

ACCEPTANCE OF CT AND FORWARD GEM DETECTORS

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GSI, DARMSTADT

XXXII PANDA CM, MARCH 2010

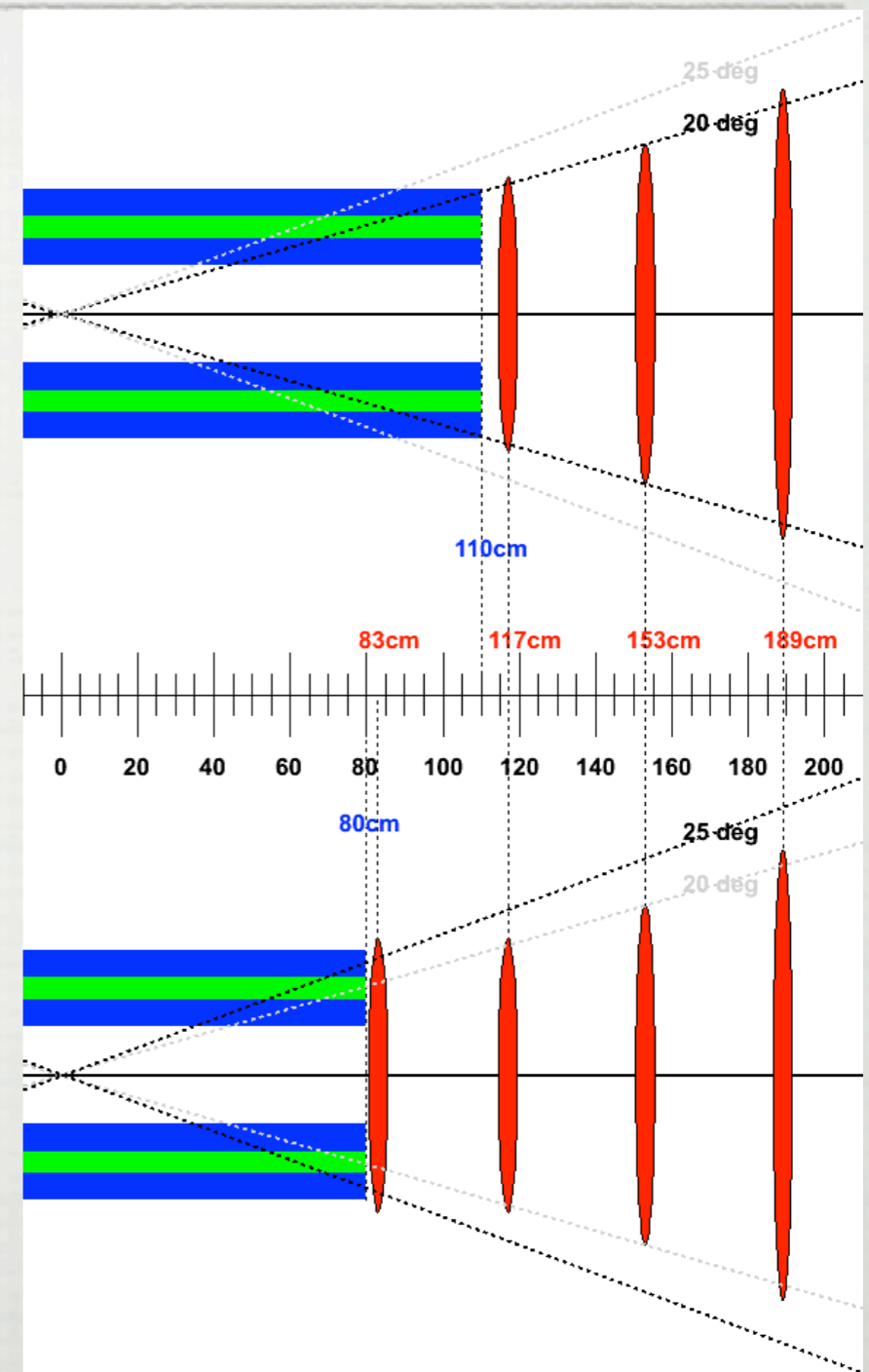
PANDA GEOMETRIES

□ LONG CENTRAL TRACKER:

- STT coverage down to $\sim 20\text{deg}$
- GEM coverage from $\sim 20\text{Deg}$ down

□ SHORT CENTRAL TRACKER:

- STT coverage down to $\sim 25\text{deg}$
- GEM coverage from $\sim 25\text{Deg}$ down

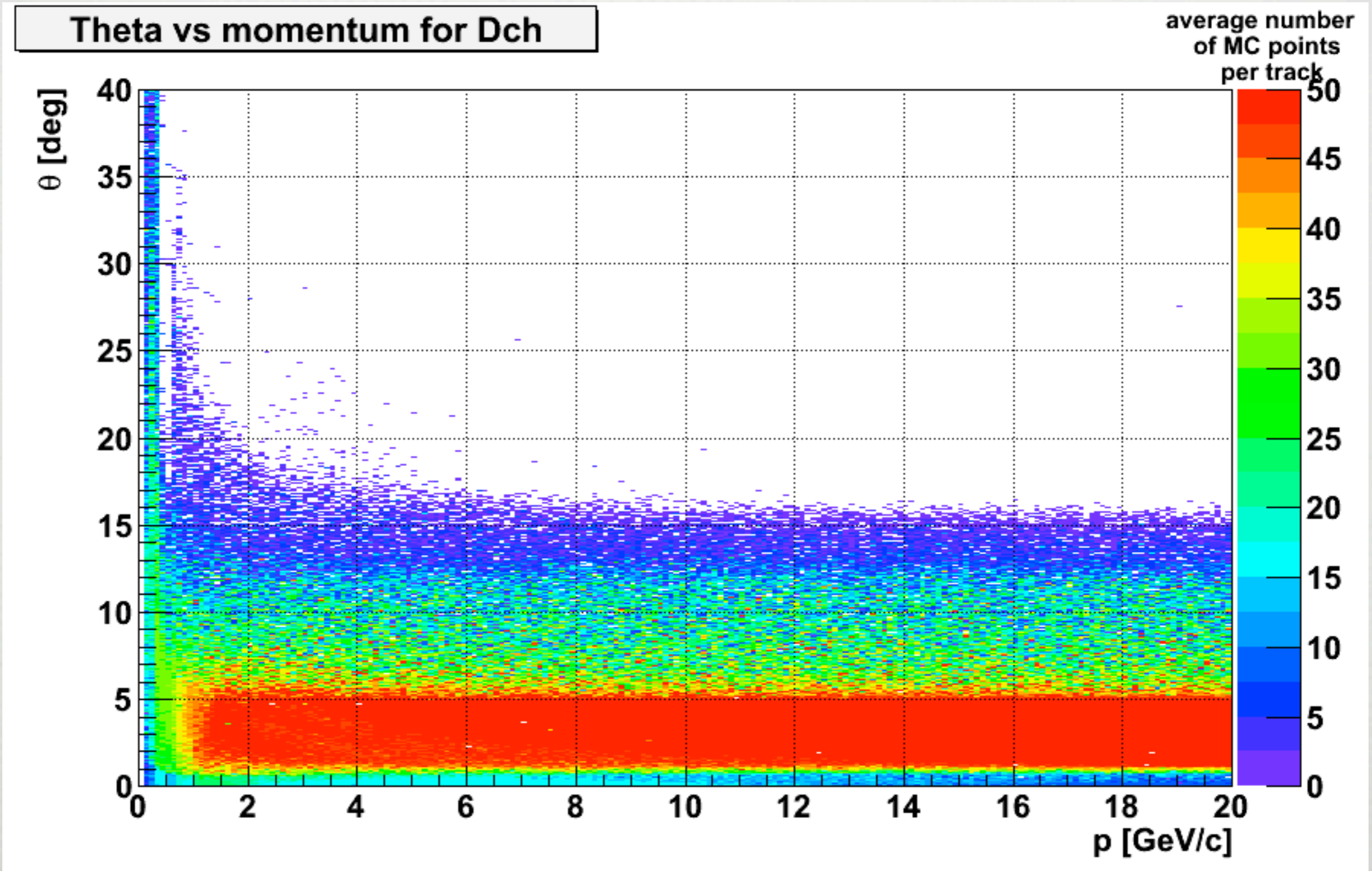


SIMULATIONS

- 1 MILLION MUONS SHOT IN TWO COMPARED GEOMETRIES
- FROM VERTEX (0cm,0cm,0cm)
- WITH EVENLY DISTRIBUTED MOMENTA:
 - $|p| \in (0.1\text{GeV}/c, 20\text{GeV}/c)$
 - $\vartheta \in (0^\circ, 40^\circ)$
 - $\varphi \in (0^\circ, 360^\circ)$

ACCEPTANCE MAP, DCH,

Θ VS MOMENTUM

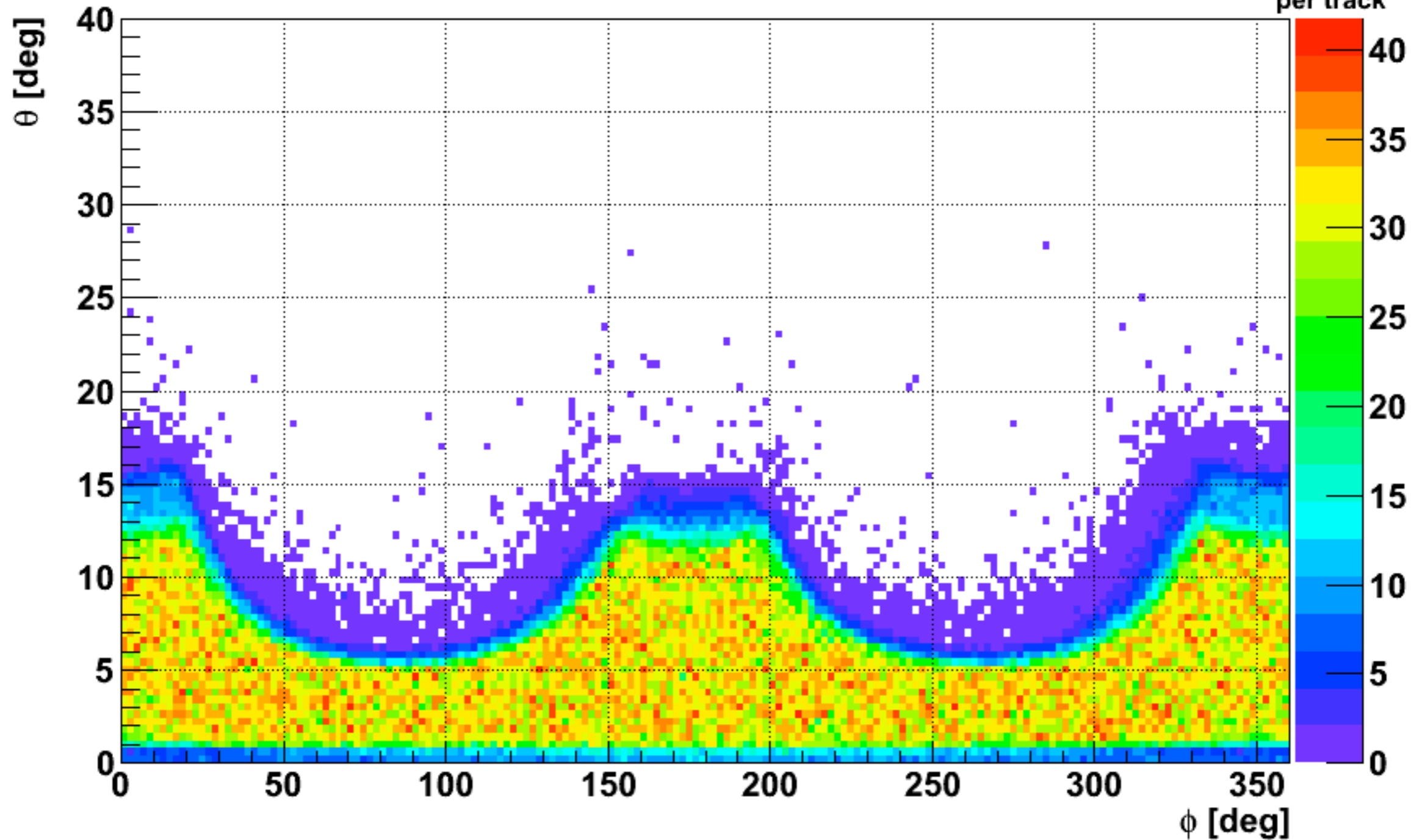


ACCEPTANCE MAP, DCH,

Θ VS Φ

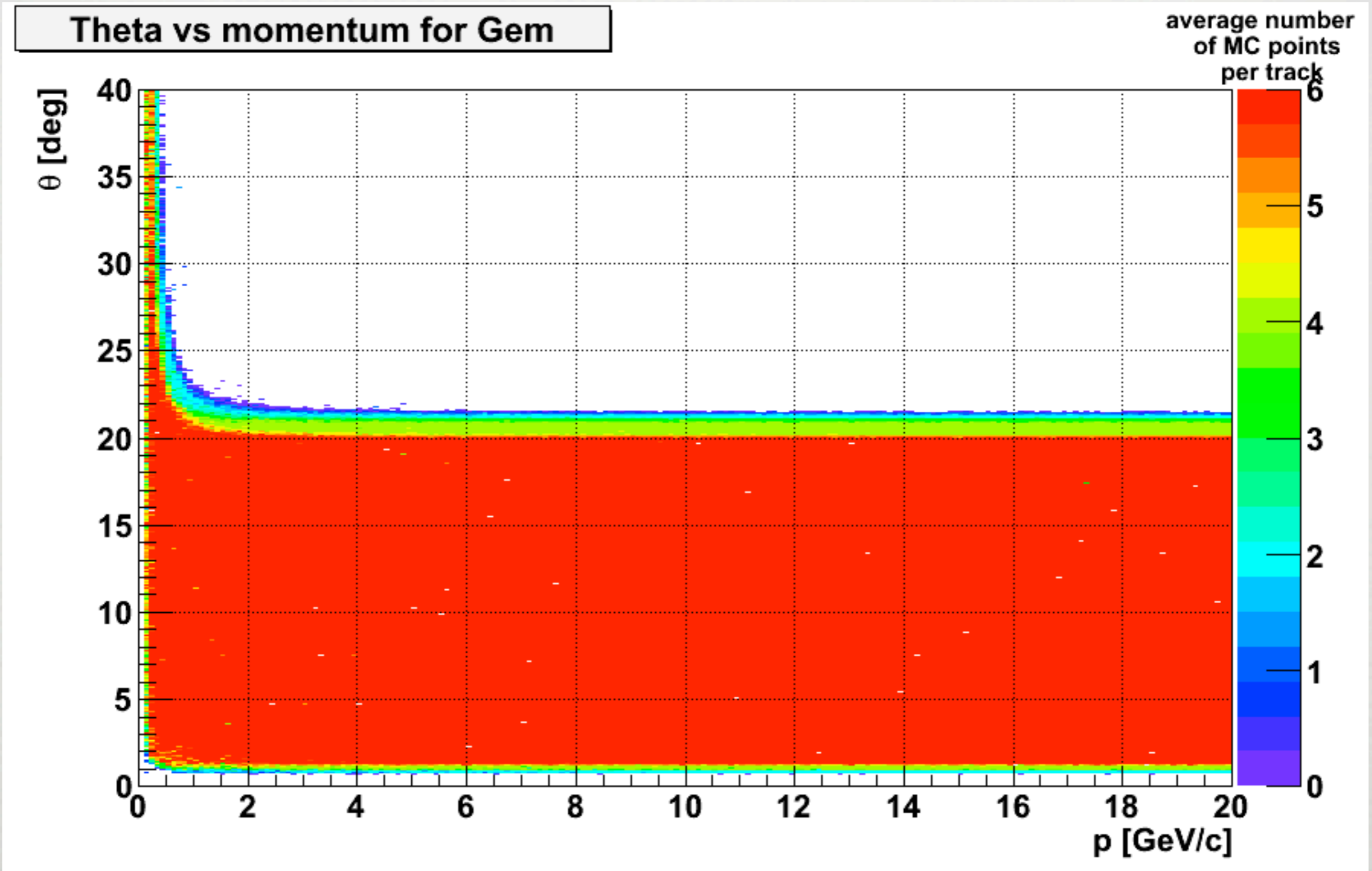
Theta vs phi for Dch for $2.0 \leq p \leq 20.0$ GeV/c

average number
of MC points
per track



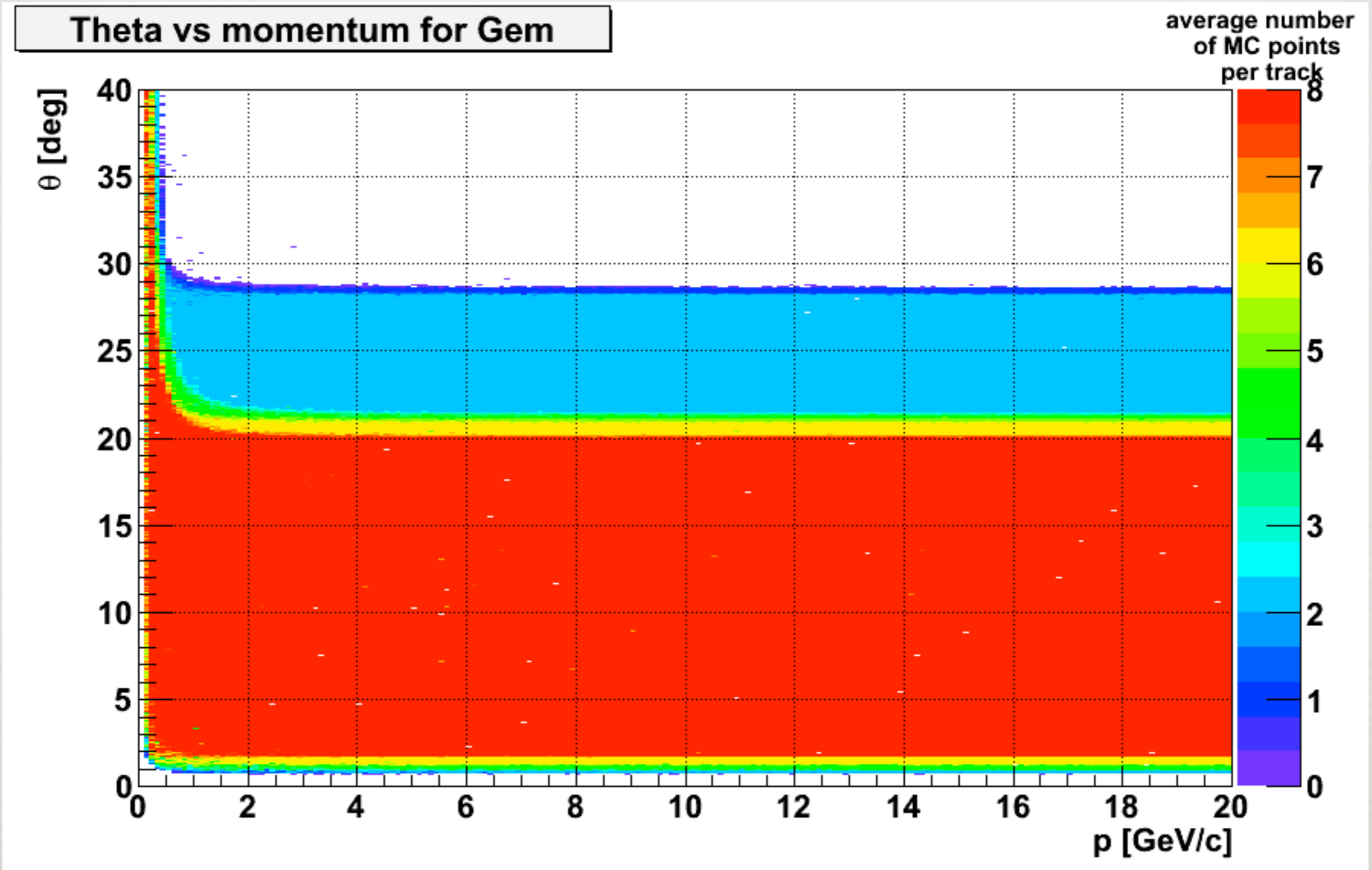
ACCEPTANCE MAP, LONG, GEM,

Θ VS MOMENTUM



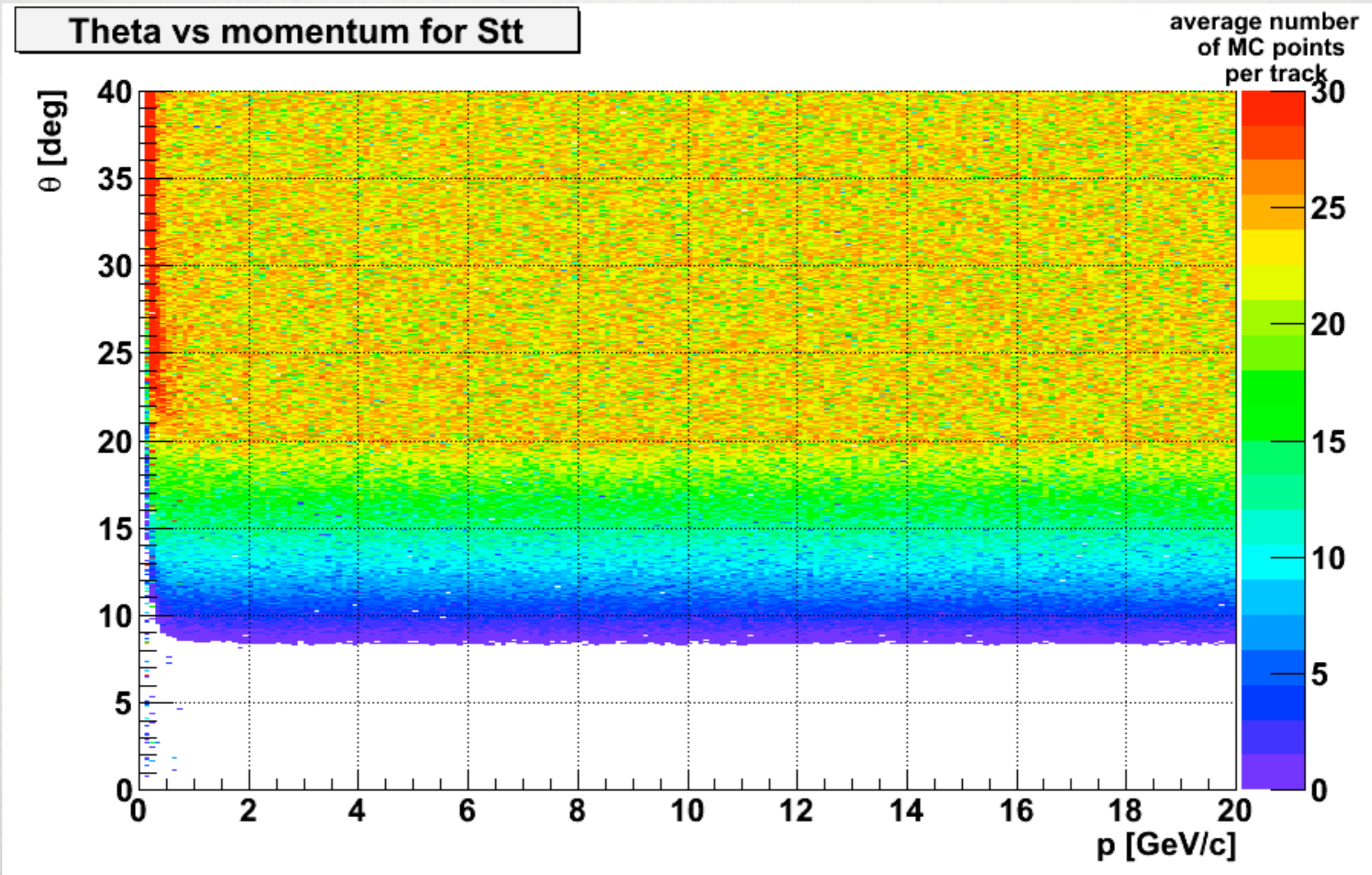
ACCEPTANCE MAP, SHORT, GEM,

Θ VS MOMENTUM



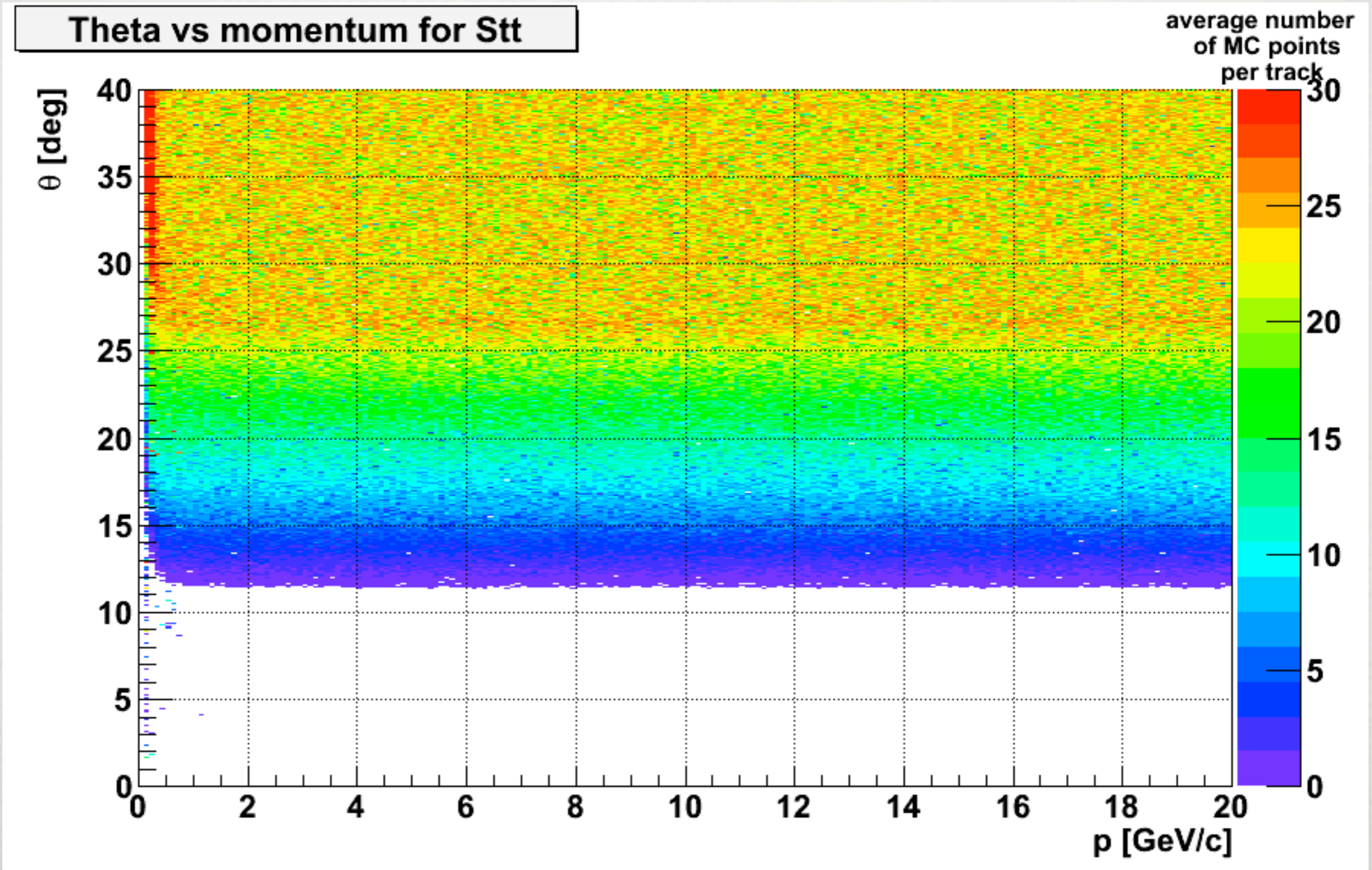
ACCEPTANCE MAP, LONG, STT,

Θ VS MOMENTUM



ACCEPTANCE MAP, SHORT, STT,

Θ VS MOMENTUM

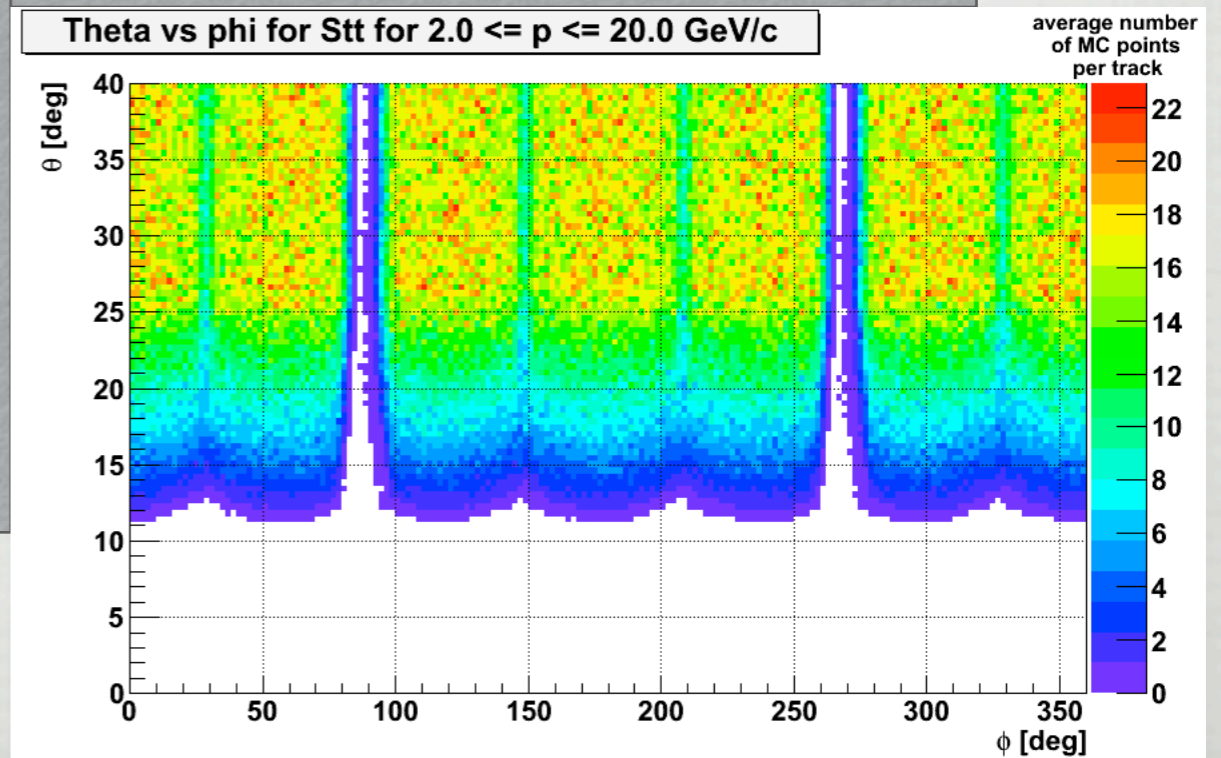
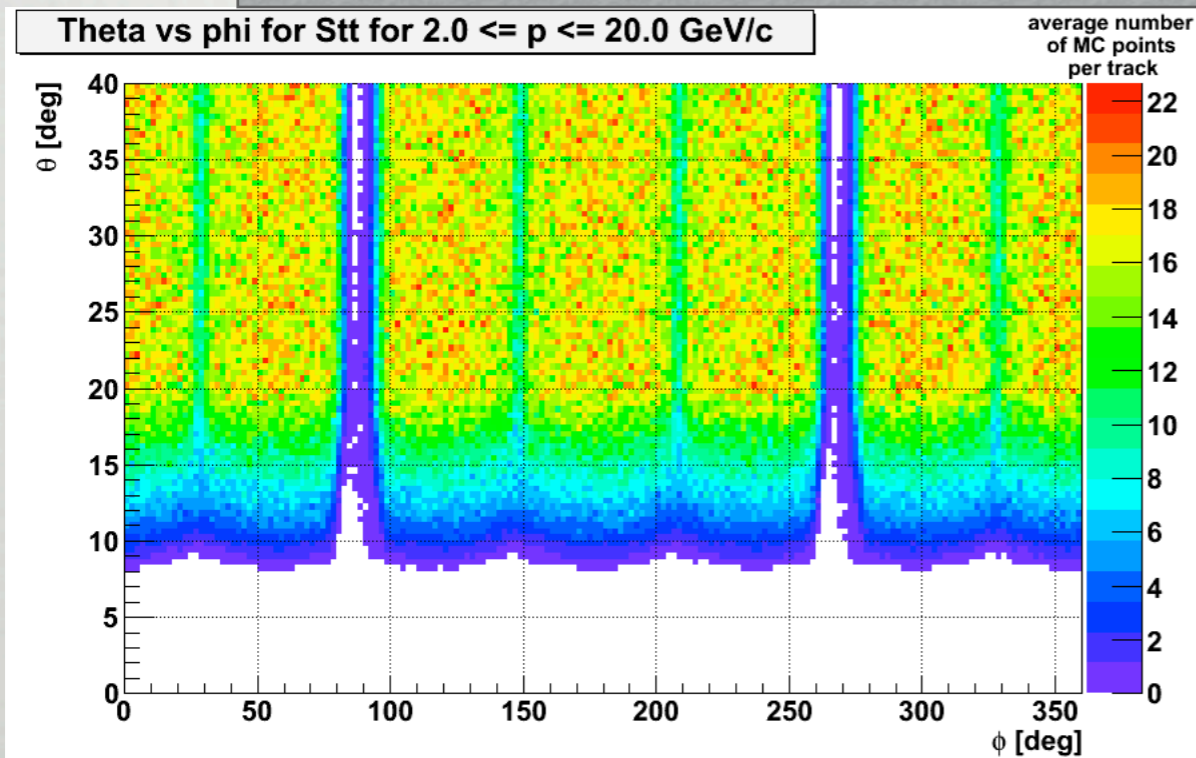
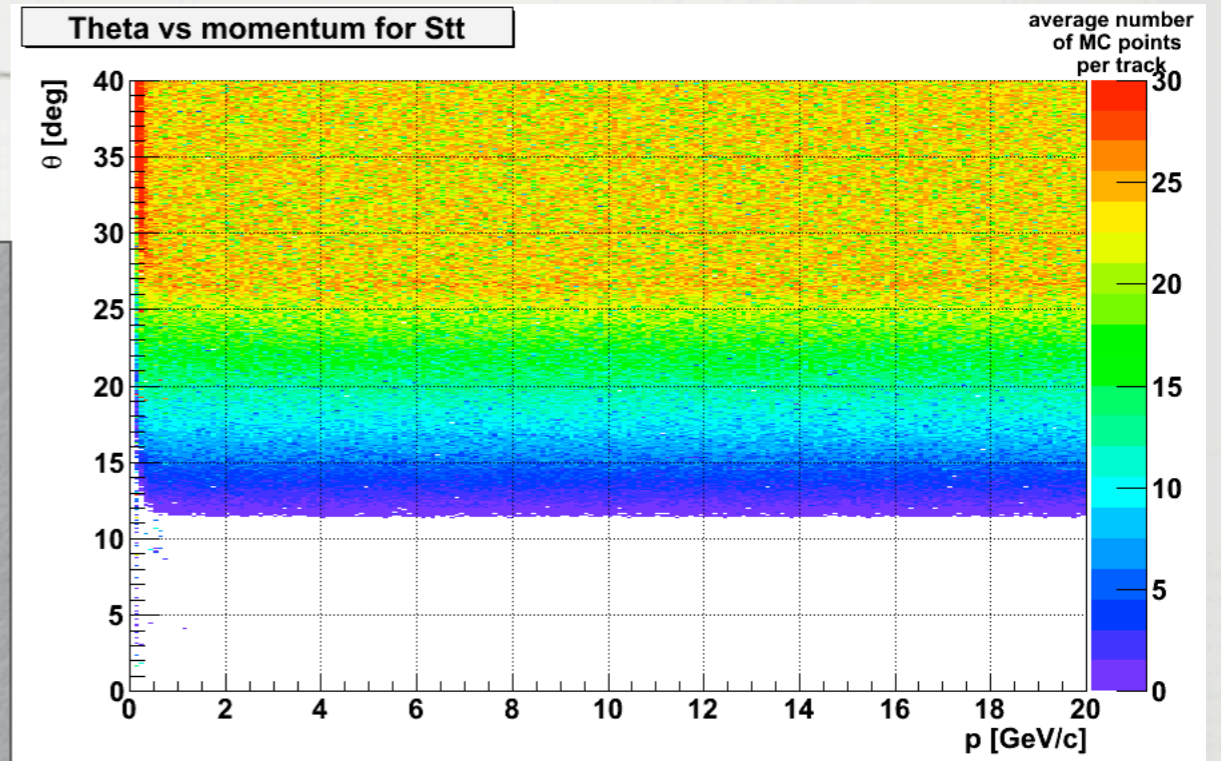
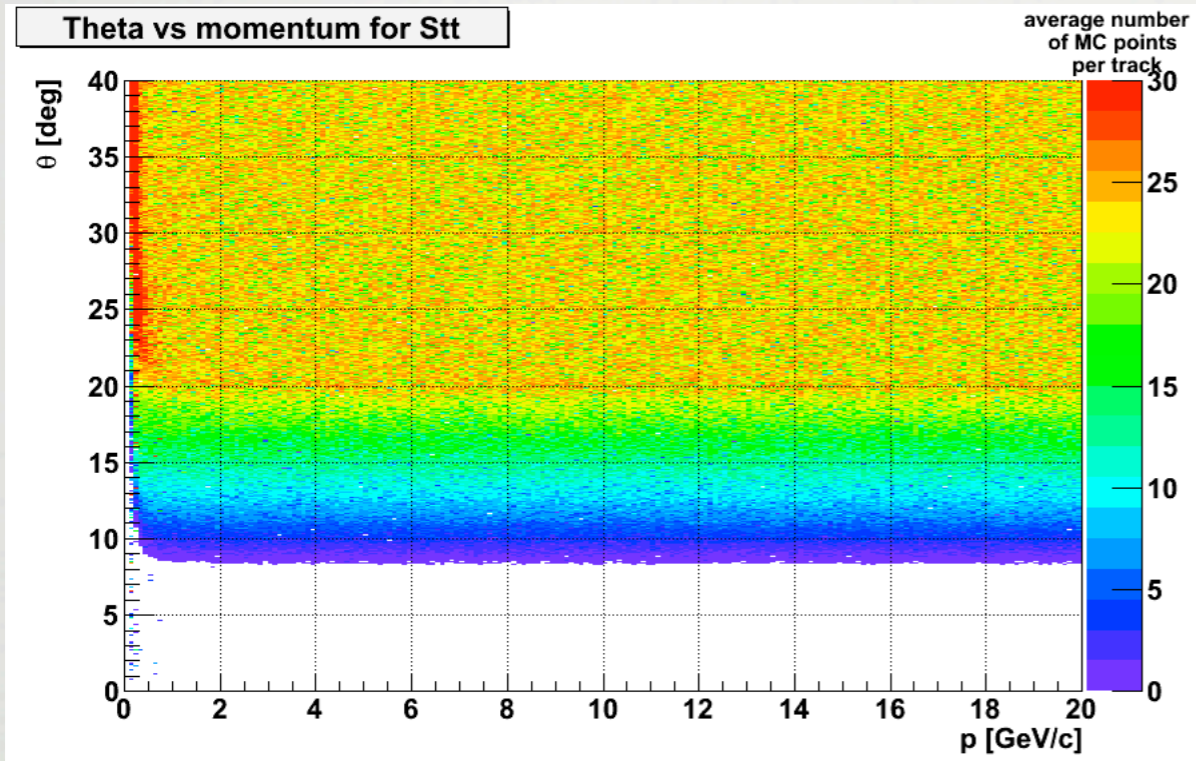


ACCEPTANCE MAP, STT,

LONG

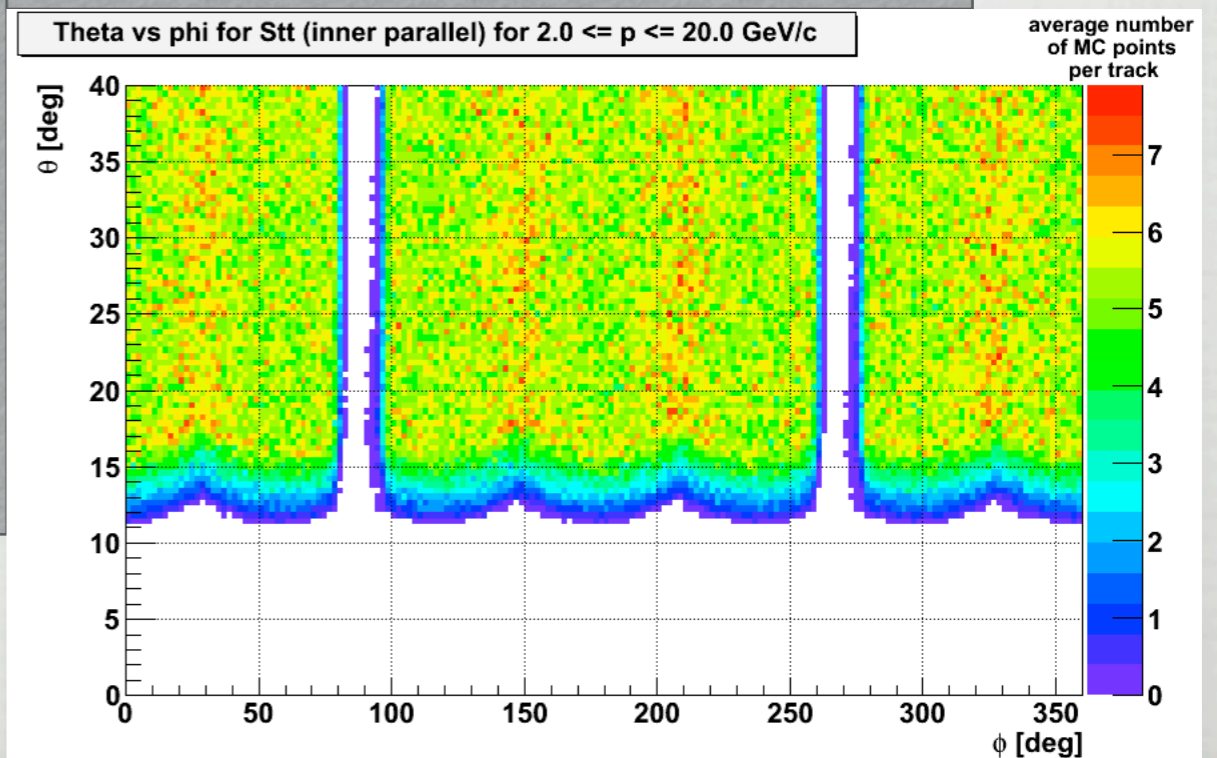
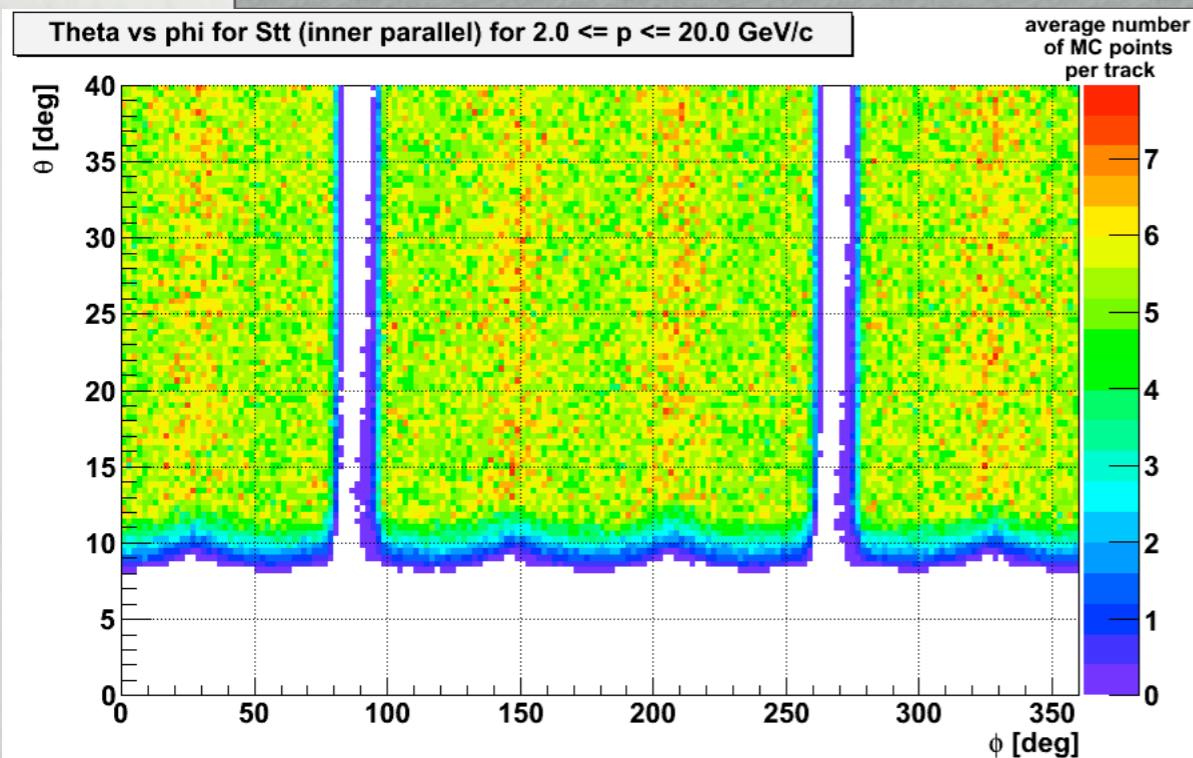
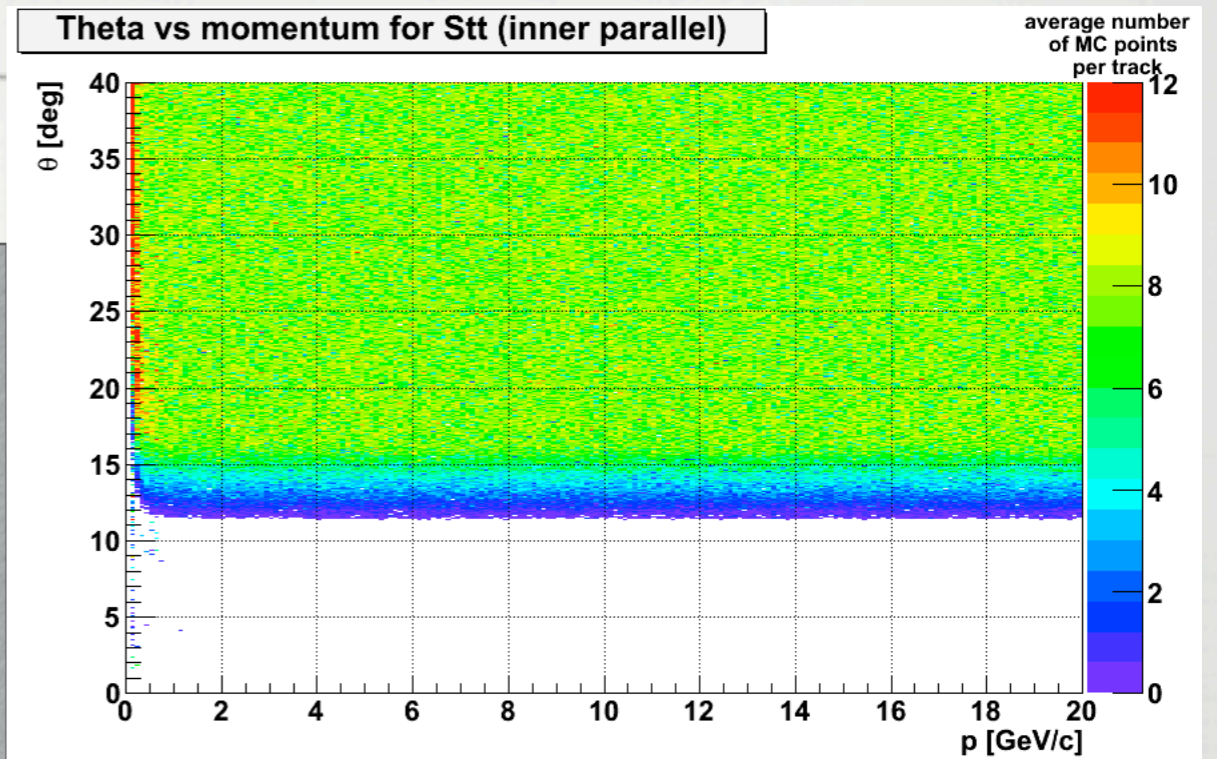
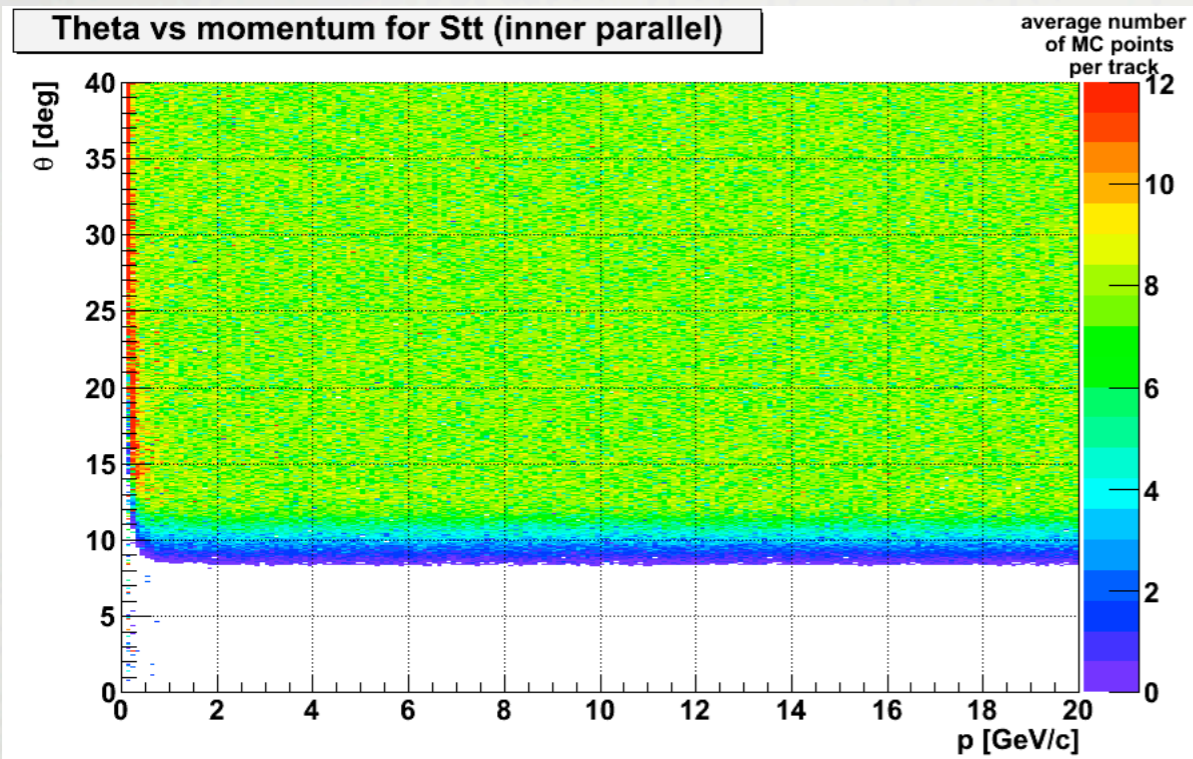
ALL

SHORT



ACCEPTANCE MAP, STT,

LONG INNER PARALLEL SHORT

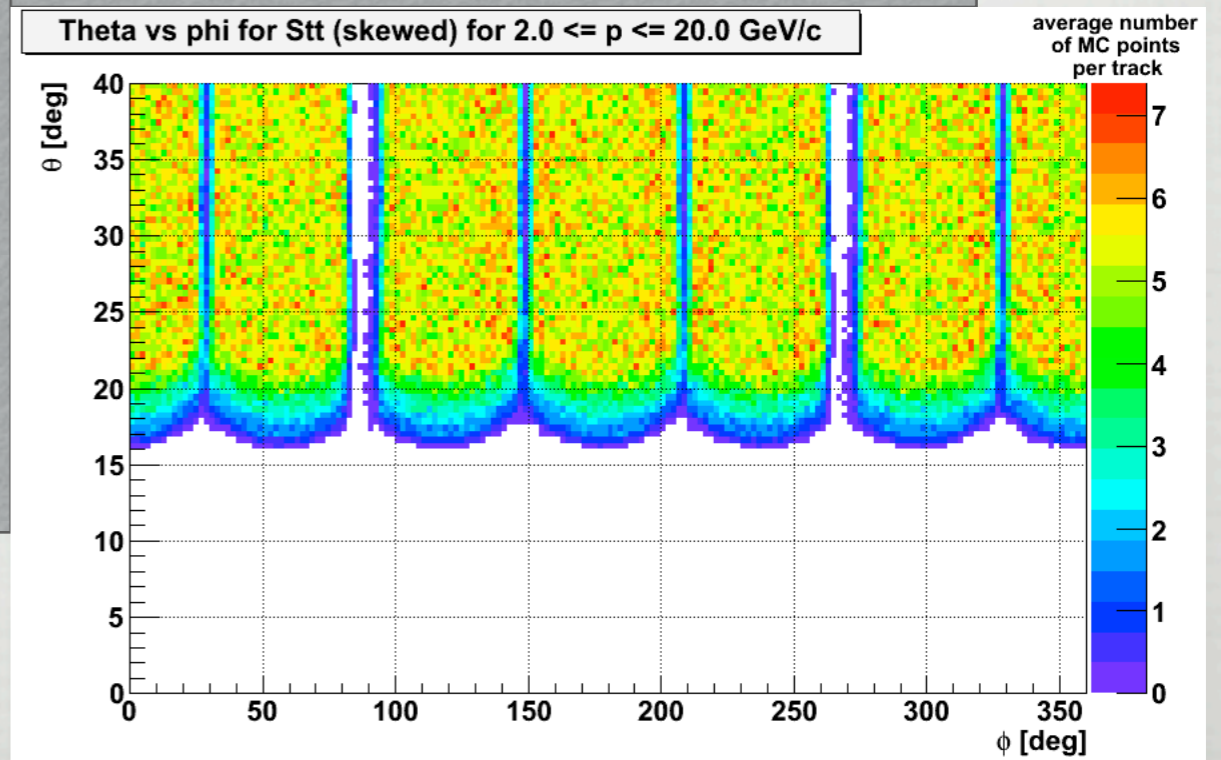
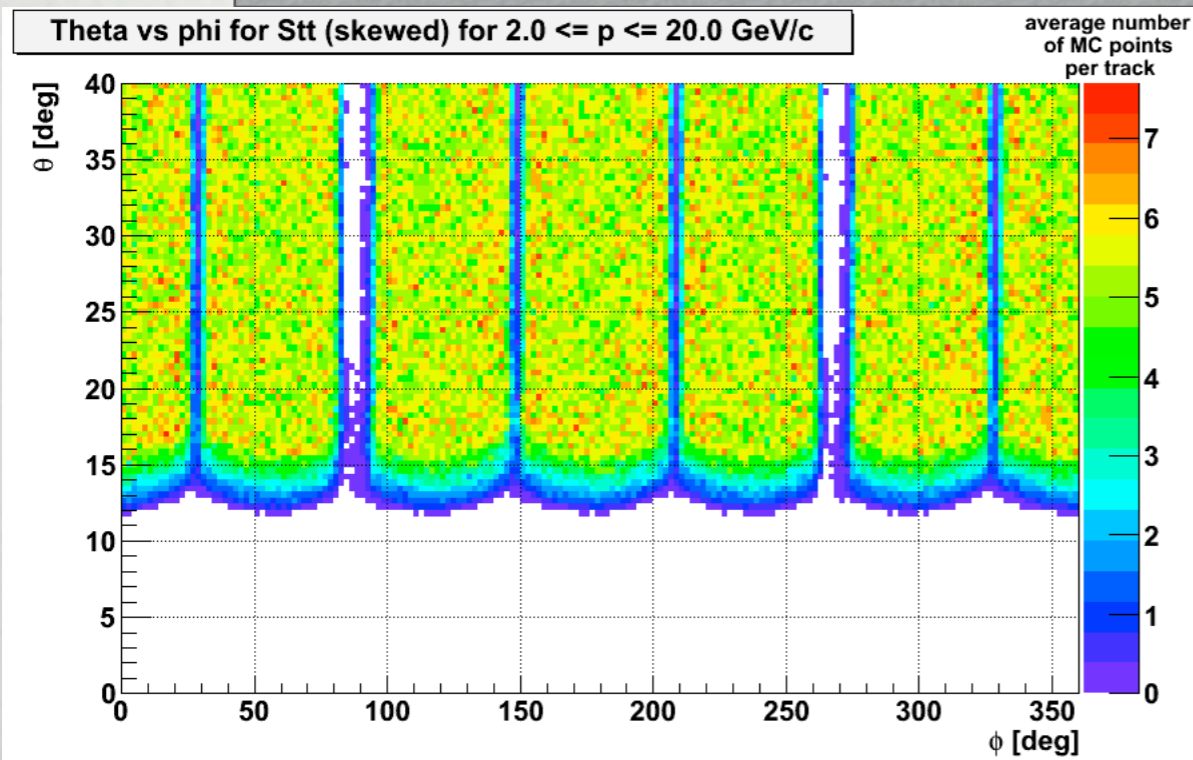
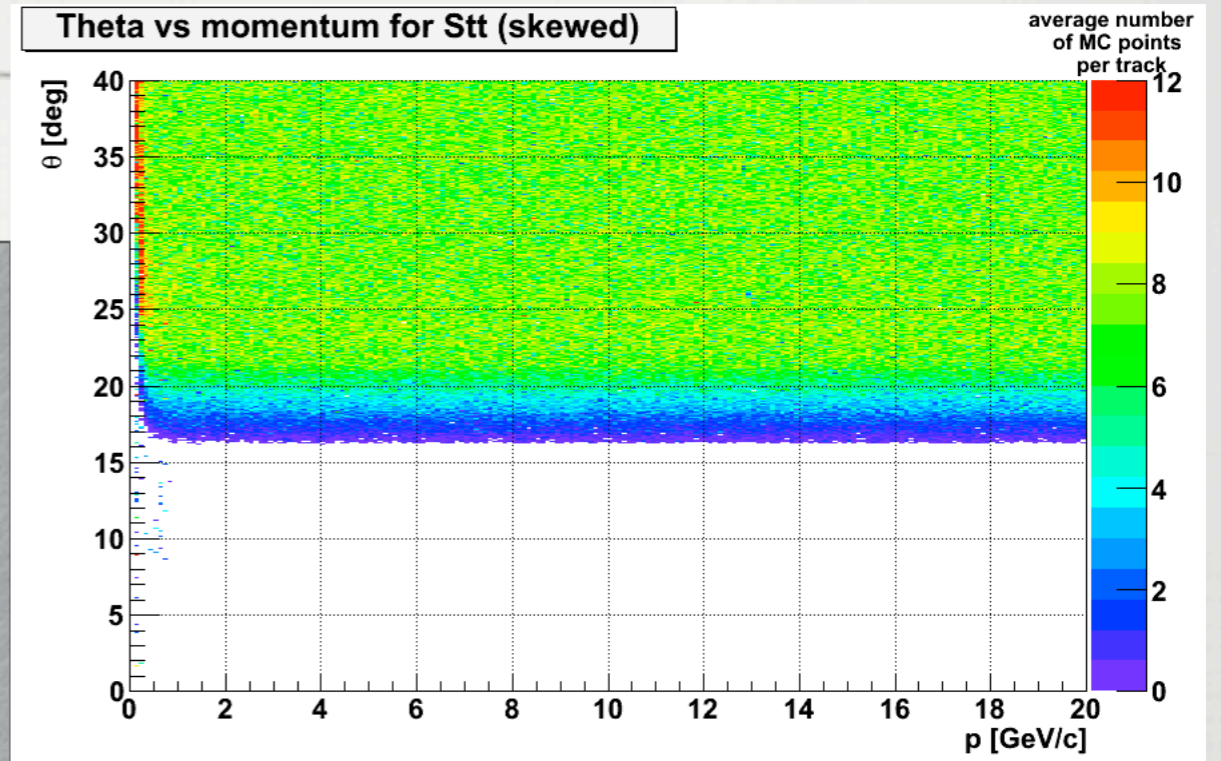
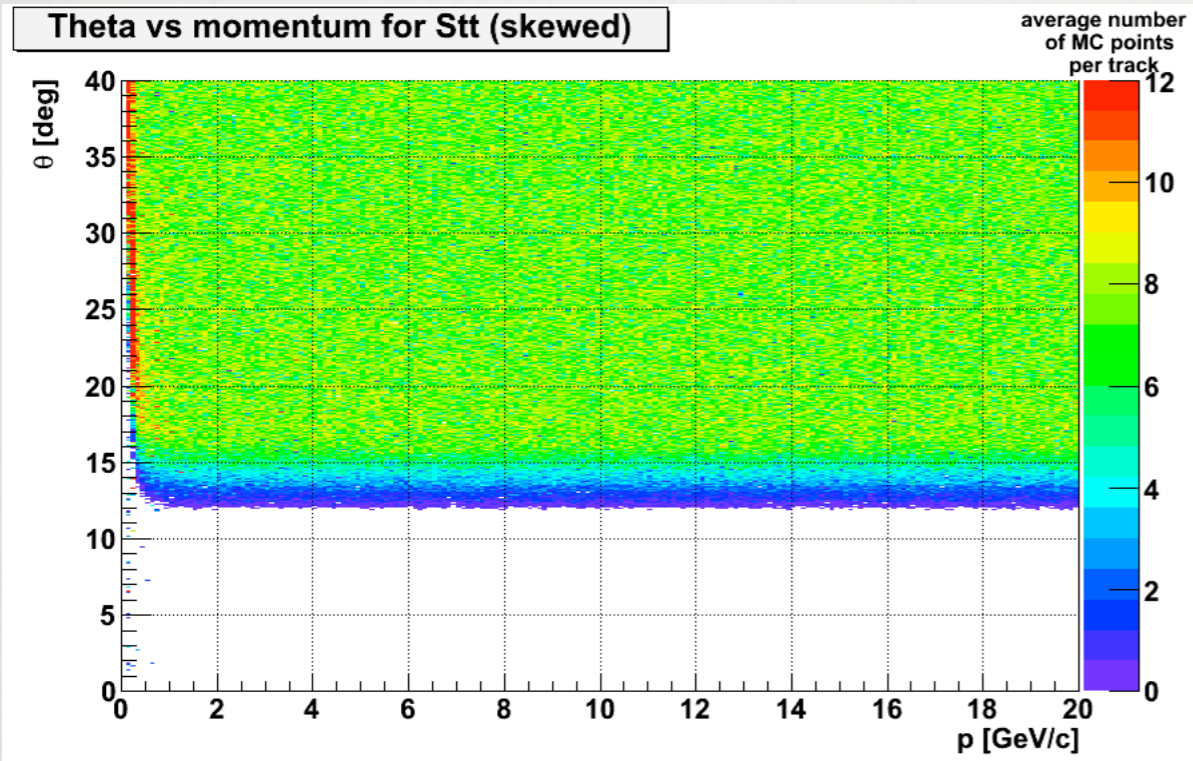


ACCEPTANCE MAP, STT,

LONG

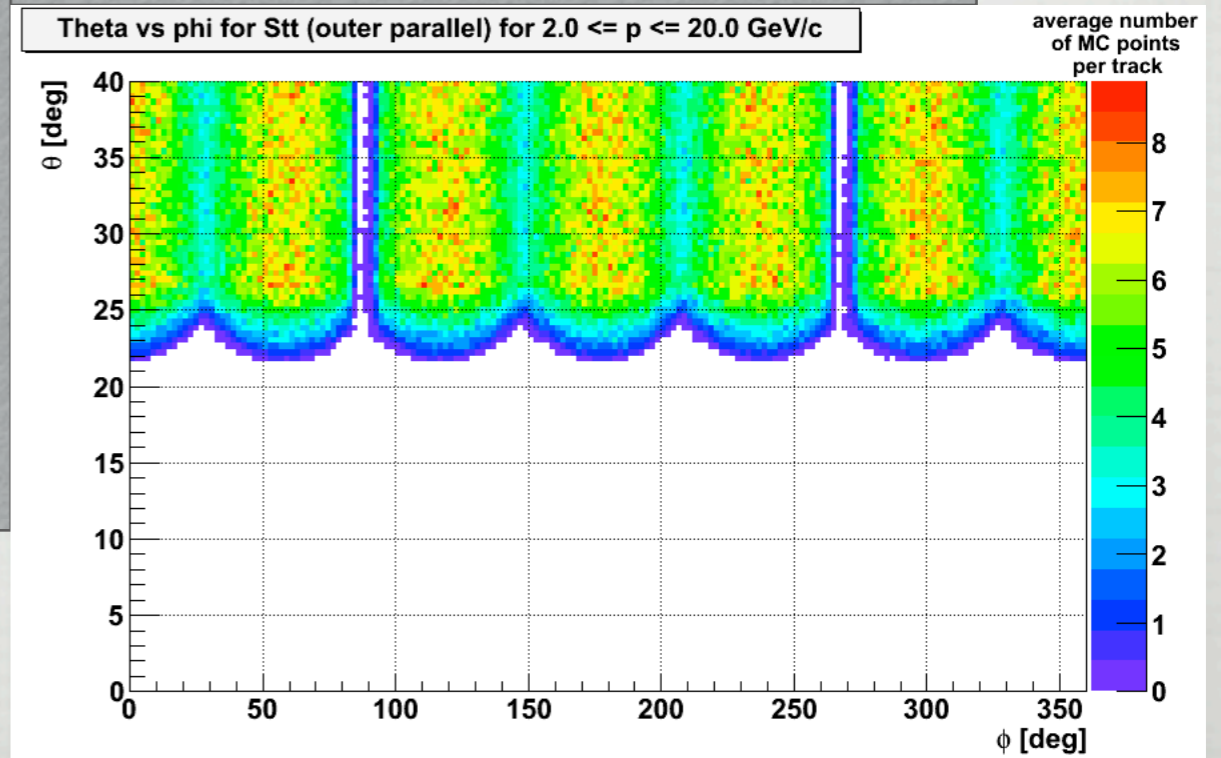
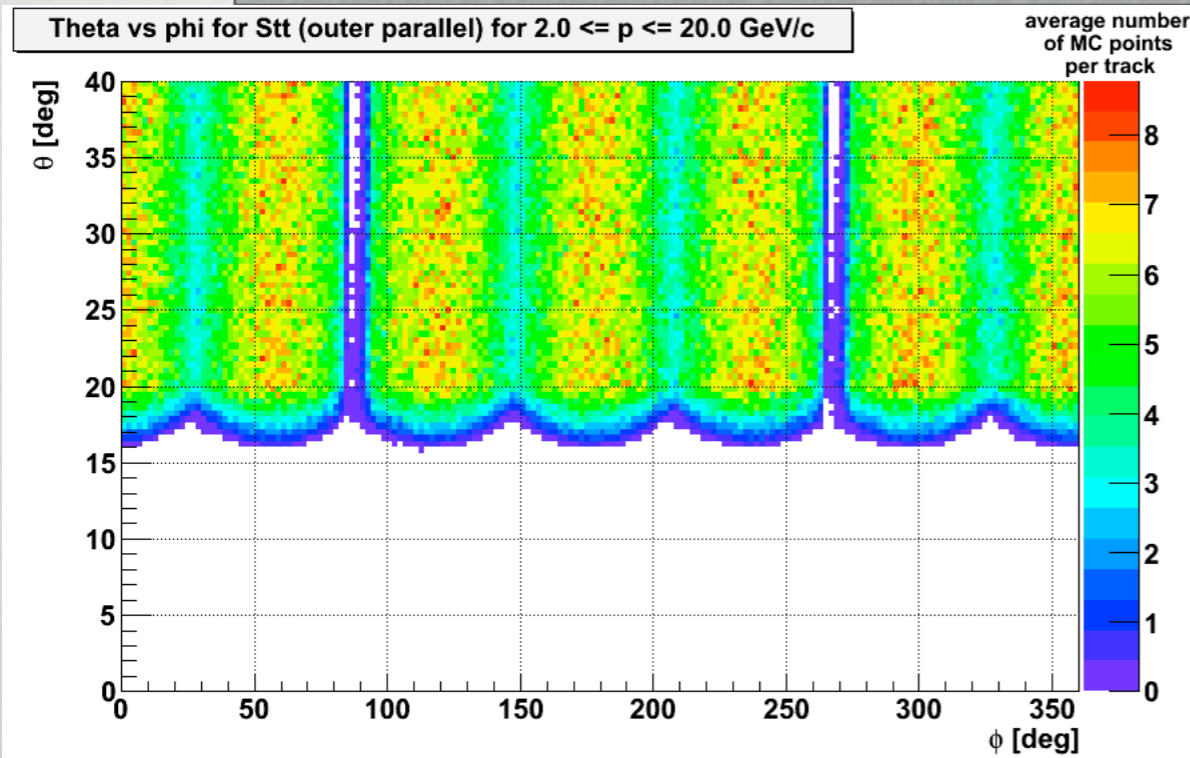
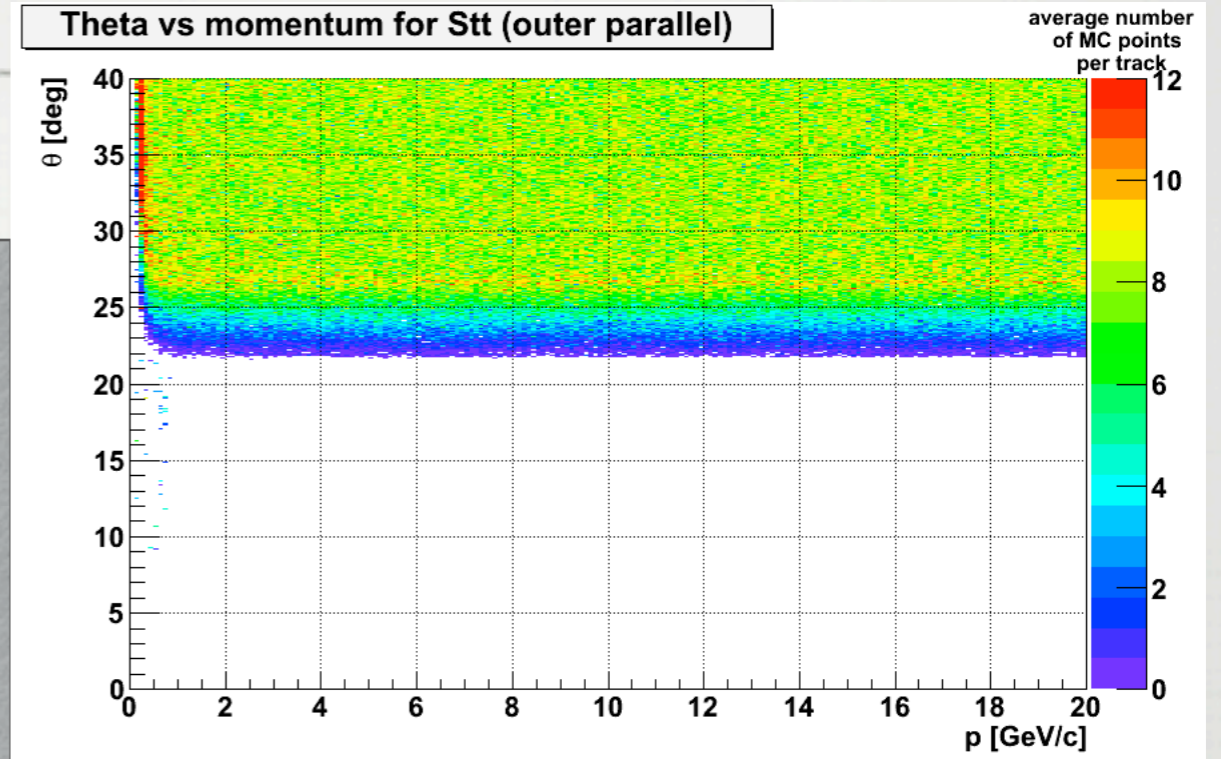
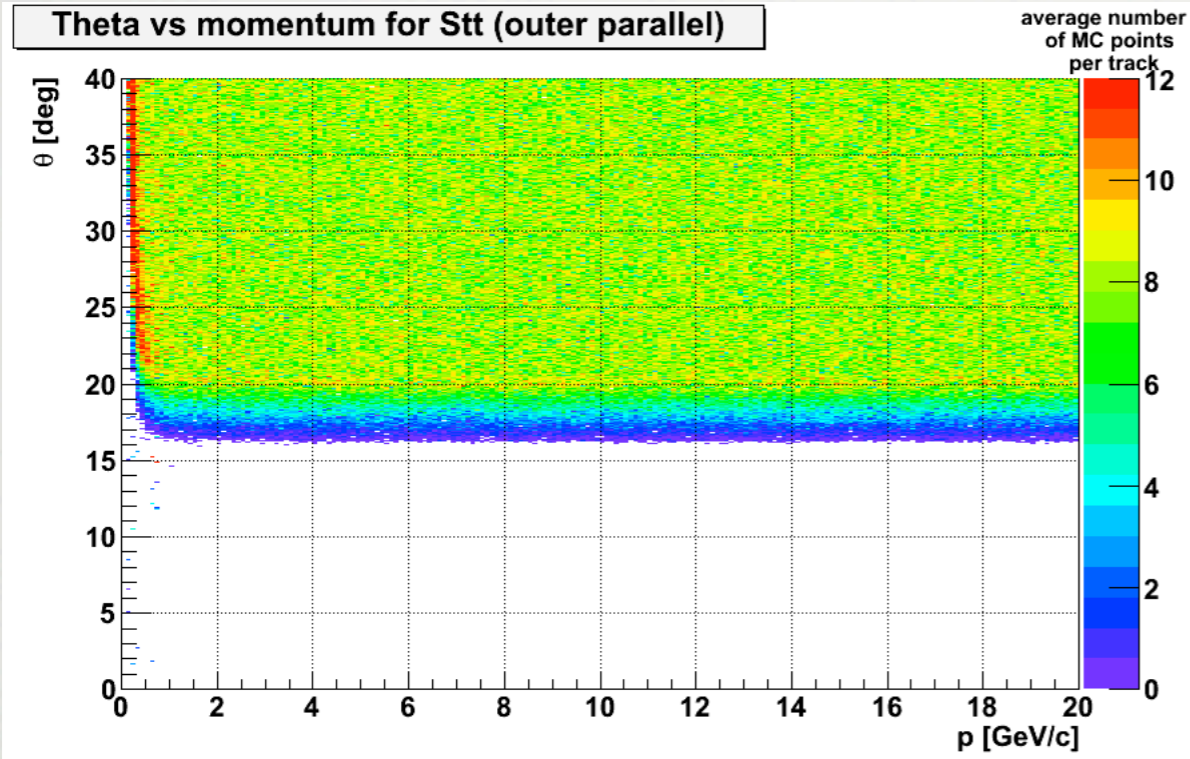
SKEWED

SHORT



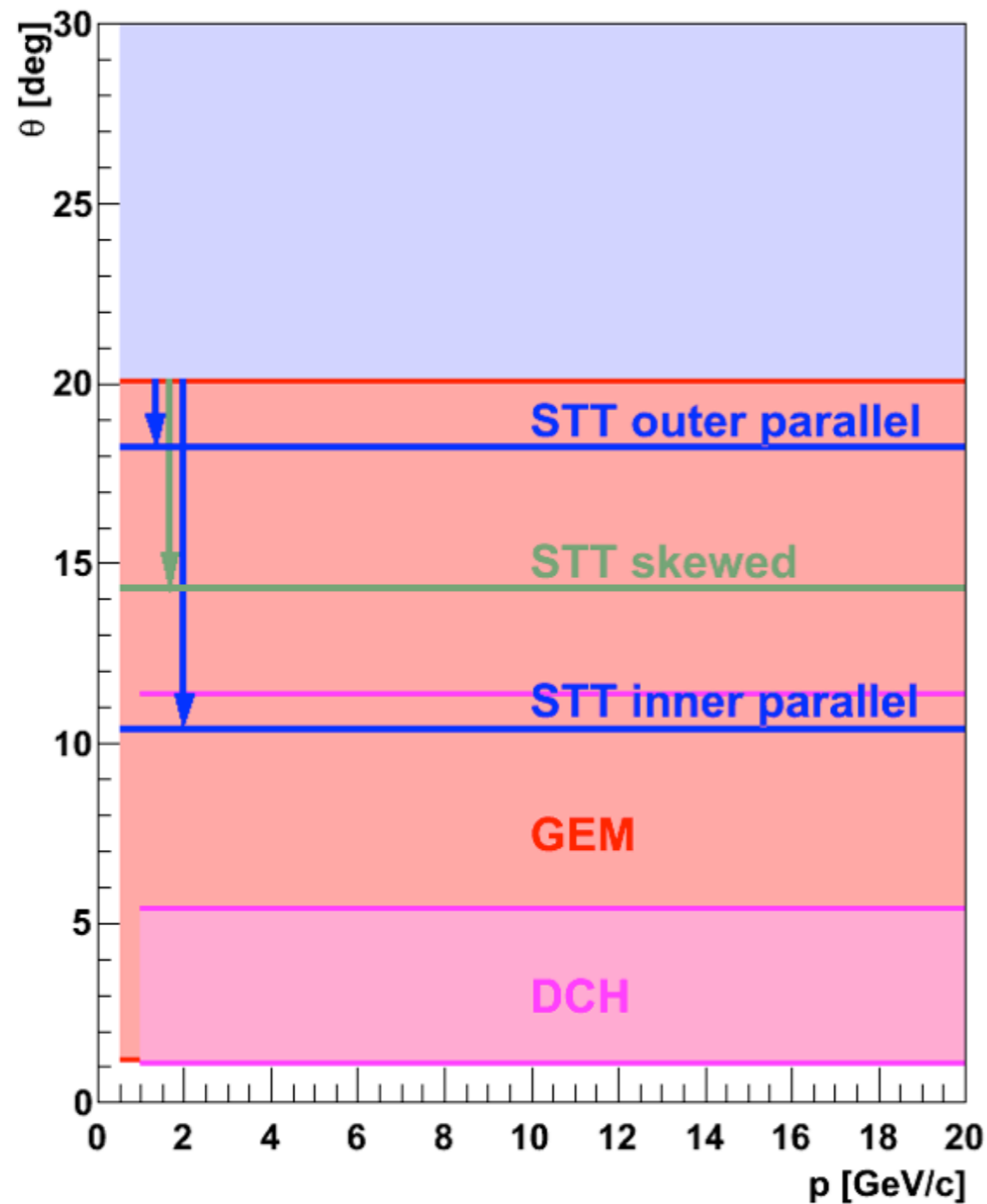
ACCEPTANCE MAP, STT,

LONG OUTER PARALLEL SHORT

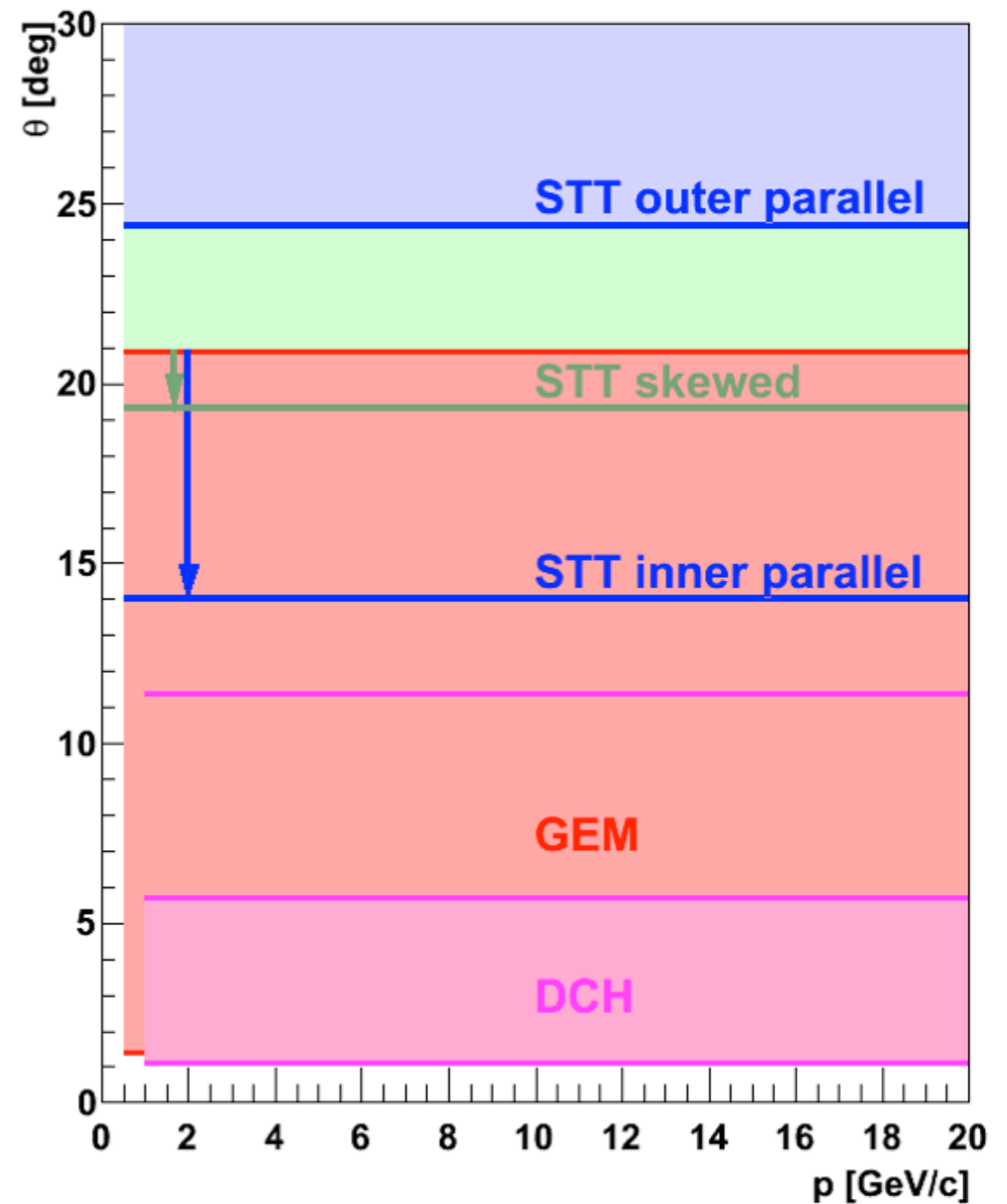


SCHEMATIC ACCEPTANCE MAPS

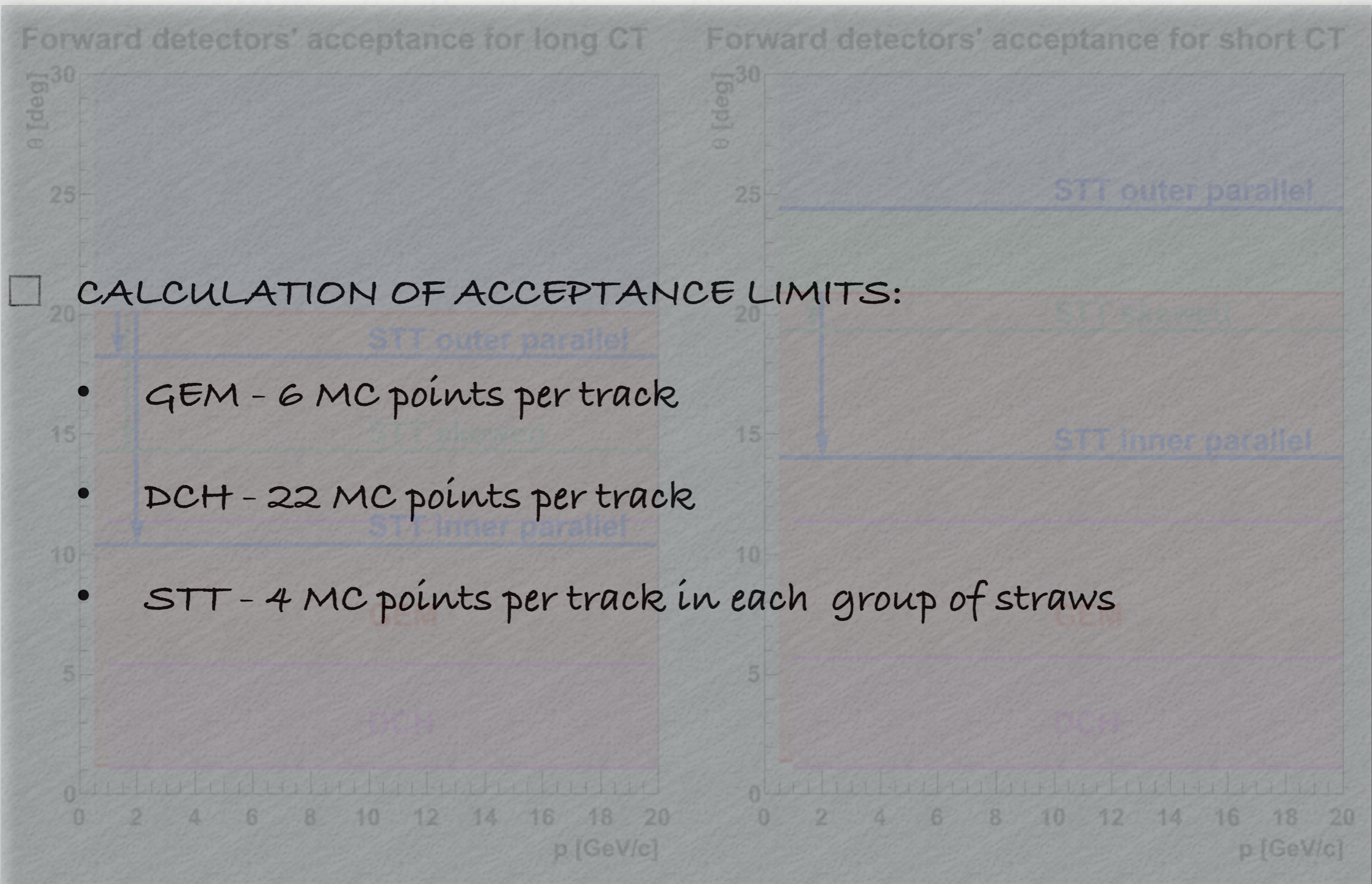
Forward detectors' acceptance for long CT



Forward detectors' acceptance for short CT

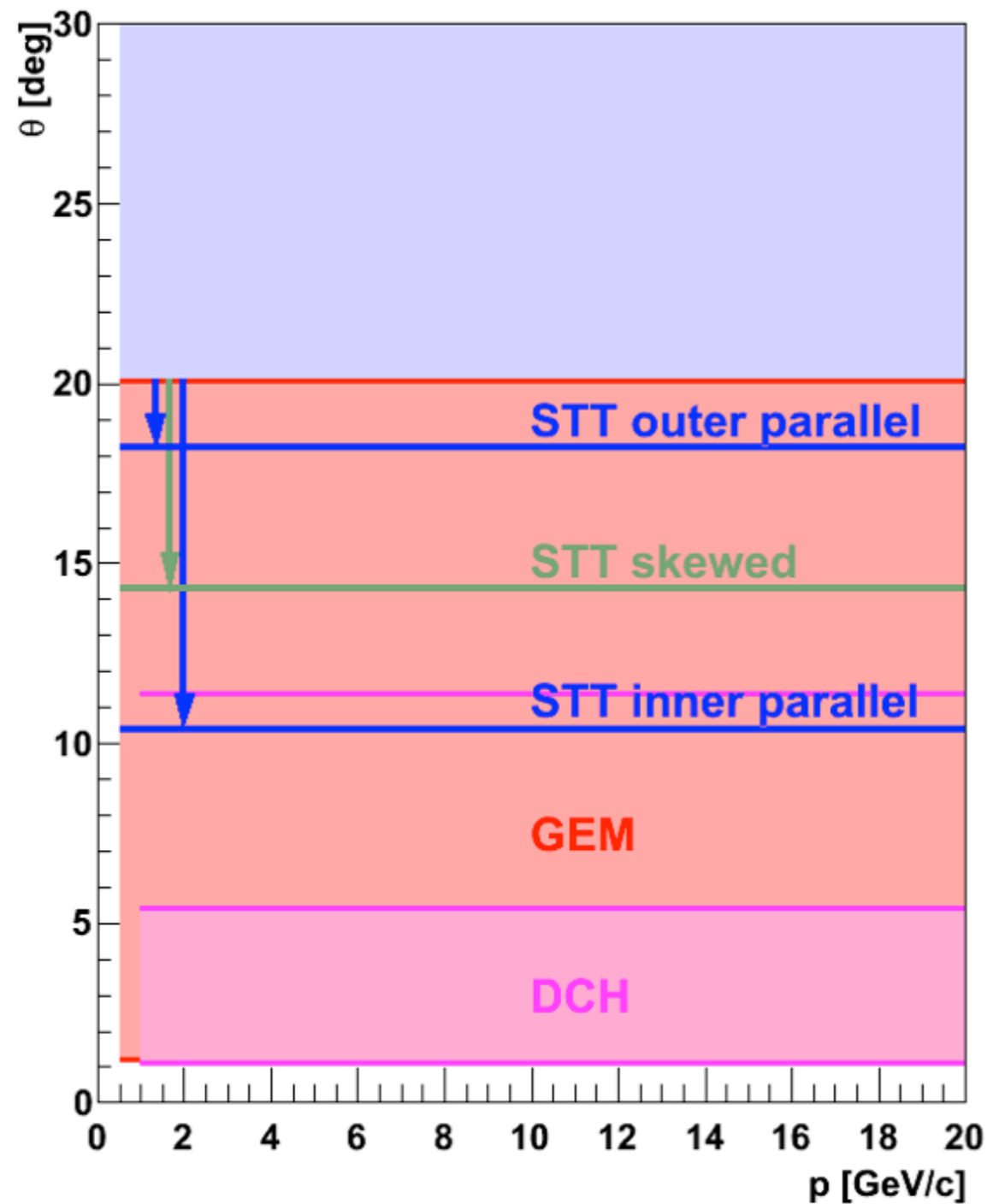


SCHEMATIC ACCEPTANCE MAPS

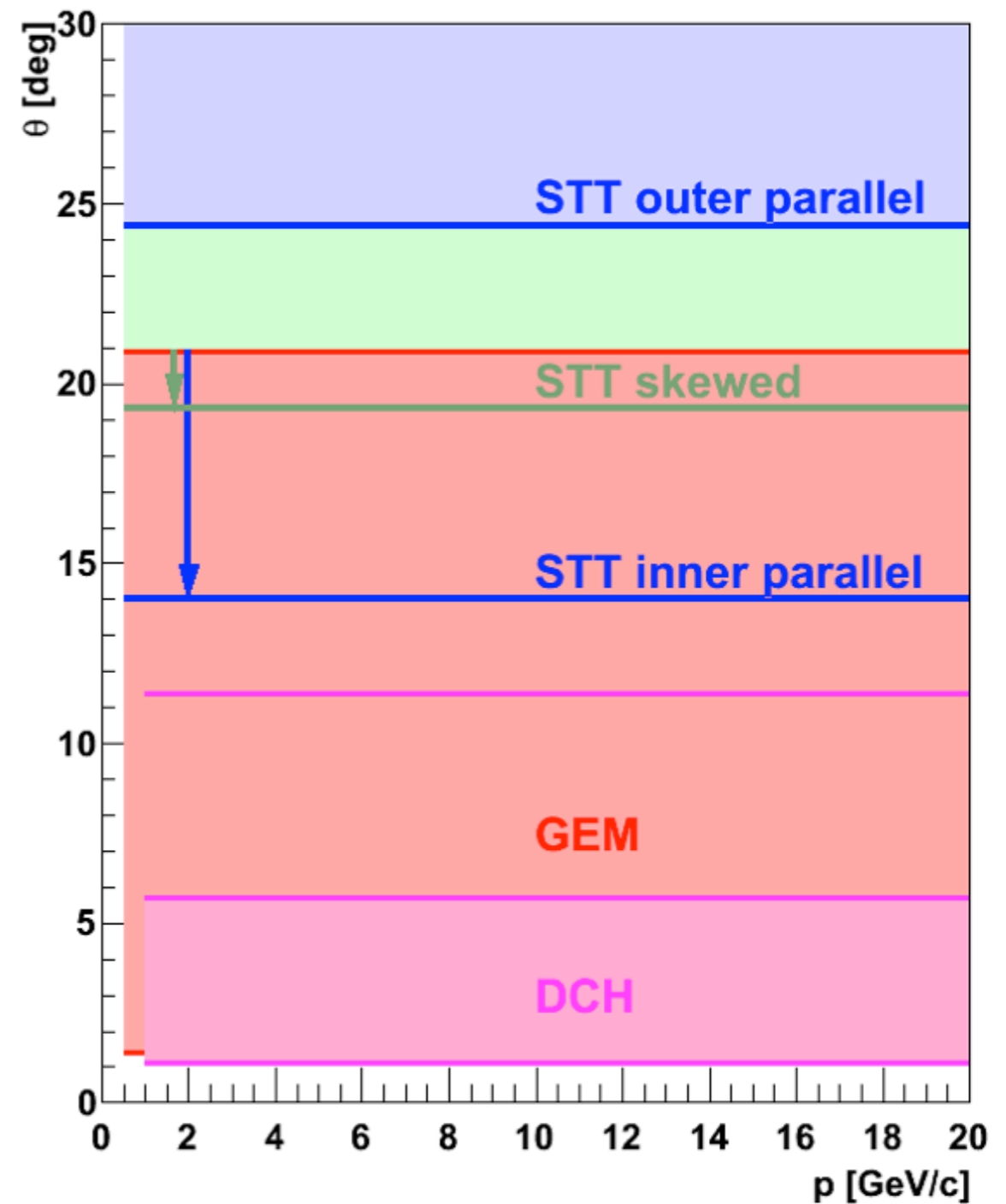


SCHEMATIC ACCEPTANCE MAPS

Forward detectors' acceptance for long CT



Forward detectors' acceptance for short CT



SUMMARY

- SHORTENING STT BY $\sim 30\text{CM}$ REDUCES STT θ ACCEPTANCE BY ~ 5 DEGREES
- ADDING A GEM STATION AT $\sim 83\text{CM}$ INCREASES GEM θ ACCEPTANCE BY ~ 1 DEGREE AND PROVIDES TWO ADDITIONAL HIGH-RESOLUTION MEASUREMENT POINTS FOR ANOTHER ~ 7 DEGREES IN θ
- THE REGION OF OVERLAPPING STT & GEM ACCEPTANCE REDUCES FROM ~ 6 DEGREES TO ~ 2 DEGREES

CONCLUSIONS

- ACCEPTANCE MAPS FOR STT, GEM AND DCH HAS BEEN PRODUCED FOR TWO DIFFERENT DESIGNS OF CENTRAL TRACKER AND GEM-TRACKER
- IN CASE OF LONG CT AND 3 GEM STATIONS IT LOOKS THAT STANDALONE TRACK FINDERS IN STT AND GEM WILL BE SUFFICIENT TO COVER ACCEPTANCE WITHOUT GAPS IN Θ
- IN CASE OF SHORT CT AND 4 GEM STATIONS A TRACK FINDER USING HITS FROM DIFFERENT DETECTORS HAS TO BE USED
- SIMPLEST CHOICE IS THE USAGE OF THE LHE TRACK FINDER AND COMPARING TRACK EFFICIENCIES AND MOMENTUM RESOLUTION IN THE REGION OF $\Theta \in (20^\circ, 25^\circ)$

Backup slides

Backup slides

STT

