Update on Tracking Efficiency Analysis

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Introduction

- Tracking Efficiency is calculated in the coin report files.
- Using new cut and template files for the replays.
- Calculating efficiencies for both HMS and SHMS simultenously.

$$\text{Tracking Efficiency} = \frac{(s)hmsscindid}{(s)hmsscinshould}$$

- Trying to check the stability of calculation with default track parameters.

Tracking Cuts

- (s)hmsscinshould = hod + PID
  - hod = goodscinhit + goodstarttime + betanotrack
- (s)hmsscindid = (s)hmsscinshould + dc.ntrack > 0
- PID cuts

Det	SHMS			HMS	
	Positron	Pion	Proton	Electron	Hadron
HGC	> 1.5	> 1.5	<= 1.5	> 0.5	< 0.5
Cal	> 0.6 & < 1.6	<= 0.6 & > 0	<= 0.6 & > 0	> 0.6 & < 2.0	< 0.6 & > 0
Aero	> 1.5	> 1.5	<= 1.5		

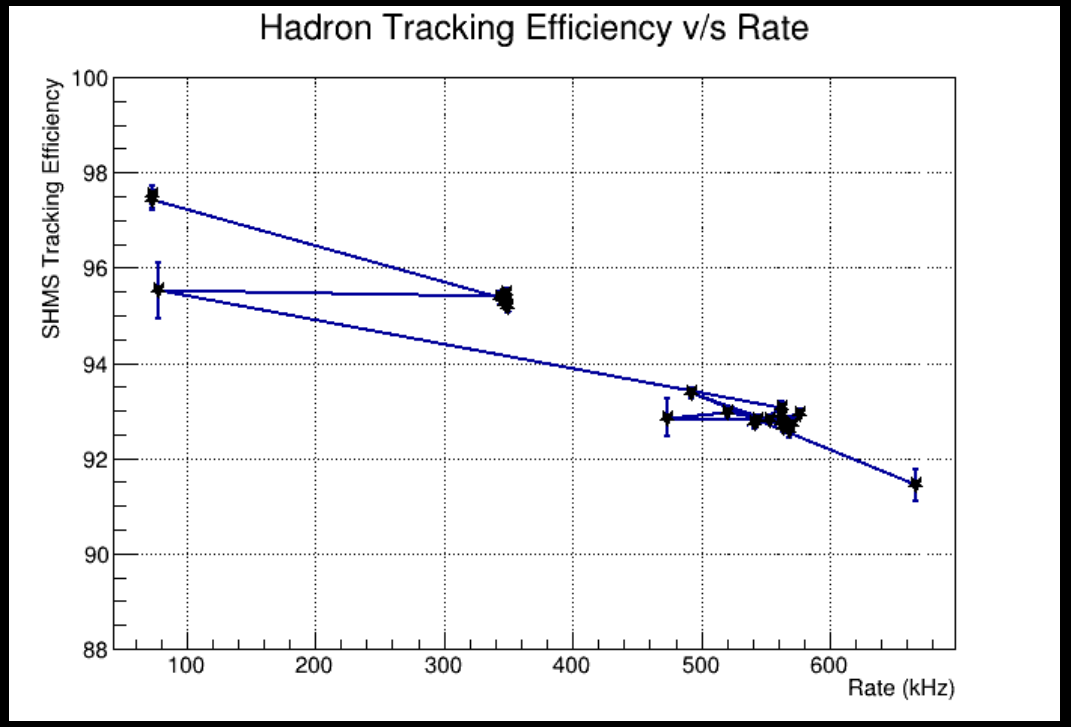
Kinematic Settings

- Run # 8038-8100
- E = 8.2 GeV

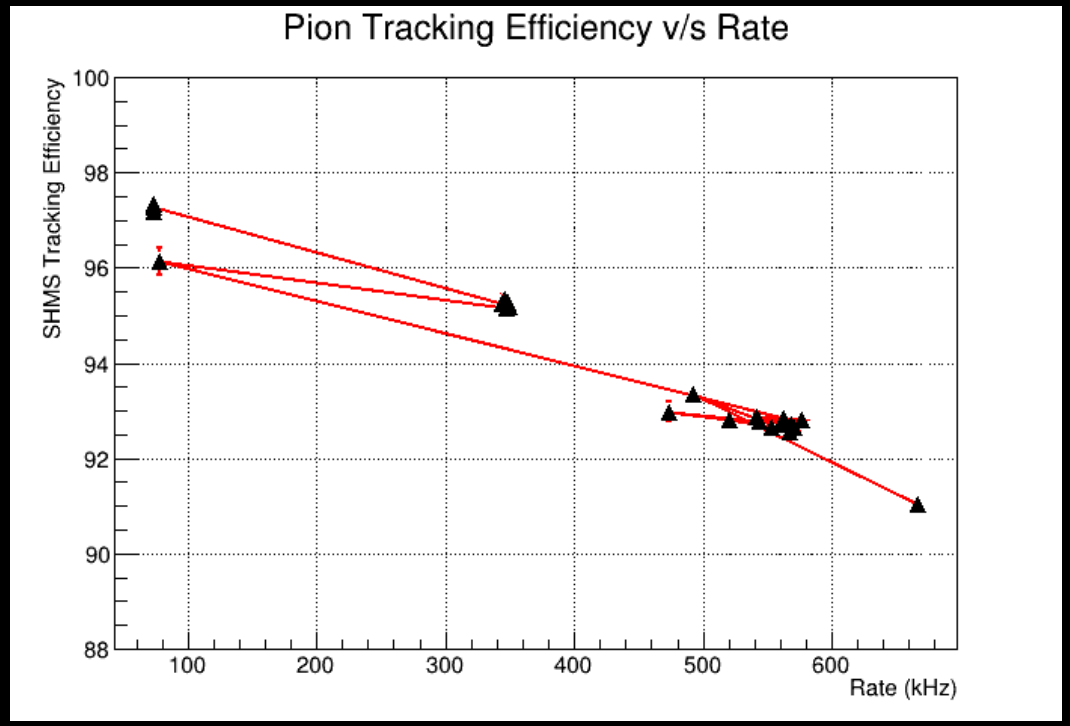
Spec.	P	Angle
HMS	**-1.82 GeV**	**25.89**
SHMS	+6.05 GeV	**6.91**

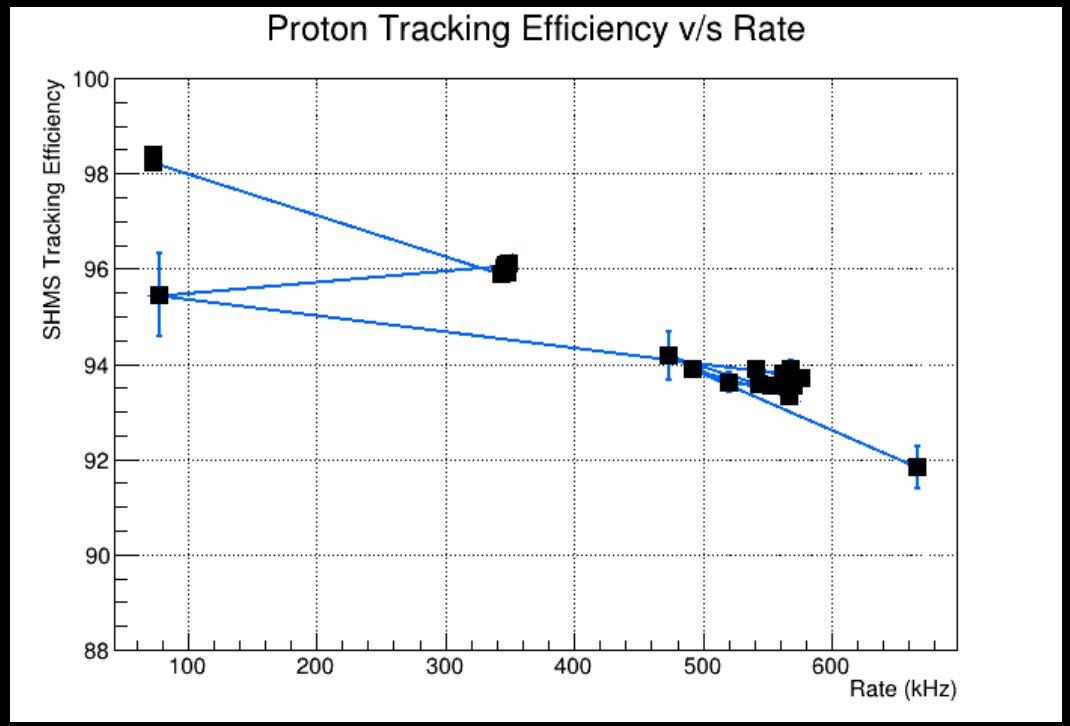
SHMS


Positron Tracking Efficiency v/s Rate
SHMS Tracking Efficiency
100
98
96
94
92
90
88
100
200
300
400
500
600
Rate (kHz)

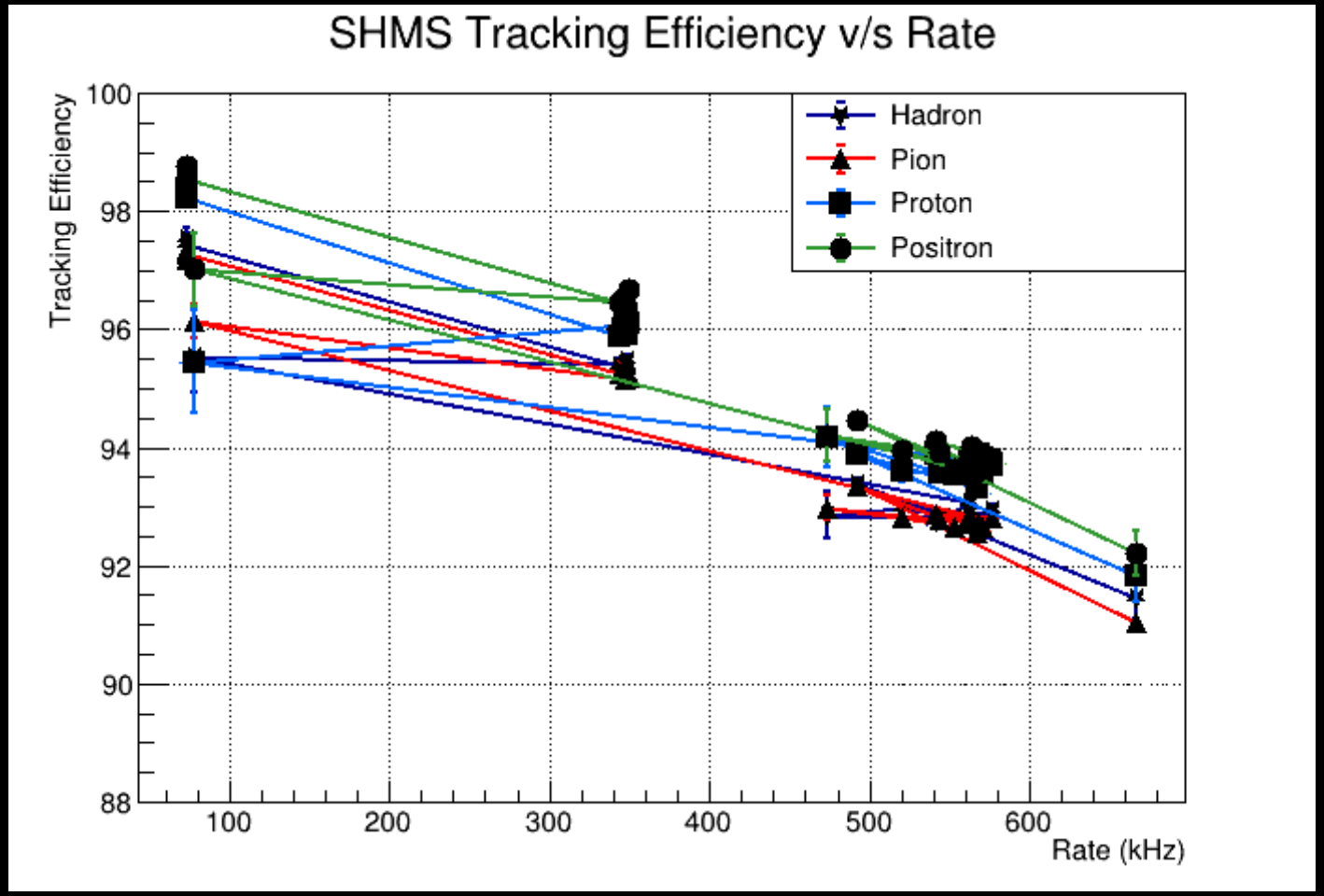

Hadron Tracking Efficiency v/s Rate
SHMS Tracking Efficiency
100
98
96
94
92
90
88
100
200
300
400
500
600
Rate (kHz)

SHMS

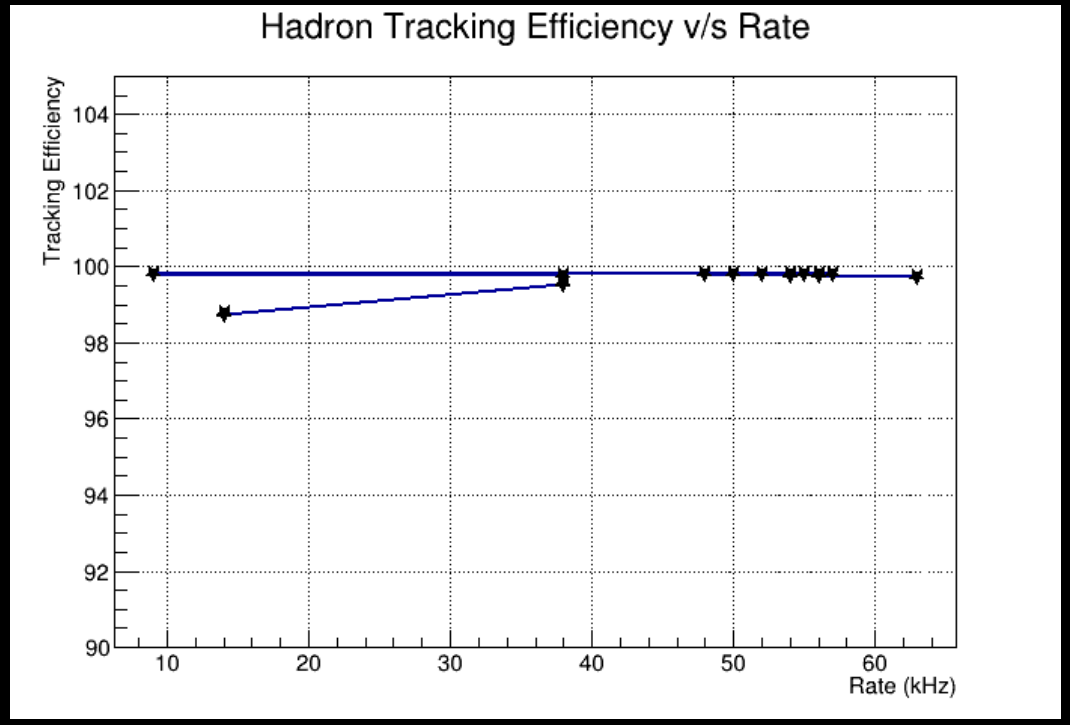

Pion Tracking Efficiency v/s Rate
SHMS Tracking Efficiency
100
98
96
94
92
90
88
100
200
300
400
500
600
Rate (kHz)

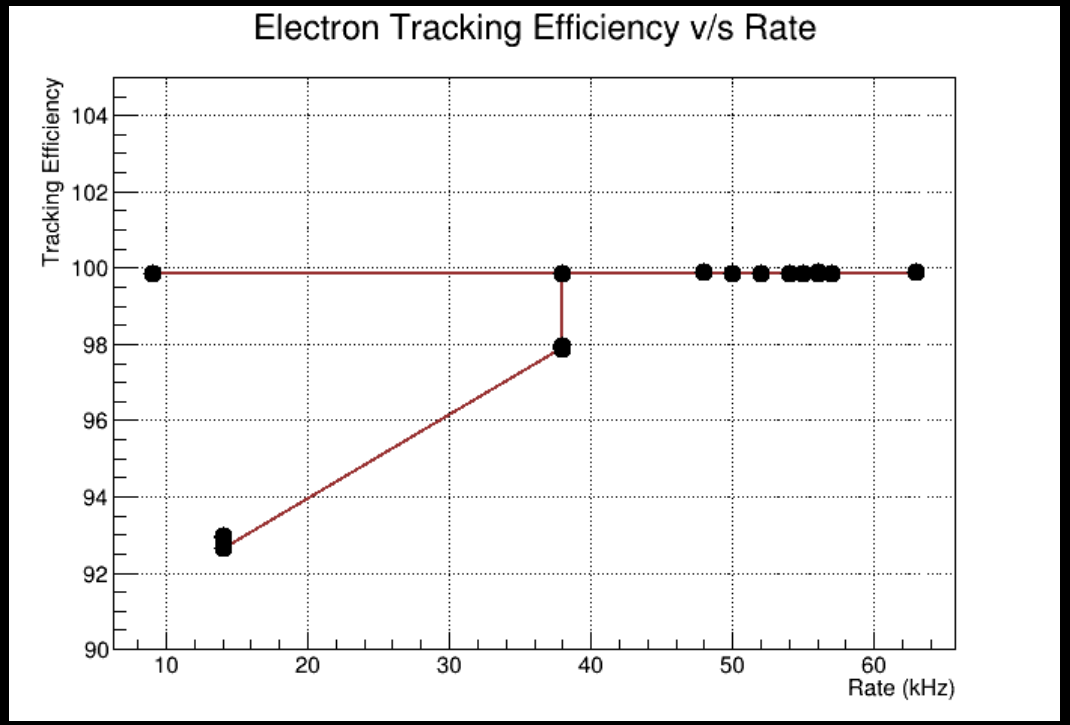

Proton Tracking Efficiency v/s Rate
SHMS Tracking Efficiency
100
98
96
94
92
90
88
100
200
300
400
500
600
Rate (kHz)

SHMS

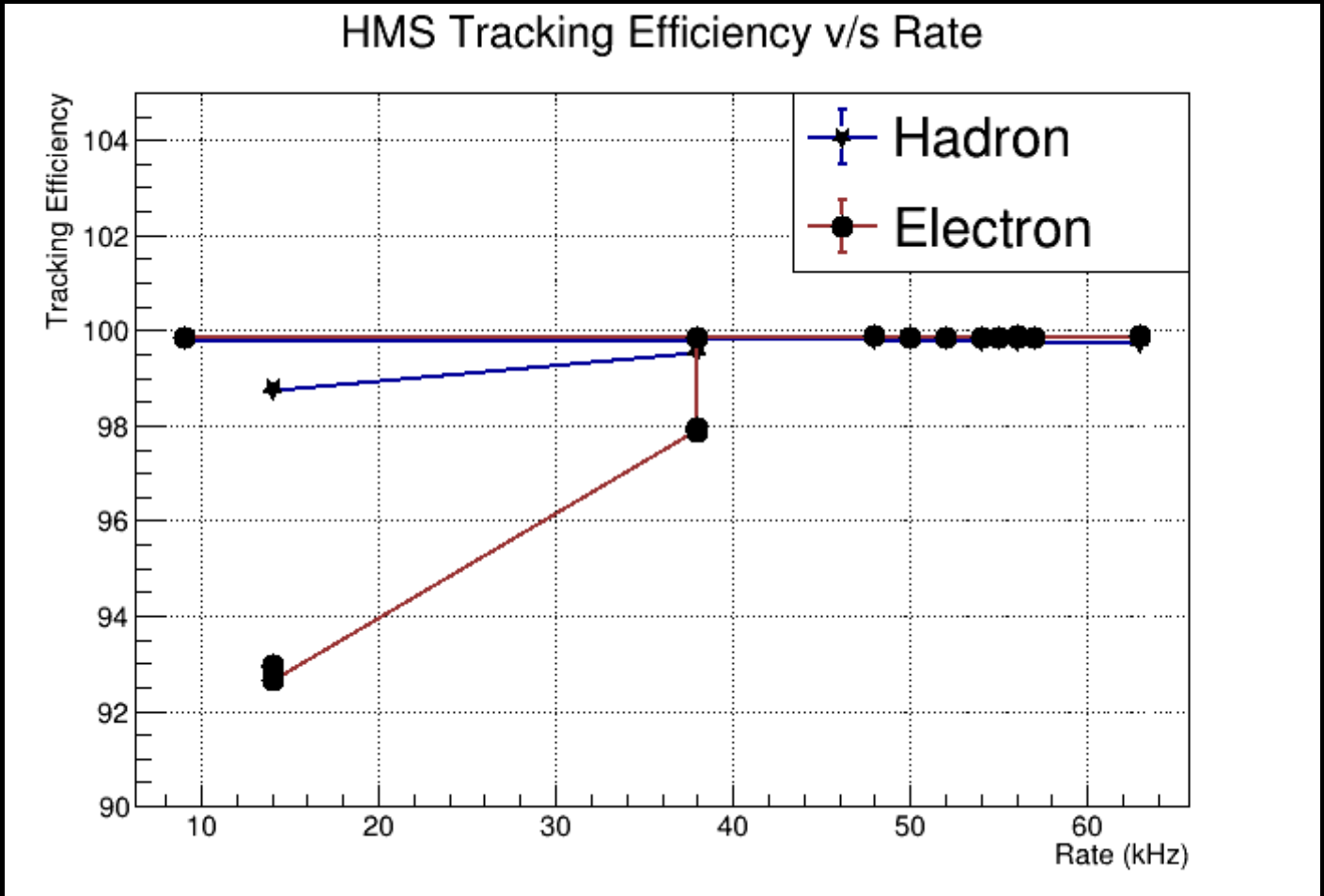

SHMS Tracking Efficiency v/s Rate
Tracking Efficiency
100
98
96
94
92
90
88
100
200
300
400
500
600
Rate (kHz)
Hadron
Pion
Proton
Positron

HMS


Hadron Tracking Efficiency v/s Rate
Tracking Efficiency
104
102
100
98
96
94
92
90
10
20
30
40
50
60
Rate (kHz)


Electron Tracking Efficiency v/s Rate
Tracking Efficiency
104
102
100
98
96
94
92
90
10
20
30
40
50
60
Rate (kHz)

HMS


HMS Tracking Efficiency v/s Rate
Tracking Efficiency
104
102
100
98
96
94
92
90
10
20
30
40
50
60
Rate (kHz)
Hadron
Electron

Summary & Outlook

- The tracking efficiency for all the particles in both spectrometer has a specific trend except few outliars.
- Need to look at higher rate for HMS to make sure the trend is similar to that of SHMS.
- Will compare the efficiencies for both spectrometer in overlapping rates region.
- Will start plotting the individual track parameter versus efficiency to complete the optimization.