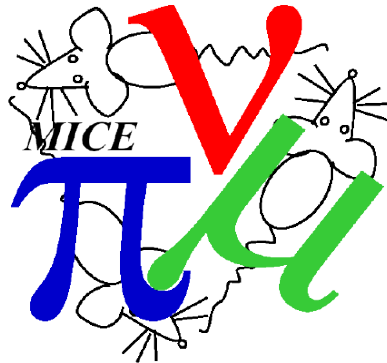




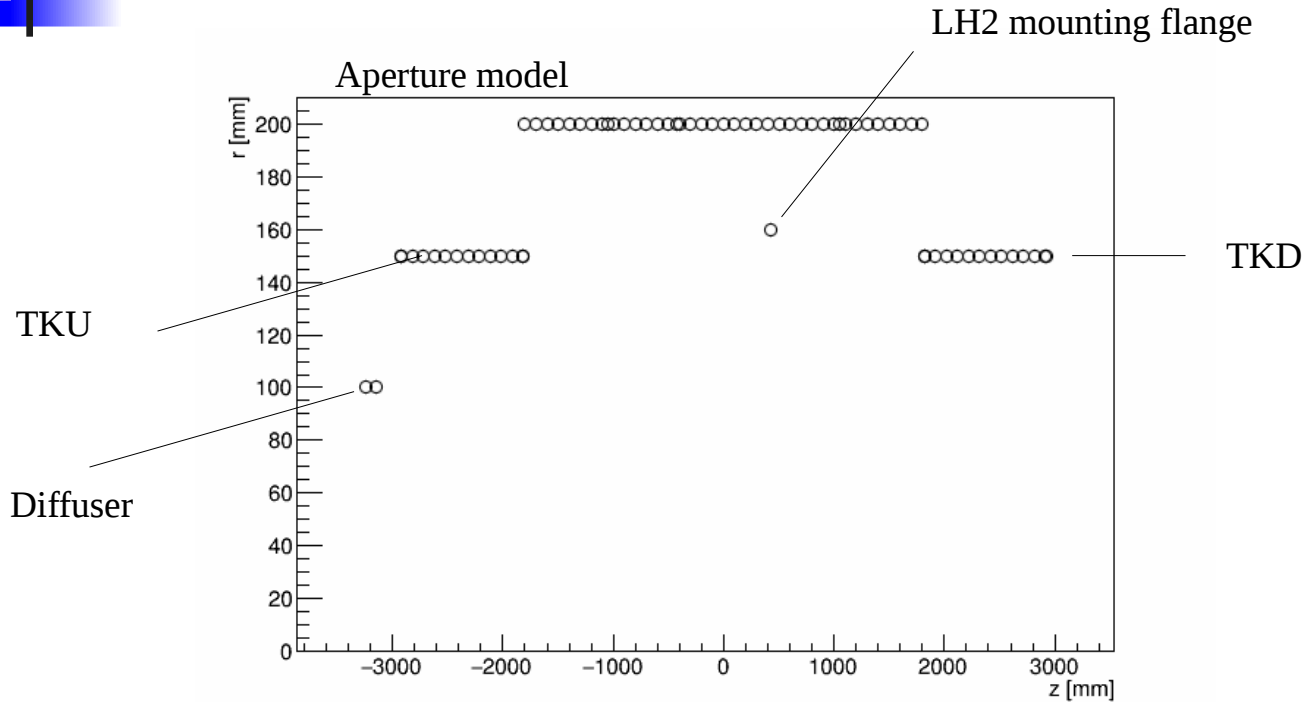
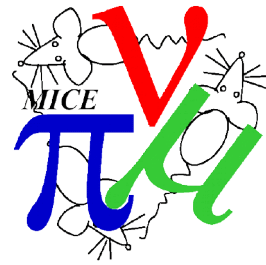
Run Settings



C. Rogers,
ASTeC Intense Beams Group
Rutherford Appleton Laboratory

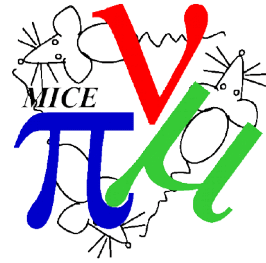


Algorithm

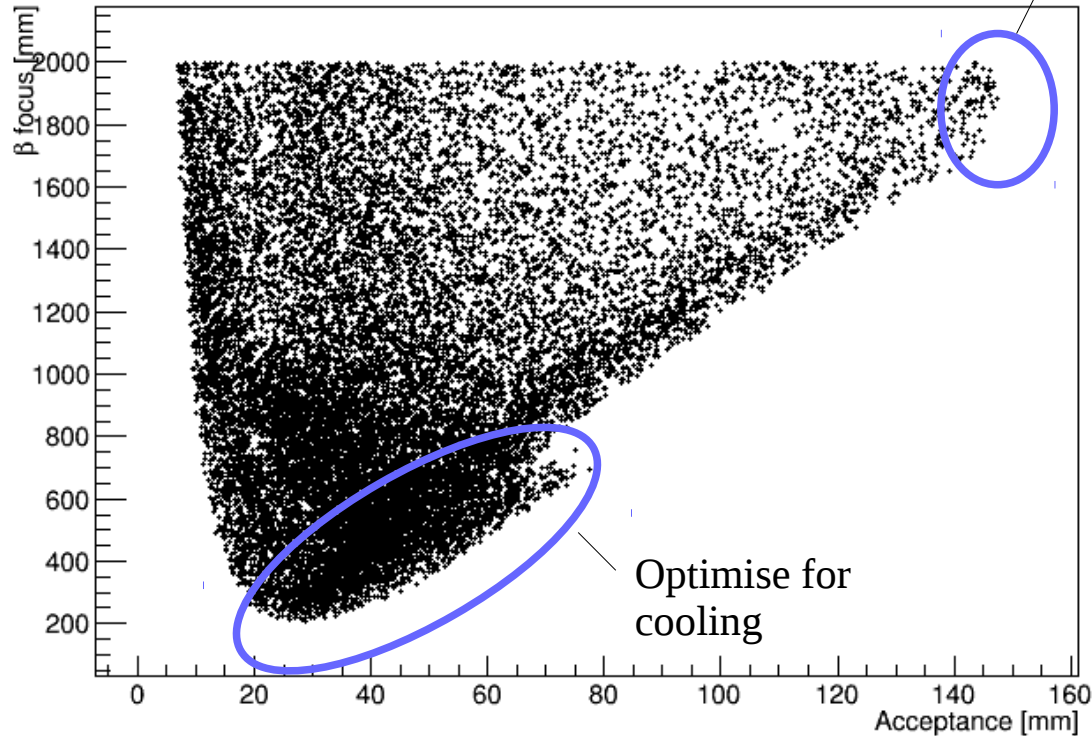


- Throw beam ellipse down MICE beamline 10000 times
 - Throw random magnet currents (why not a grid?)
- Use naive linear model for apertures
- Assume beta is matched at TKU
- Try to map space of acceptance and beta at focus coil
- M2D is switched off and solenoid mode for all solutions
- 3T in SSU and SSD

200 MeV/c

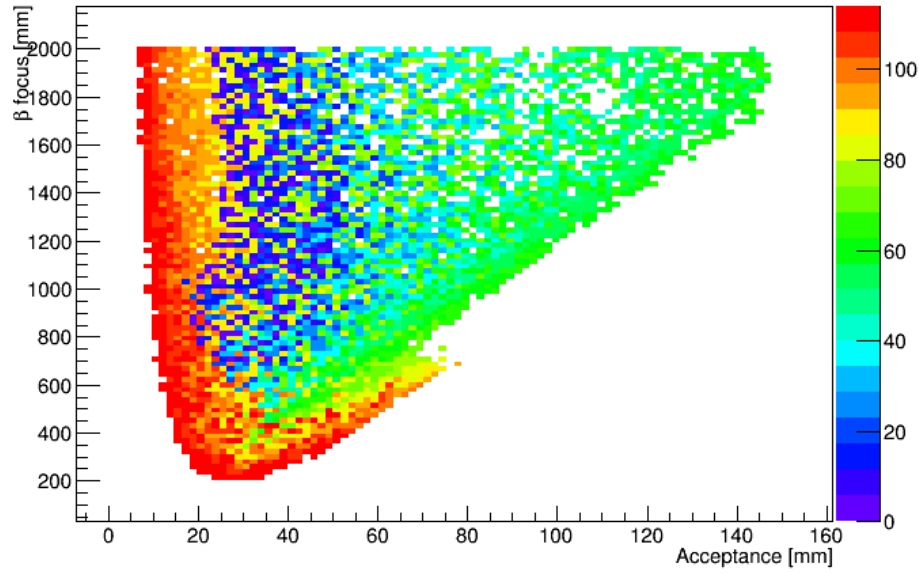


Optimise for material physics

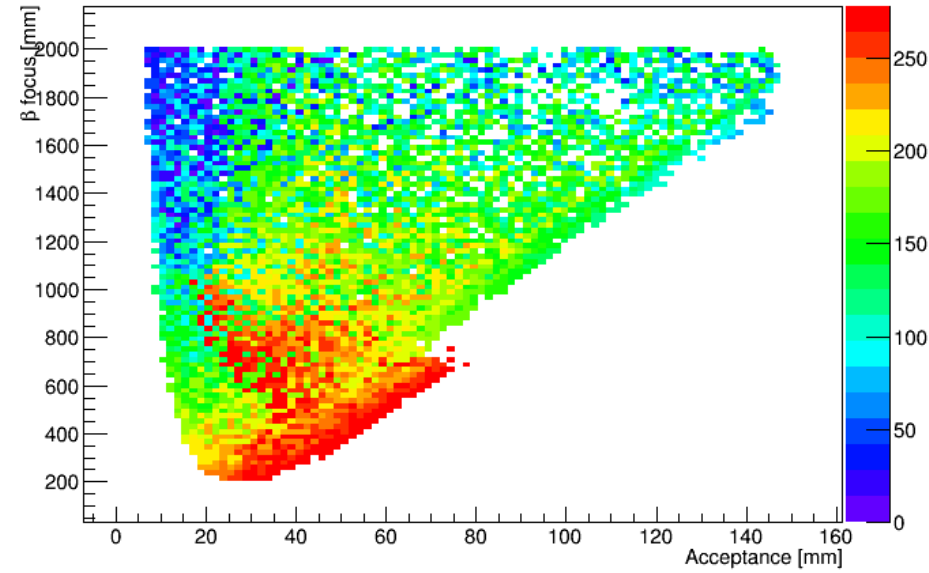


- Family of solutions
 - Higher acceptance is always best
 - Low beta is best for cooling

FocusCoil_US

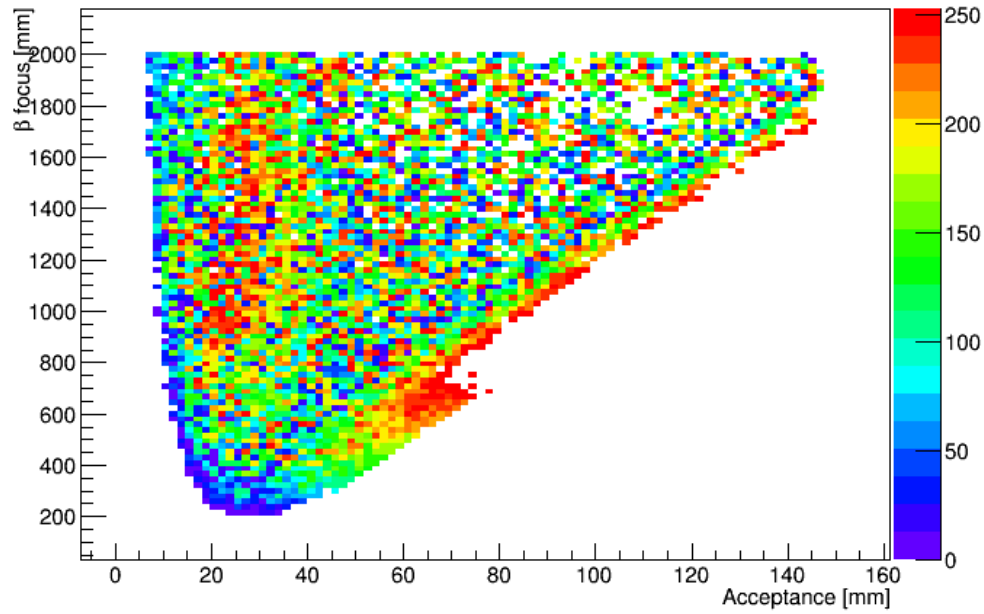


MatchCoil1_US

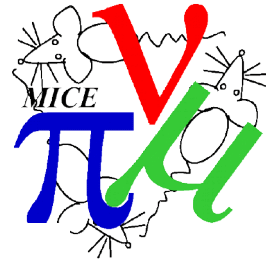


- Force proportional to $M1 \cdot FC$

MatchCoil2_US

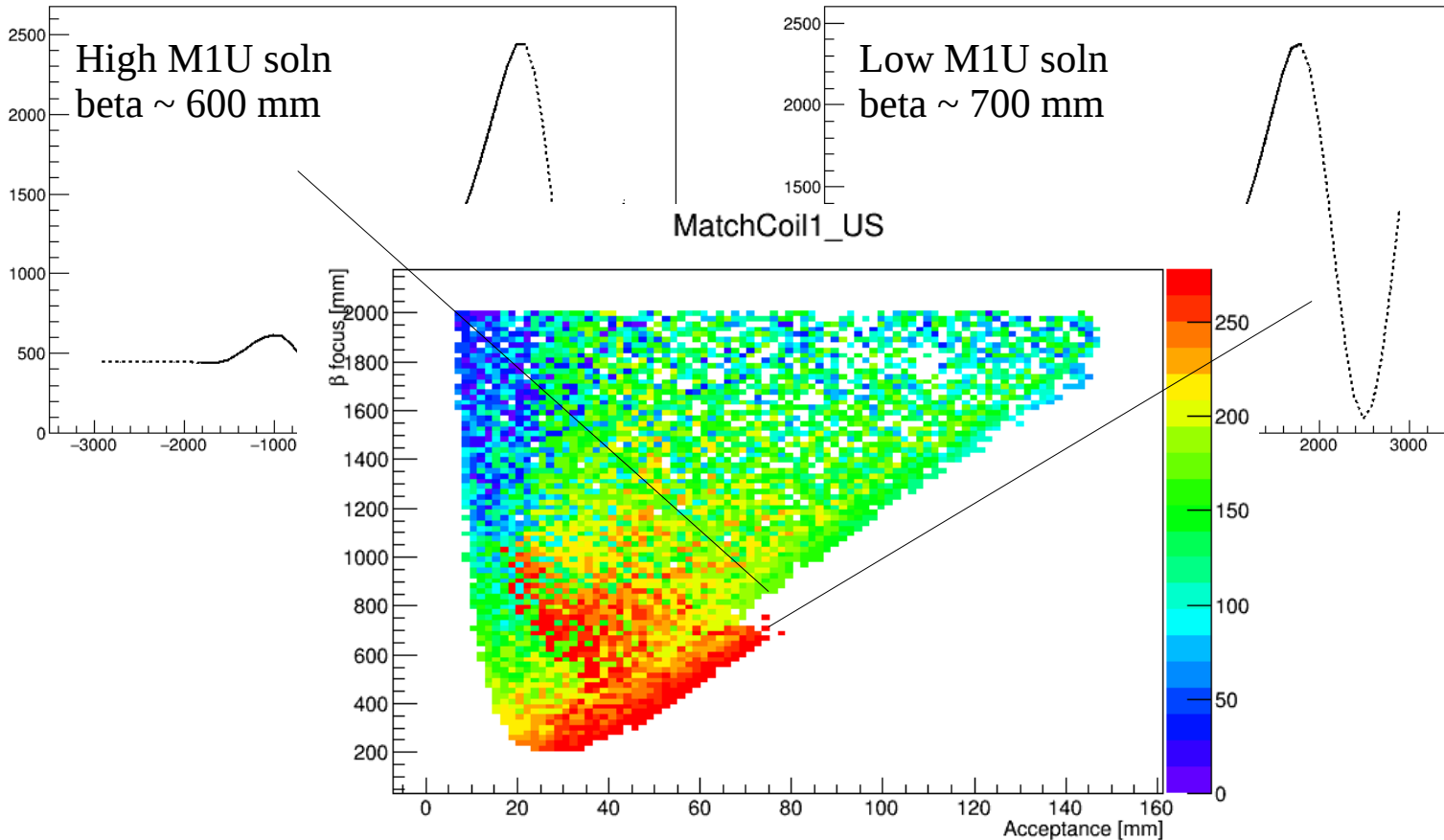


- M2 – for reference



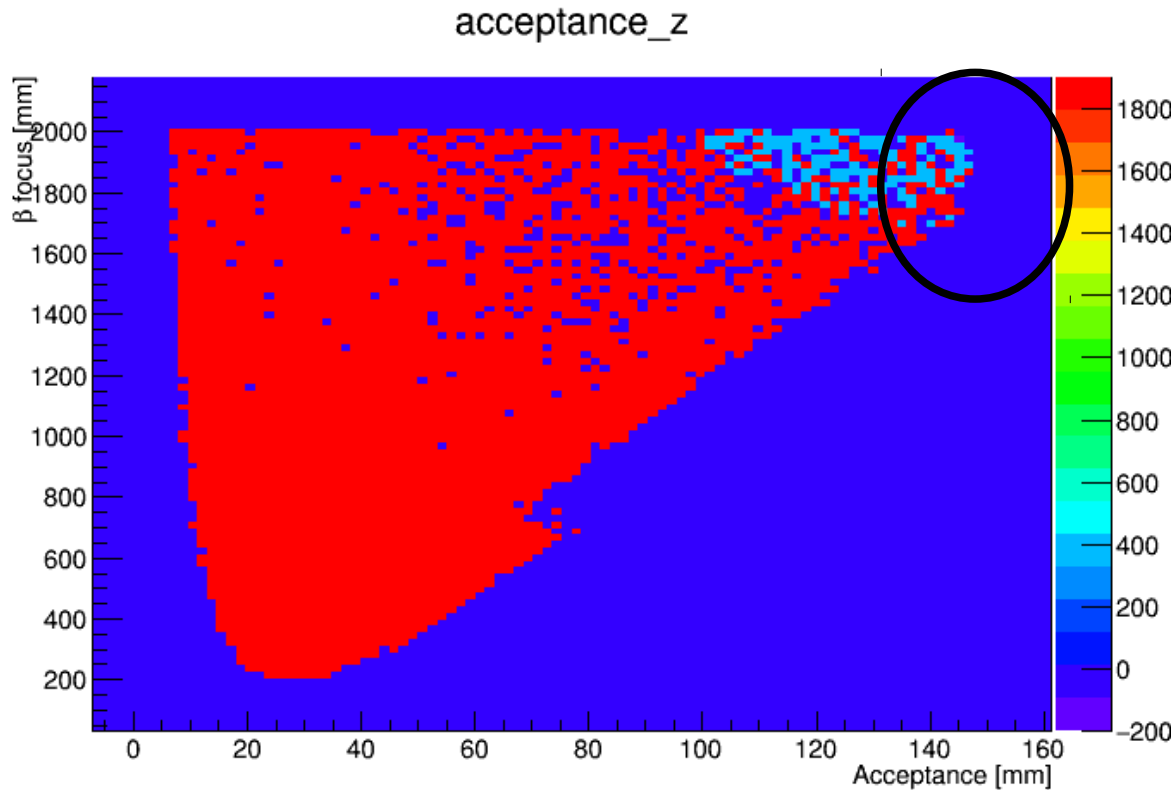
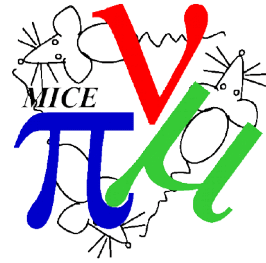
p=200.0 MeV/c, FC=83.79, M1_DS=0.0, M2_DS=0.0, M1_US=275.17, M2_US=240.3 A

p=200.0 MeV/c, FC=65.68, M1_DS=0.0, M2_DS=0.0, M1_US=189.2, M2_US=236.14 A



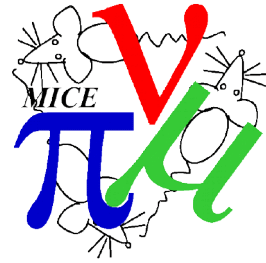
- Two families of solutions
 - High M1U solution has focus upstream of FC
 - Low M1U solution has defocus on FC

Z position of aperture

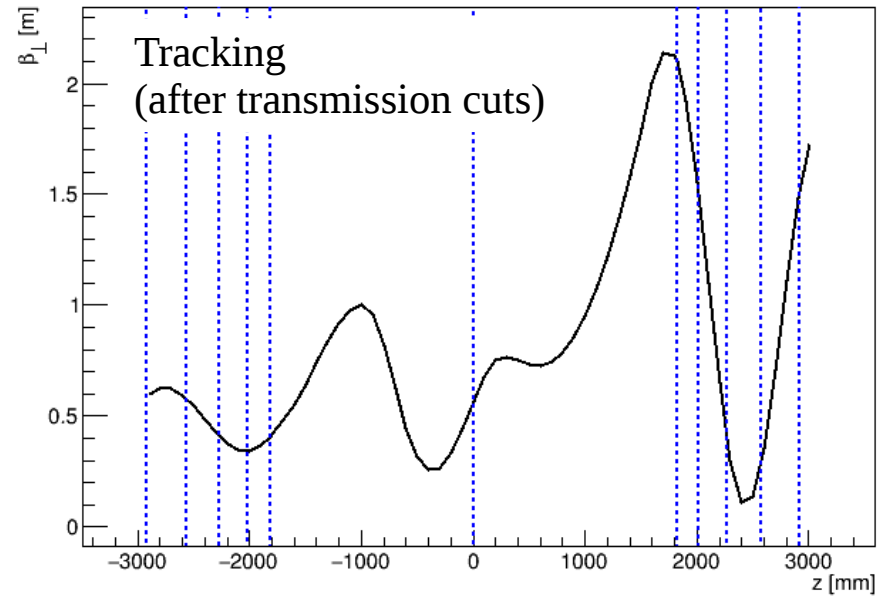
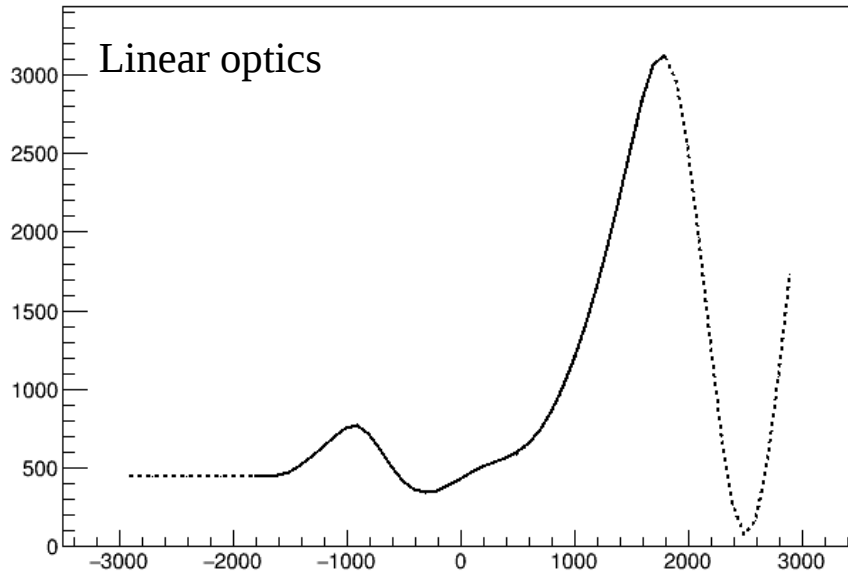


- “Roundness” of the nose is a real feature
 - Aperture at high β_{focus} becomes the FC mounting flange

Tracking

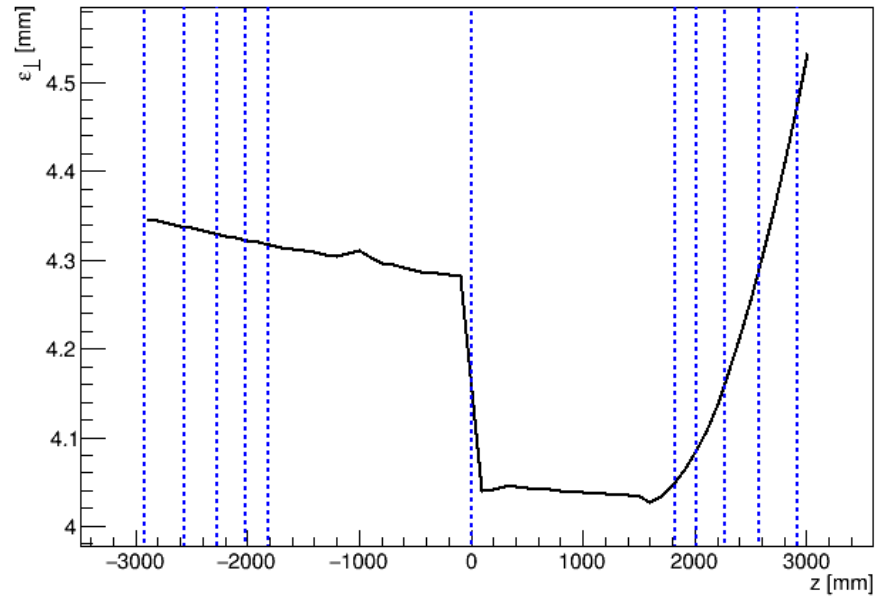
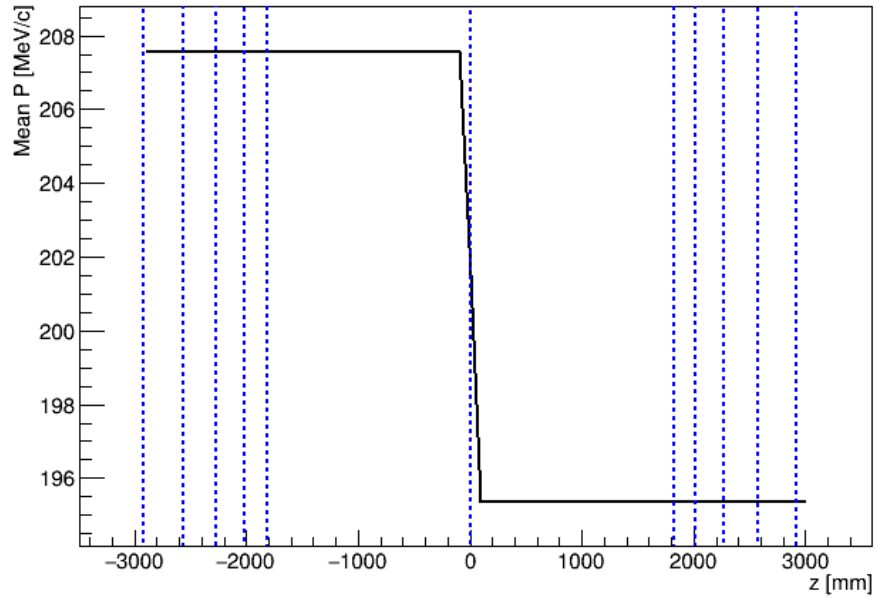
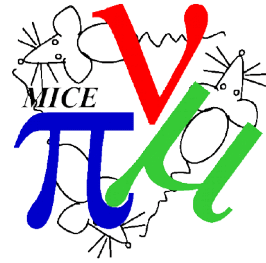


p=200.0 MeV/c, FC=107.76, M1_DS=0.0, M2_DS=0.0, M1_US=277.63, M2_US=169.35 A



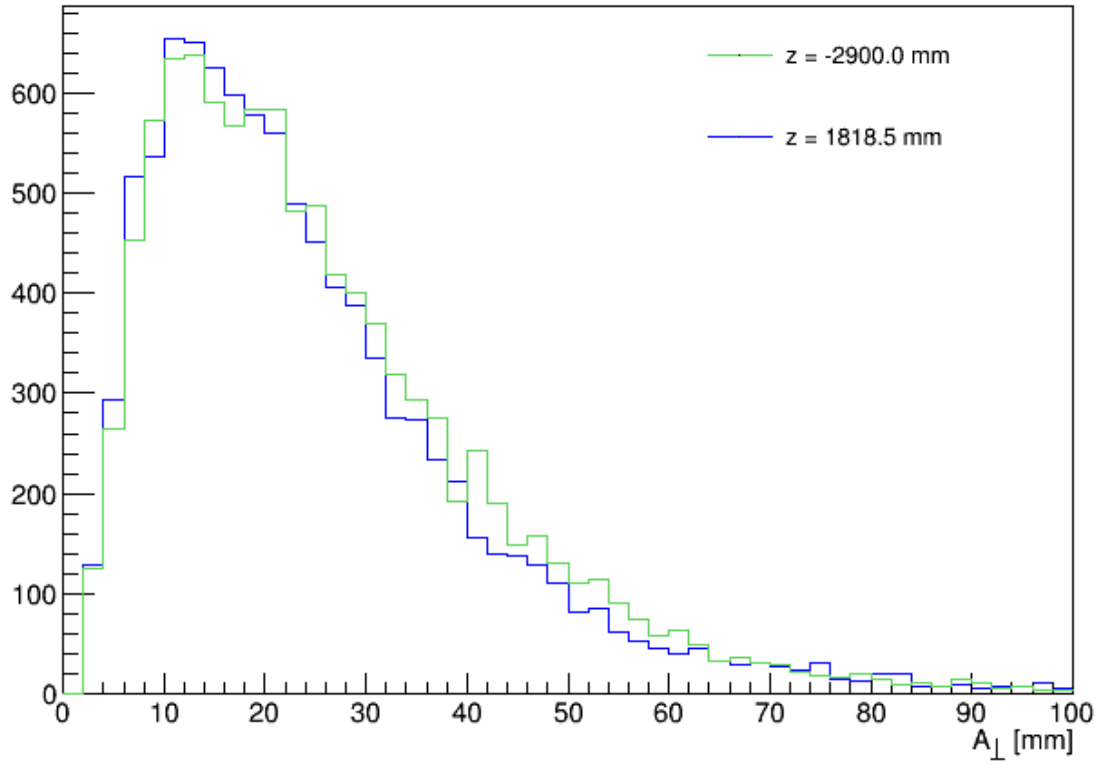
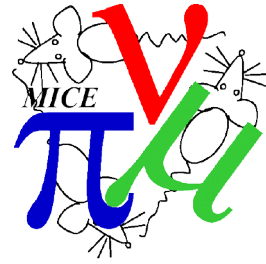
- Try tracking a “cooling” beam – look at performance
 - M2U = 277.63 A
 - M1U = 169.35 A
 - FC = 107.76 A
- Simple channel model

Tracking

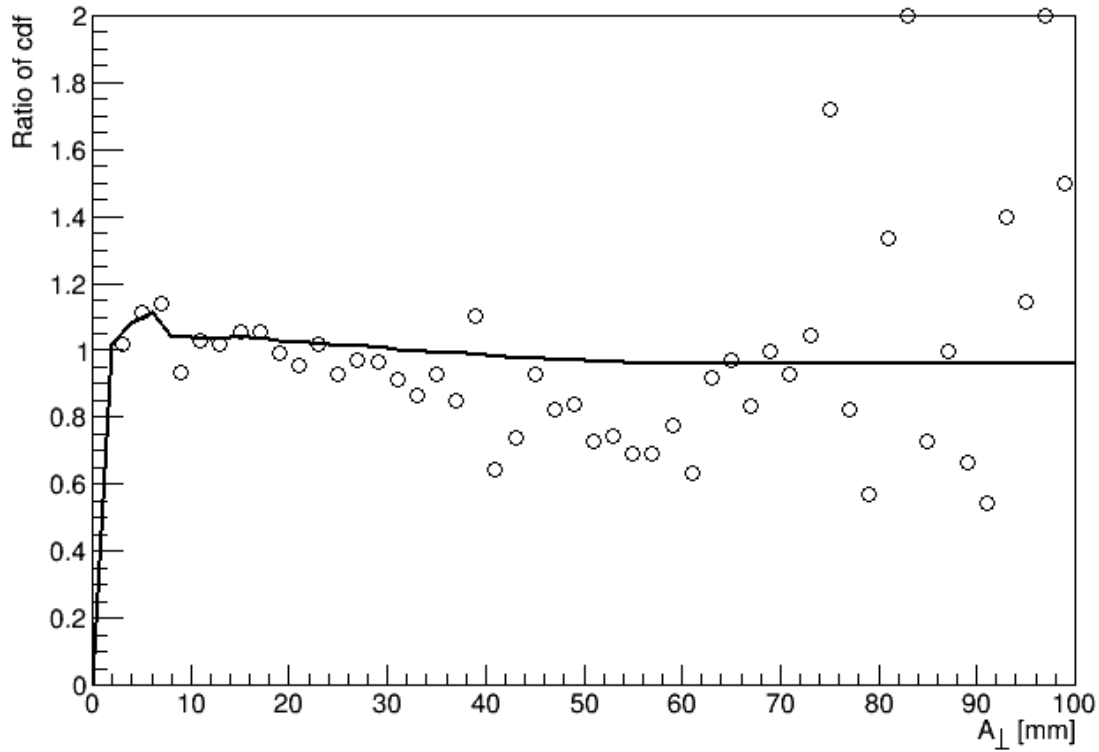
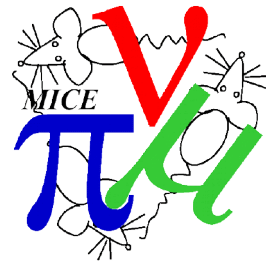


- 69.8 % transmission

Tracking

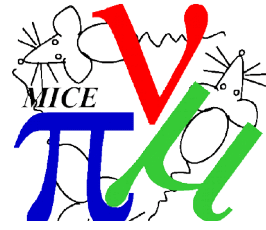


Tracking

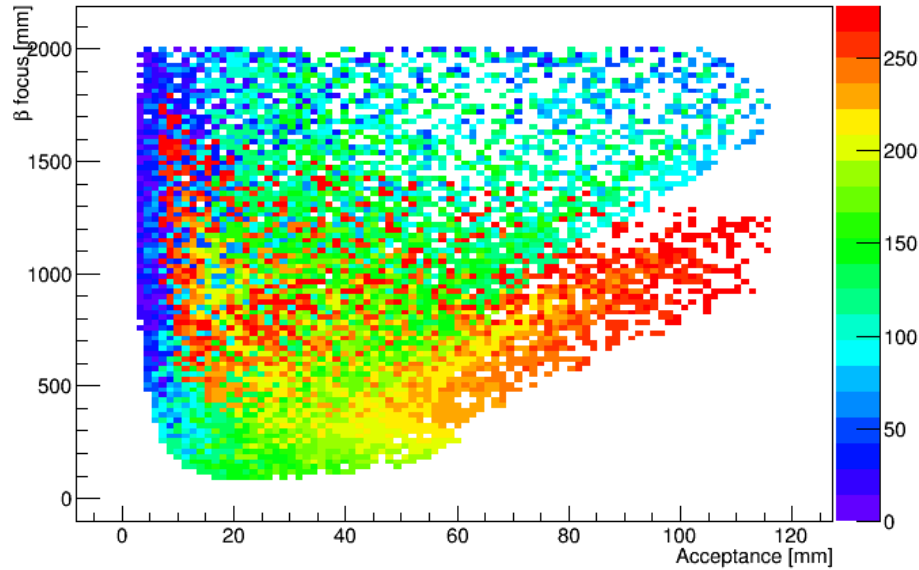


- Points show ratio of each bin
- Line shows ratio of cdf

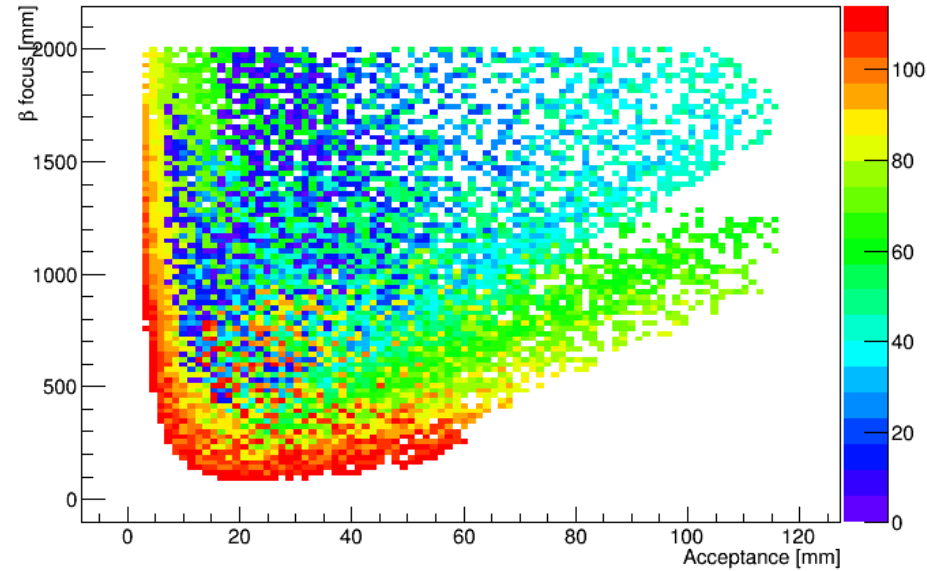
140 MeV/c



MatchCoil1_US

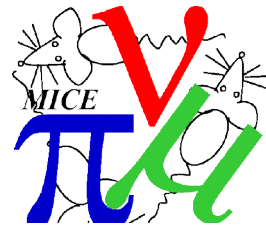


FocusCoil_US

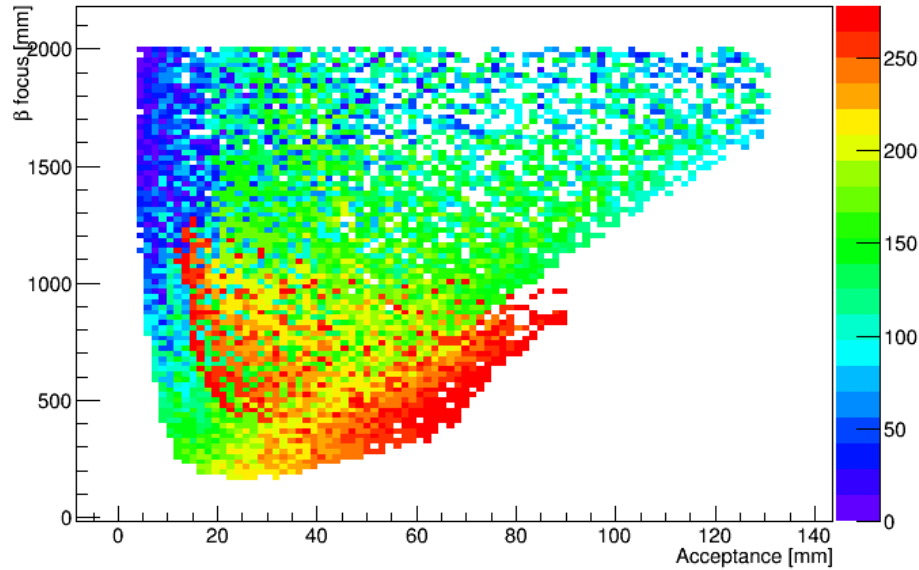


- Force proportional to $M1 \cdot FC$

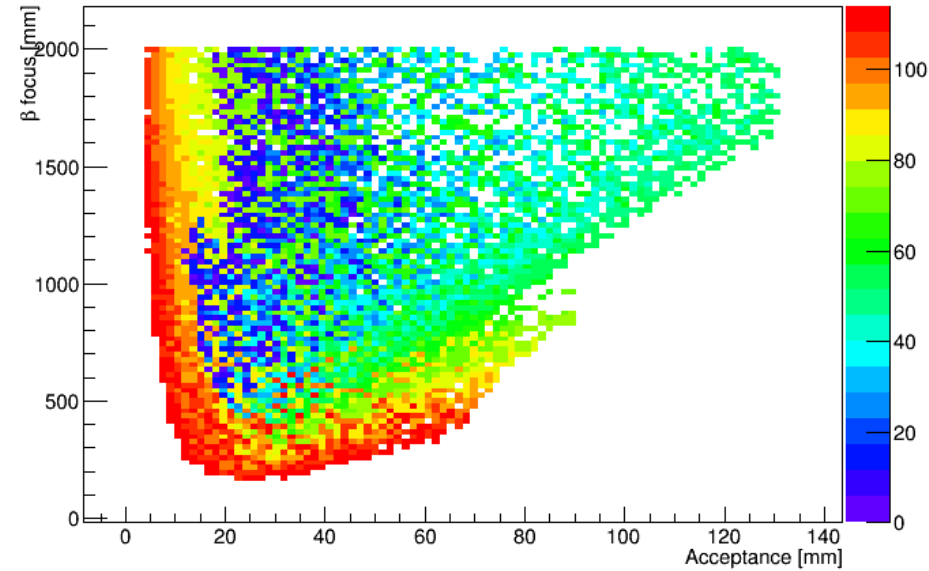
170 MeV/c



MatchCoil1_US

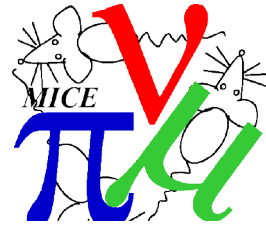


FocusCoil_US

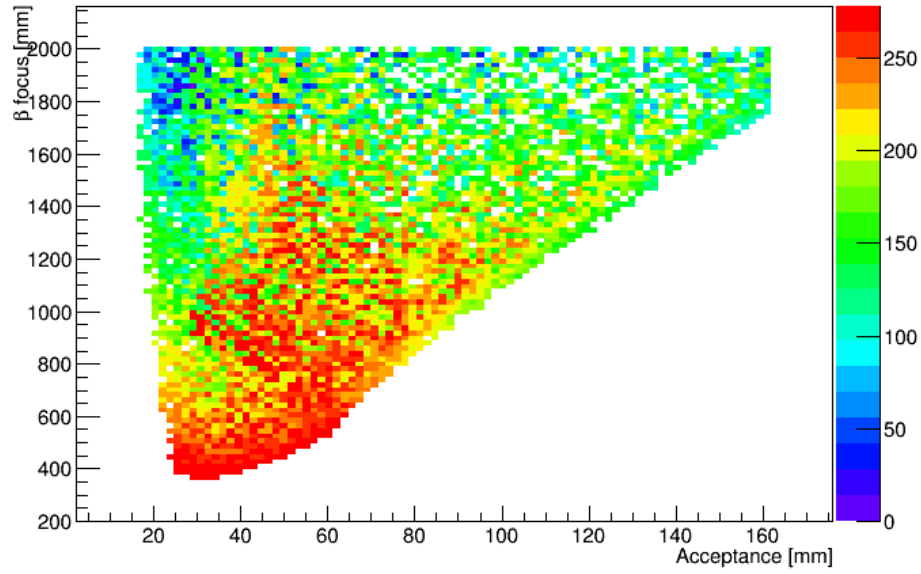


- Force proportional to $M1 * FC$

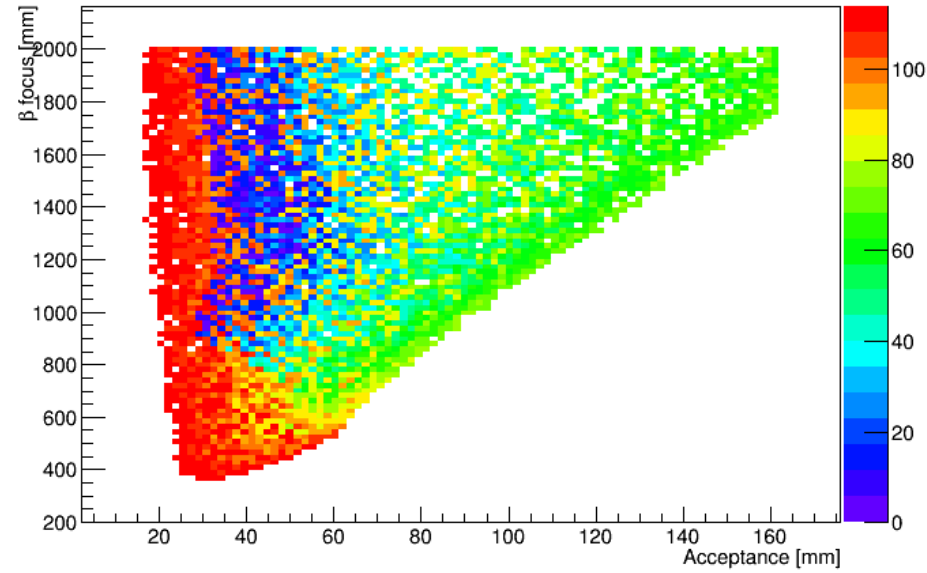
240 MeV/c



MatchCoil1_US

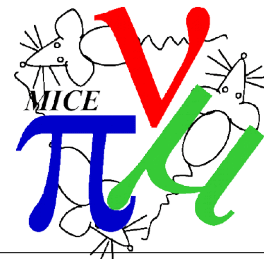


FocusCoil_US



- Force proportional to $M1 * FC$

Settings



Setting	BL	E2	CC	E1	M2	M1	FC	M1	M2	E1	CC	E2	Notes
6.1.1	3-140+M3-Test2	189.75	205.50	175.50	213.64	44.45	48.22	0.00	0.00	175.50	205.50	189.75	
6.1.2	3-170+M3-Test1	189.75	205.50	175.50	77.91	107.60	50.67	0.00	0.00	175.50	205.50	189.75	
6.1.3	3-200+M3-Test1	189.75	205.50	175.50	92.74	120.54	58.40	0.00	0.00	175.50	205.50	189.75	
6.1.4	3-240+M3-Test1	189.75	205.50	175.50	185.58	99.76	74.53	0.00	0.00	175.50	205.50	189.75	

6.2.1	3-200+M3-Test1	-189.75	-205.50	-175.50	-92.74	-120.54	-58.40	0.00	0.00	-175.50	-205.50	-189.75	BL in -ve polarity
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Setting	BL	E2	CC	E1	M2	M1	FC	M1	M2	E1	CC	E2	Notes
7.1.1	3-200+M3-Test1	189.75	205.5	175.5	169.35	277.63	107.76		0	0	175.5	205.5	Em 2 mm, beta 500, 200 MeV/c
7.1.2	?	189.75	205.5	175.5	169.35	277.63	107.76		0	0	175.5	205.5	Em 6 mm, beta 500, 200 MeV/c
7.1.3	?	189.75	205.50	175.50	169.35	277.63	107.76	0.00	0.00	175.50	205.50	189.75	Em 10 mm, beta 500, 200 MeV/c

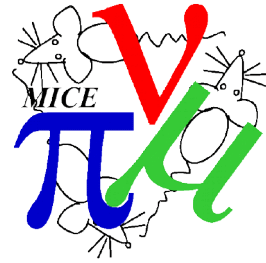
Setting	BL	E2	CC	E1	M2	M1	FC	M1	M2	E1	CC	E2	Notes
7.2.1	?	189.75	205.50	175.50	1.94	239.95	85.04	0.00	0.00	175.50	205.50	189.75	Em 6 mm, beta 500, 140 MeV/c
7.2.2	?	189.75	205.50	175.50	46.82	276.05	98.13	0.00	0.00	175.50	205.50	189.75	Em 6 mm, beta 500, 170 MeV/c
7.2.3	?	189.75	205.50	175.50	236.74	277.96	109.33	0.00	0.00	175.50	205.50	189.75	Em 6 mm, beta 500, 240 MeV/c

Setting	BL	E2	CC	E1	M2	M1	FC	M1	M2	E1	CC	E2	Notes
7.3.1	3-200+M3-Test1	189.75	205.50	175.50	6.74	276.04	113.84	0.00	0.00	175.50	205.50	189.75	Em 6 mm, beta 200, 200 MeV/c
7.3.2	3-200+M3-Test1	189.75	205.50	175.50	117.6	275.78	109.69	0.00	0.00	175.50	205.50	189.75	Em 6 mm, beta 400, 200 MeV/c
7.3.3	3-200+M3-Test1	189.75	205.50	175.50	203.02	277.47	97.22	0.00	0.00	175.50	205.50	189.75	Em 6 mm, beta 600, 200 MeV/c
7.3.4	3-200+M3-Test1	189.75	205.50	175.50	251.25	275.70	79.42	0.00	0.00	175.50	205.50	189.75	Em 6 mm, beta 800, 200 MeV/c

Setting	BL	E2	CC	E1	M2	M1	FC	M1	M2	E1	CC	E2	Notes	
7.4.1	3-200+M3-Test1	-189.75	-205.5	-175.5	-169.35	-277.63	-107.76		0	0	-175.5	-205.5	-189.75	Em 2 mm, beta 500, 200 MeV/c
7.4.2	?	-189.75	-205.5	-175.5	-169.35	-277.63	-107.76		0	0	-175.5	-205.5	-189.75	Em 6 mm, beta 500, 200 MeV/c
7.4.3	?	-189.75	-205.50	-175.50	-169.35	-277.63	-107.76	0.00	0.00	-175.50	-205.50	-189.75	Em 10 mm, beta 500, 200 MeV/c	



To do



- To do:
 - Question – should we choose something intermediate and run with it?
 - e.g. M2: 150; M1: 150; FC: 60
 - Trim the trim coils
 - Full MC