



Data Summary



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SC Magnet Currents



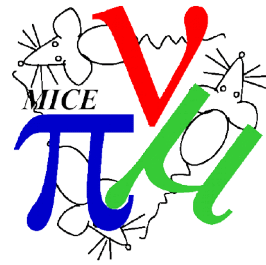
- Decided to run with 140 MeV/c
 - Optics group agreed this looked like the best set up
- Decided to run with solenoid mode
 - Re-establish similar parameter space to user run 2016-03
- Choice between
 - Low beta setting (0.2 m)
 - Intermediate beta setting (~ 0.75 m)
 - High beta setting with worse performance (~ 1.2 m)
- In the end, decided on High beta setting
 - Low force between FC and SS
 - Re-establish similar parameter space to user run 2016-03

Summary of Data Taking



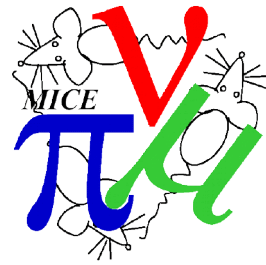
- Ramped magnets on Friday
- Magnet ramp delayed by a few days due to issues with apparently spontaneous ramping of the coils
- Finally ramped on Friday
- No data on Saturday and Sunday
 - Faulty controller on the water circuit in the trench
 - ISIS was flaky due to leak in methane circuit in TS1
 - Thanks to hardware team for diagnosis and repair effort
- First really solid data was on Monday morning
- Due to strong effort from MICE we were able to staff shifts continuously for 54 hours or so from Monday morning through Wednesday afternoon
 - Thanks to those who contributed shift effort
 - Magnet ramp down at 14:00 Wednesday
- The magnets, once ramped, worked without a hitch

Summary of Data Taking



- We had three aims
 - Measure emittance change across the upstream/downstream detectors
 - Look for better optimised beamlines
 - Study the 3-200+M0 beamline to compare with 7469 data
- Successfully found matched beamlines at 140 MeV/c 6 mm emittance and 140 MeV/c 10 mm emittance
- Did not find a good match for 140 MeV/c 3 mm emittance
- Paolo will report (perhaps in future analysis meeting)

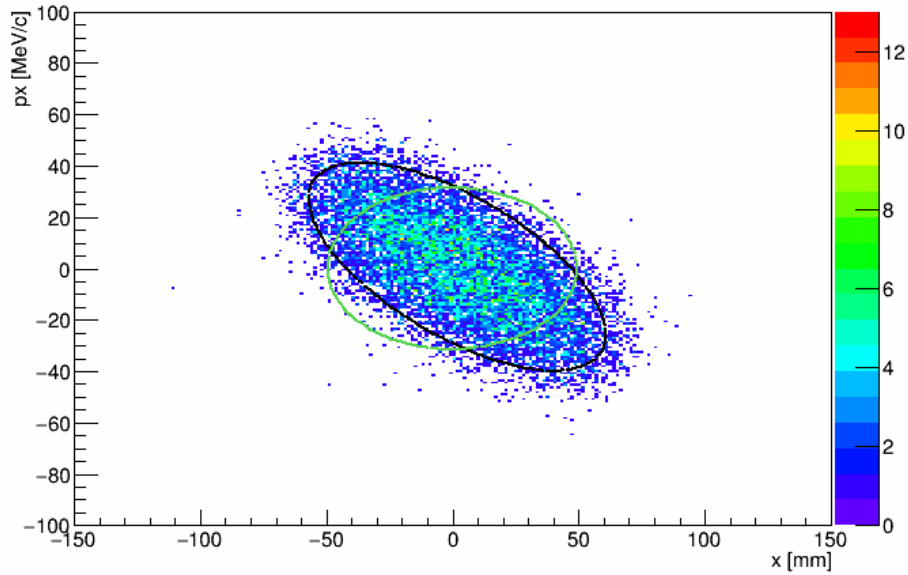
Data summary



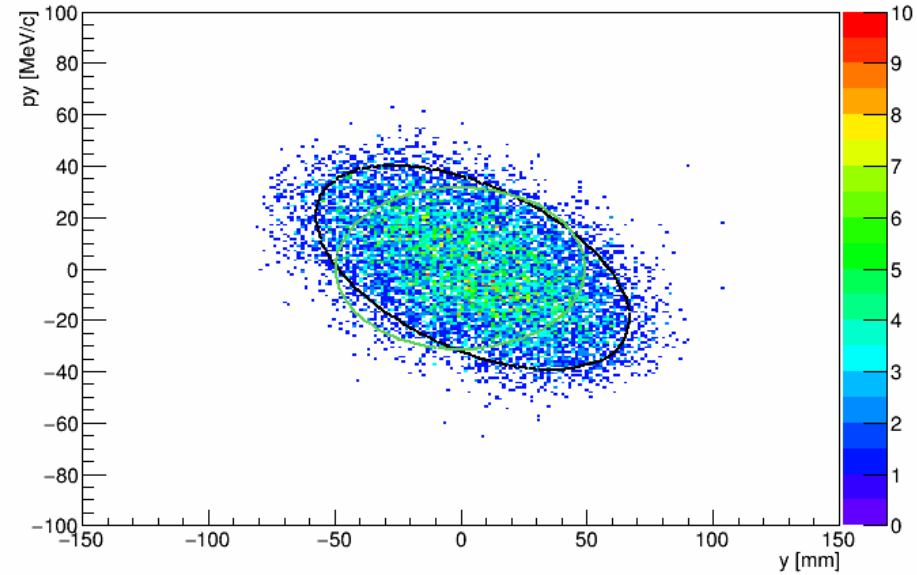
Momentum	Runs	TOF1 Triggers	TOF2 Triggers	lmc1234 sum	Time	Number at TOF2	Number passing TOF01 cut	Number passing all cuts	Number in peak 4 MeV/c p_tot bin	Number in peak 200 ps tof12 bin
10-140+M3-Test1	[8526]	69603	13586	343801	1 hrs 8 mins	21917	4264	1671	68.0	627.0
6-140+M3-Test1	[8519, 8520, 8521, 8522]	173132	40792	828515	2 hrs 53 mins	63511	15176	3443	211.0	1347.0
3-140+M3-Test2	[8518, 8529, 8530, 8531, 8532, 8537, 8538, 8541, 8542, 8543]	822900	426868	3632707	7 hrs 37 mins	244217	201961	27367	8767.0	11023.0
6-140+M3-Test2	[8593, 8595, 8596, 8597, 8598, 8599, 8600, 8602]	3427958	1195790	505707	10 hrs 12 mins	433689	230231	58676	3253.0	21408.0

- Additionally some beamline optimisation runs
- Additionally 3-200+M0 runs

3-140+M3-Test2

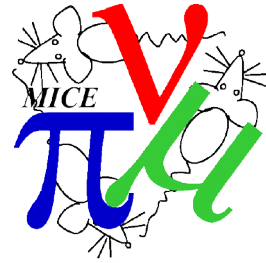


3-140+M3-Test2

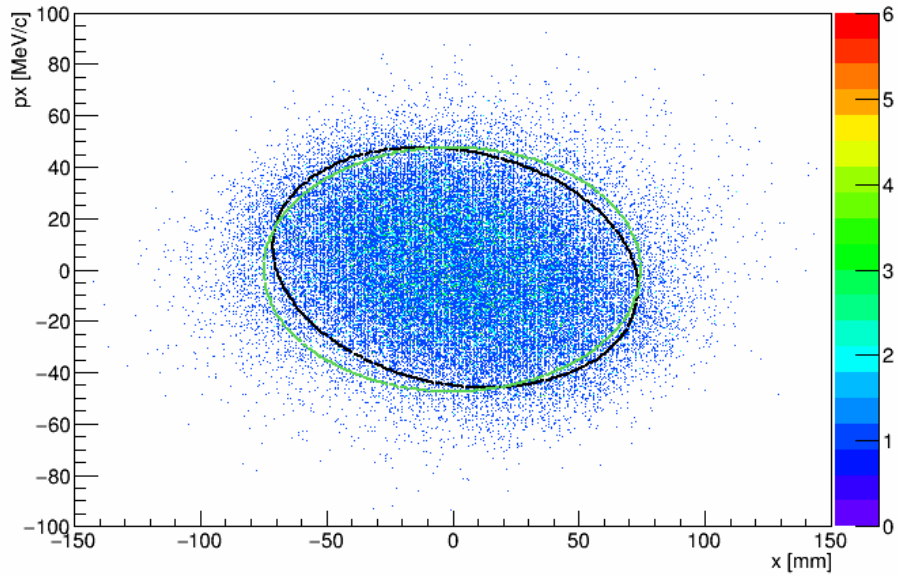


- 3 mm emittance beam is quite mismatched

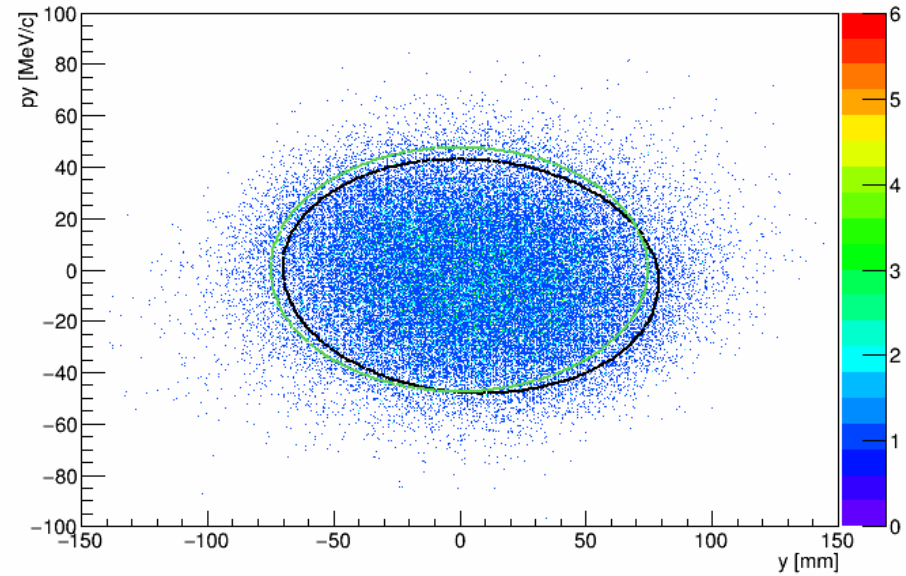
Analysis



6-140+M3-Test2

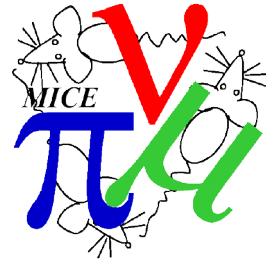


6-140+M3-Test2

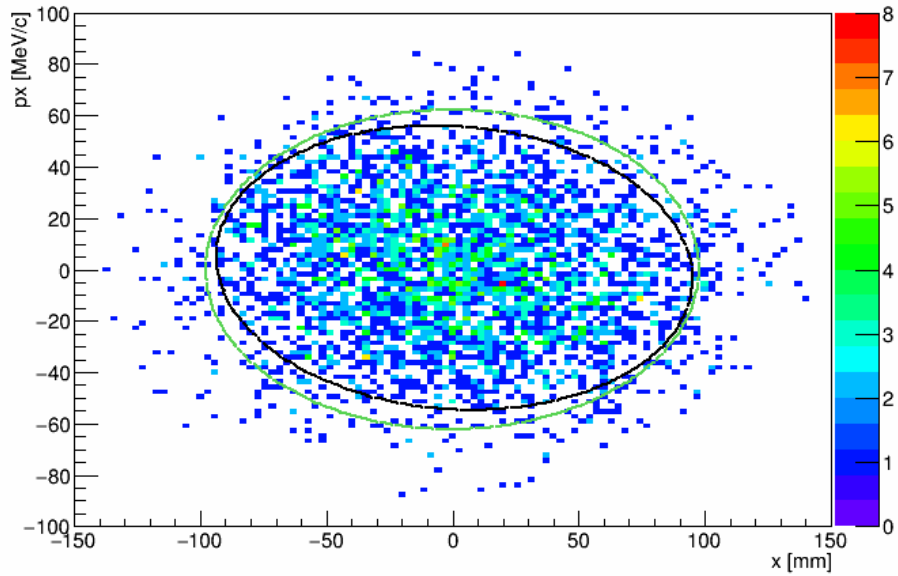


- 6 mm beam looks better

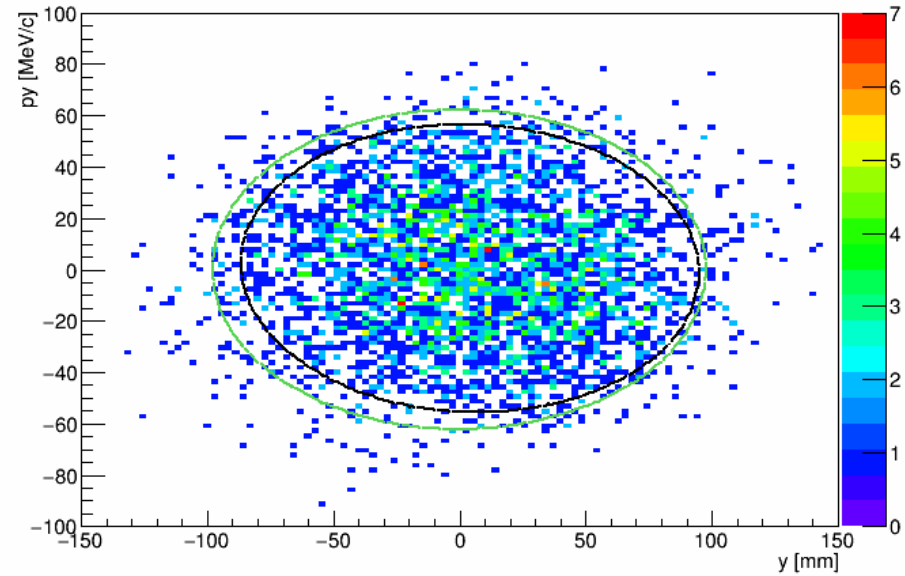
Analysis



6-140+M3-diff-1111-q789-25pc

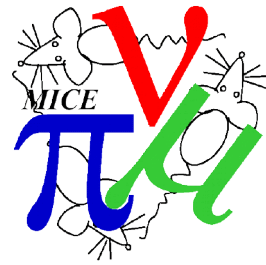


6-140+M3-diff-1111-q789-25pc



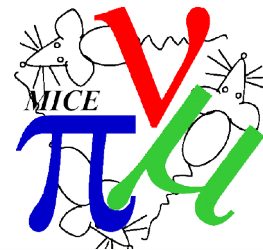
- 10 mm beam also looks better

Sources of bias/error

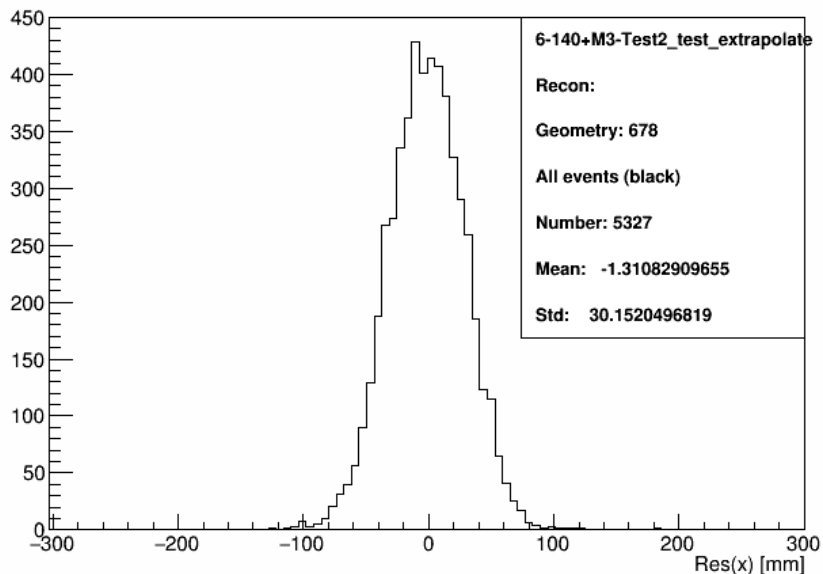


- Bias on the measured $x/p_x/y/p_y$ phase space and transmission
 - Intrinsic detector resolution (scattering and spatial resolution)
 - **Detector efficiency**
 - Magnetic field in reconstruction region
 - Detector noise
- Bias on the model of the channel
 - **(Magnet) alignment**
 - Absorber material
 - (Other) material budget
 - Measured upstream particle properties

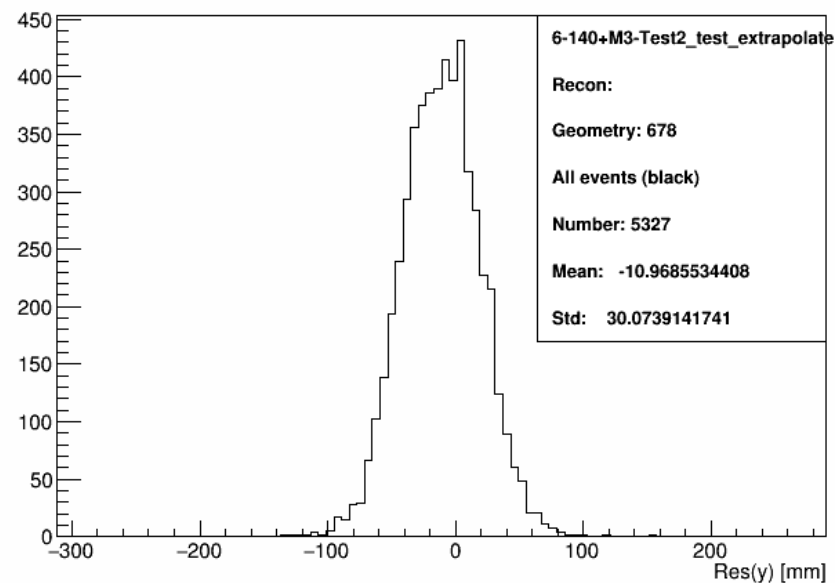
Magnetic alignment



tkd_tp: x

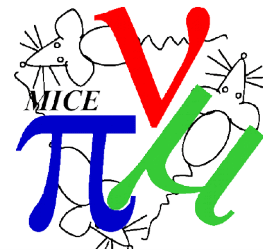


tkd_tp: y

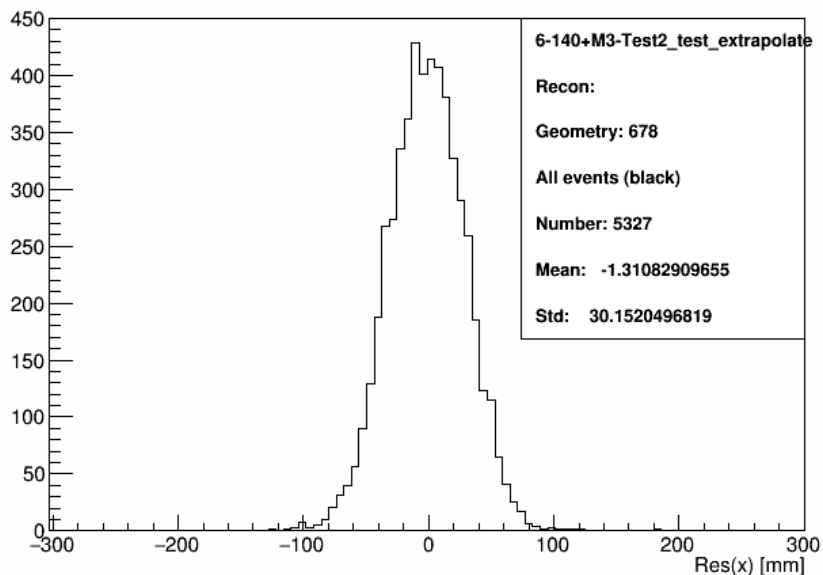


- Throw tracks from TKU station 1 to TKD station 1
- Do they land on a track point?
- How close is the “thrown” track to the “measured” track
- Simple model for the beamline – missing material/etc (so e.g. wrong energy)

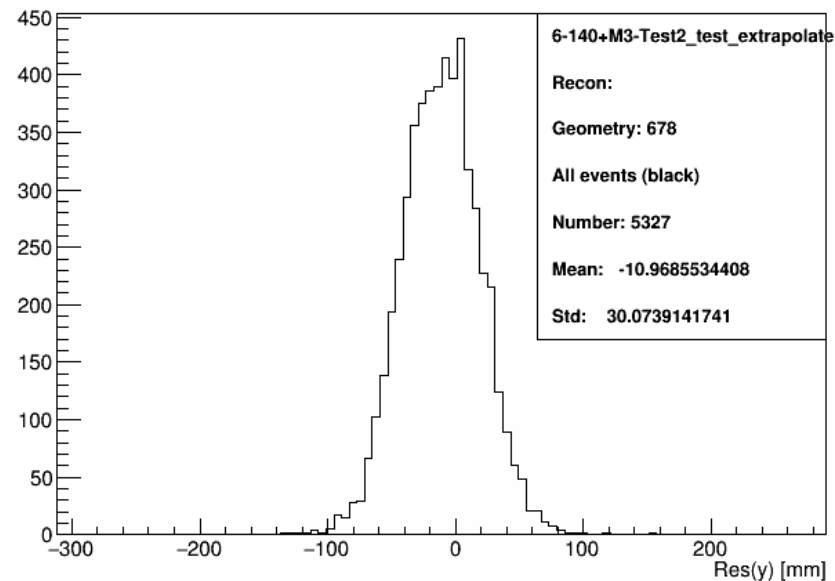
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tkd_tp: x

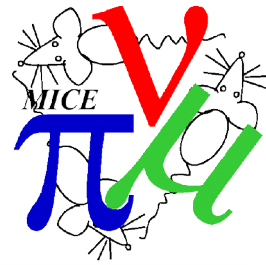


tkd_tp: y

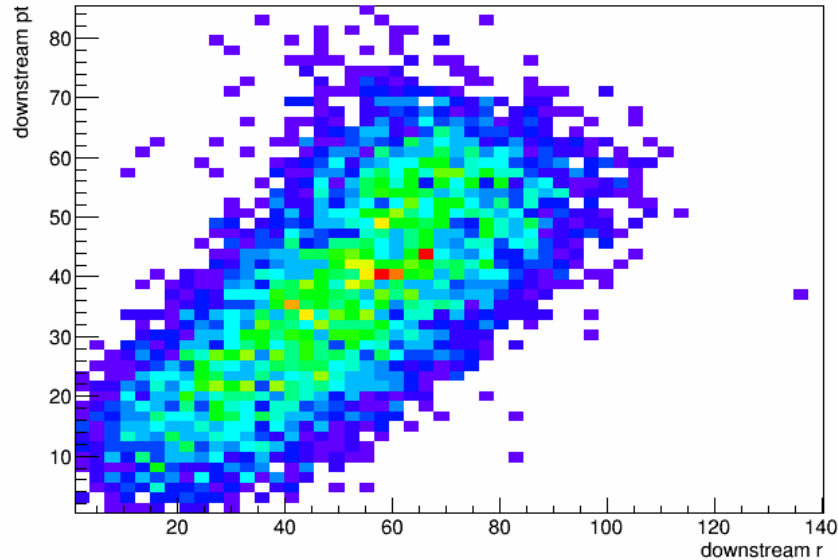


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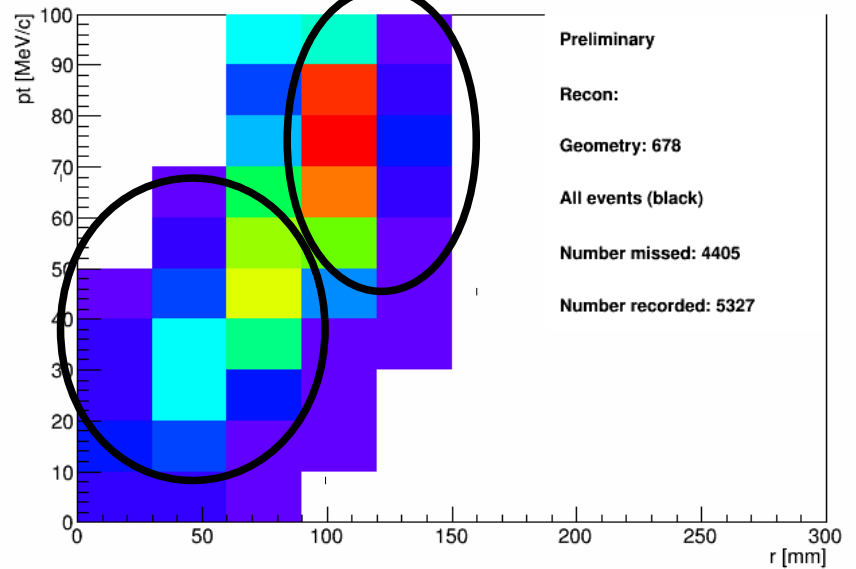
Tracker efficiency



6-140+M3-Test2_test_extrapolate



Misses - tkd_tp



- Possible inefficiency in tracker recon
 - 4405 tracks are recorded in TKU but not TKD
 - 5327 tracks are recorded in both TKU and TKD
 - Upper right hand region is likely scraping
 - Lower left hand region is likely inefficiency