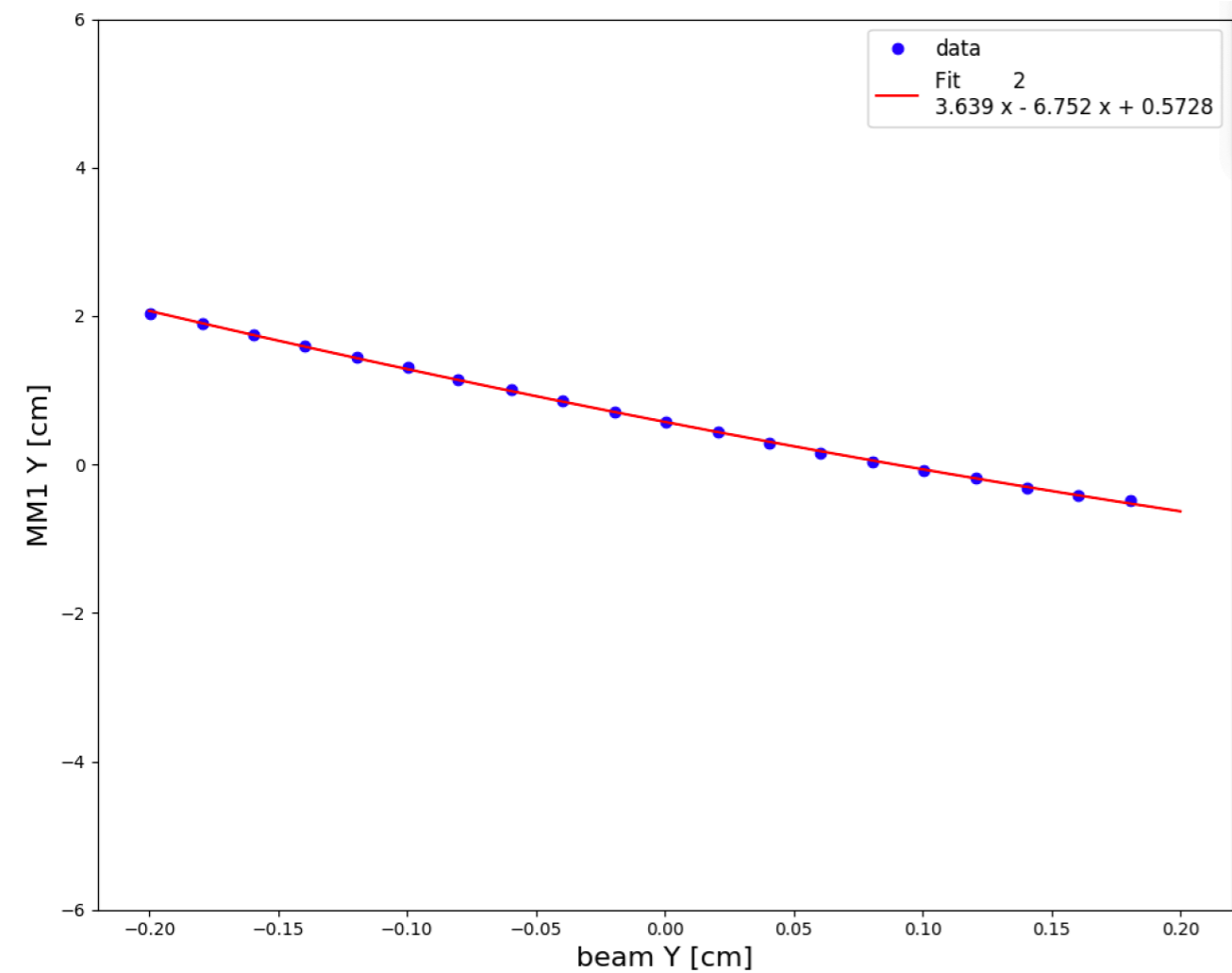
Horn Current 200kA

Vertical muon flux centroid on MM1 & MM2 from simulation



Horn Current 180kA

Vertical muon flux centroid on MM1 & MM2 from simulation



An example of showing correlation

