

SHMS Scintillator Paddles Acceptance Study

C. Yero

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PURPOSE OF STUDY:

- Determine which SHMS paddles in (S1X, S2X) hodoscope planes are relevant for the CaFe kinematics in momentum acceptance of (+5, +20)% and turn OFF SHMS scintillator paddles that are irrelevant to the CaFe kinematics.
- Turning OFF paddles outside the SHMS momentum acceptance (+5,+20)% will make the potentially high SHMS rates more manageable, as SHMS (e-) will be stationed at very low angles (6.8, 8.3) deg
- Even though coincidence rates should NOT be a problem, (~ few kHz of DAQ rate from rate estimates), singles-rates can be a problem, but we cannot simulate background in SIMC. We can only simulate the reaction of interest.

ONLY USE SHMS ACCEPTANCE REQUIRED BY CAFE: (5, 20)%

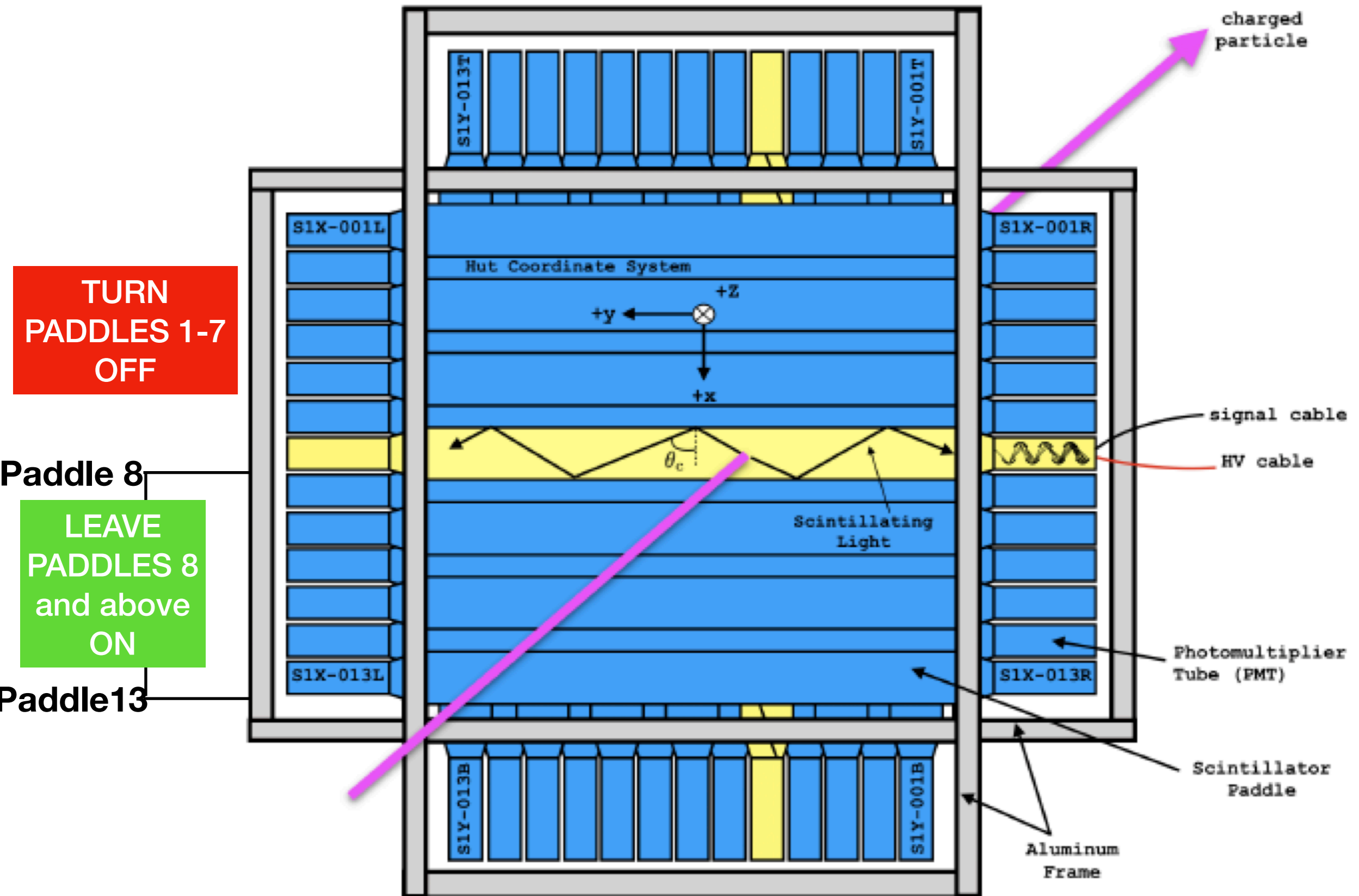
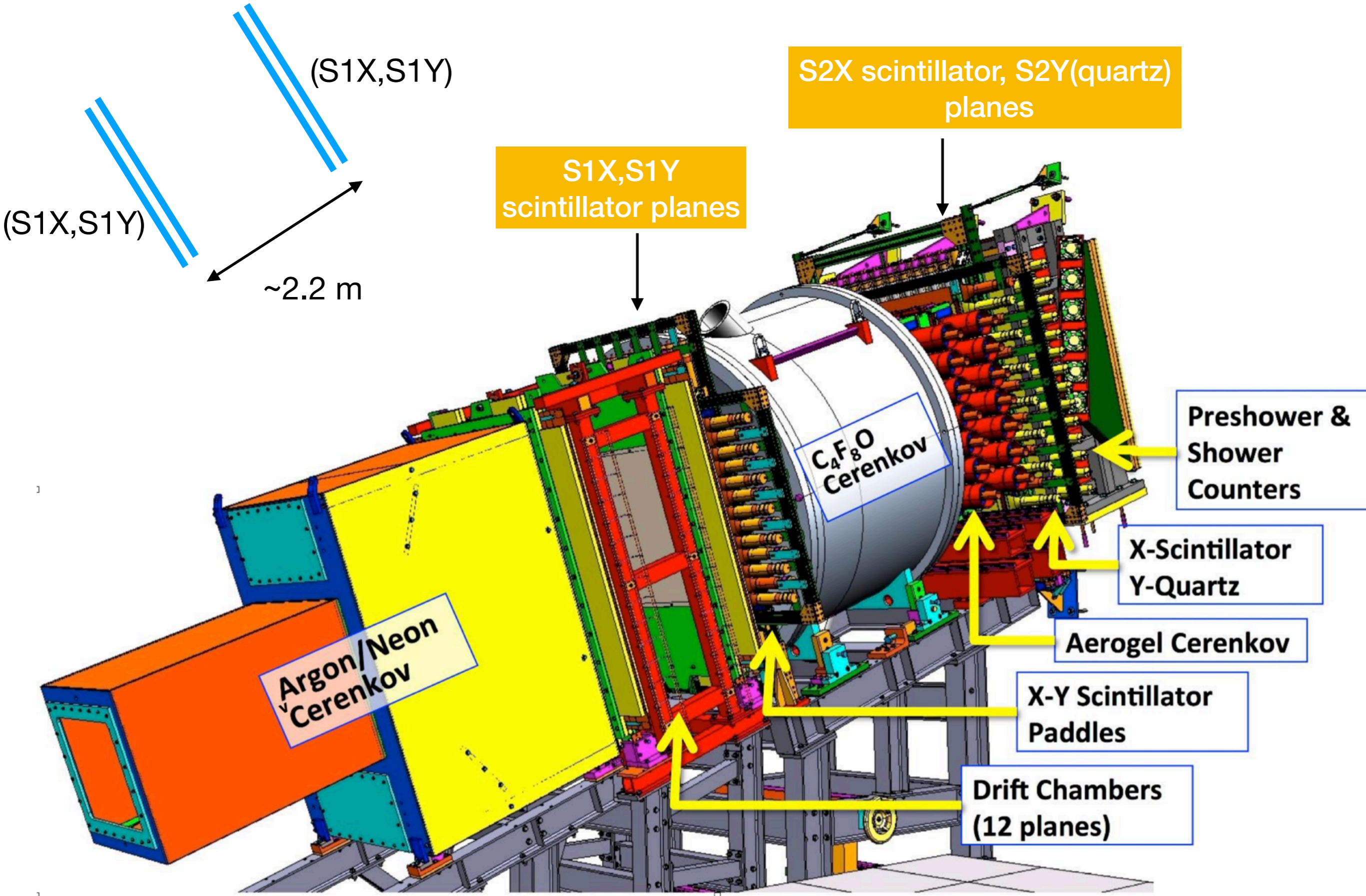
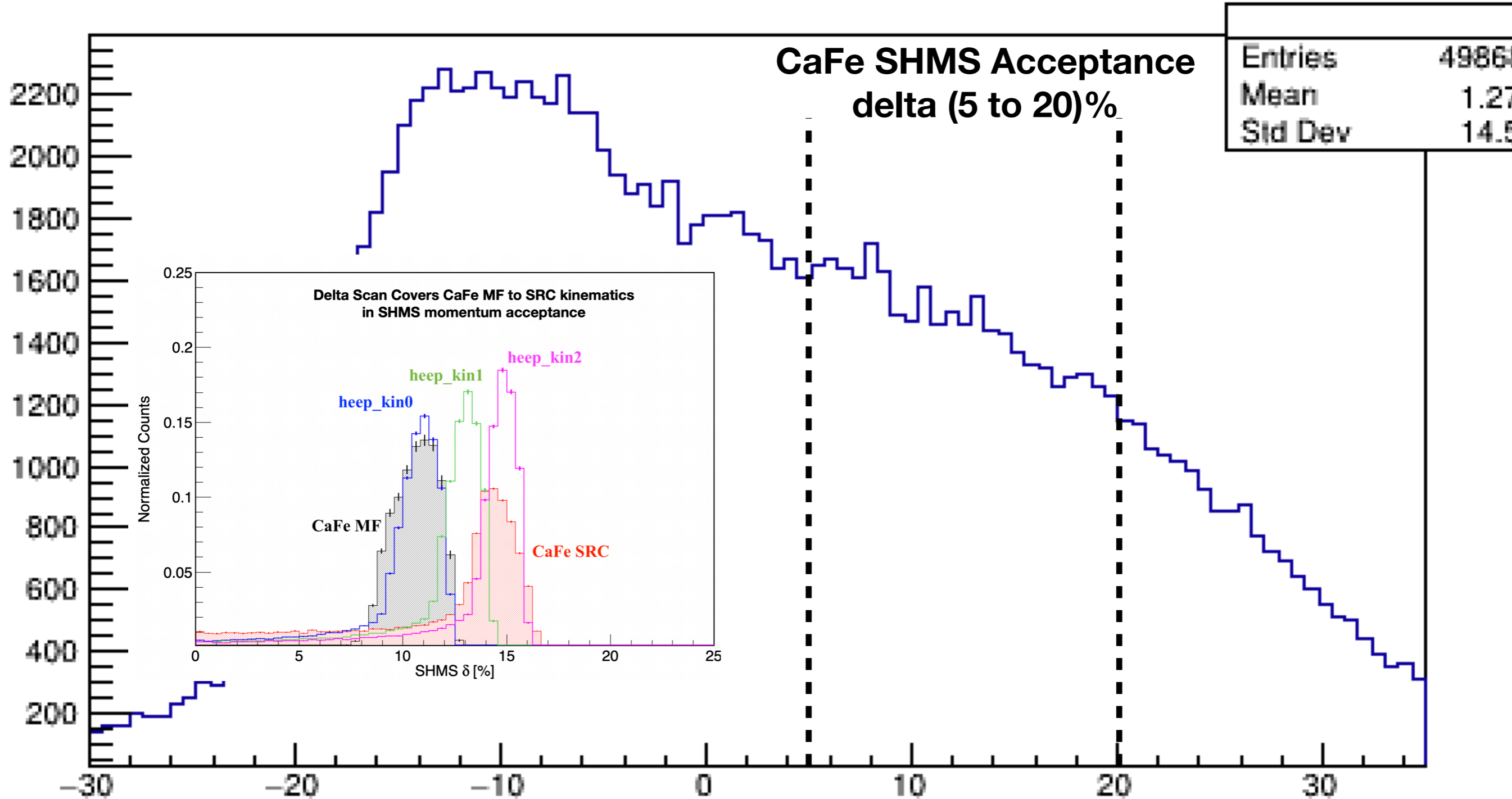


Figure 3.26: Front view of the SHMS S1X (front) and S1Y (back) hodoscope planes.

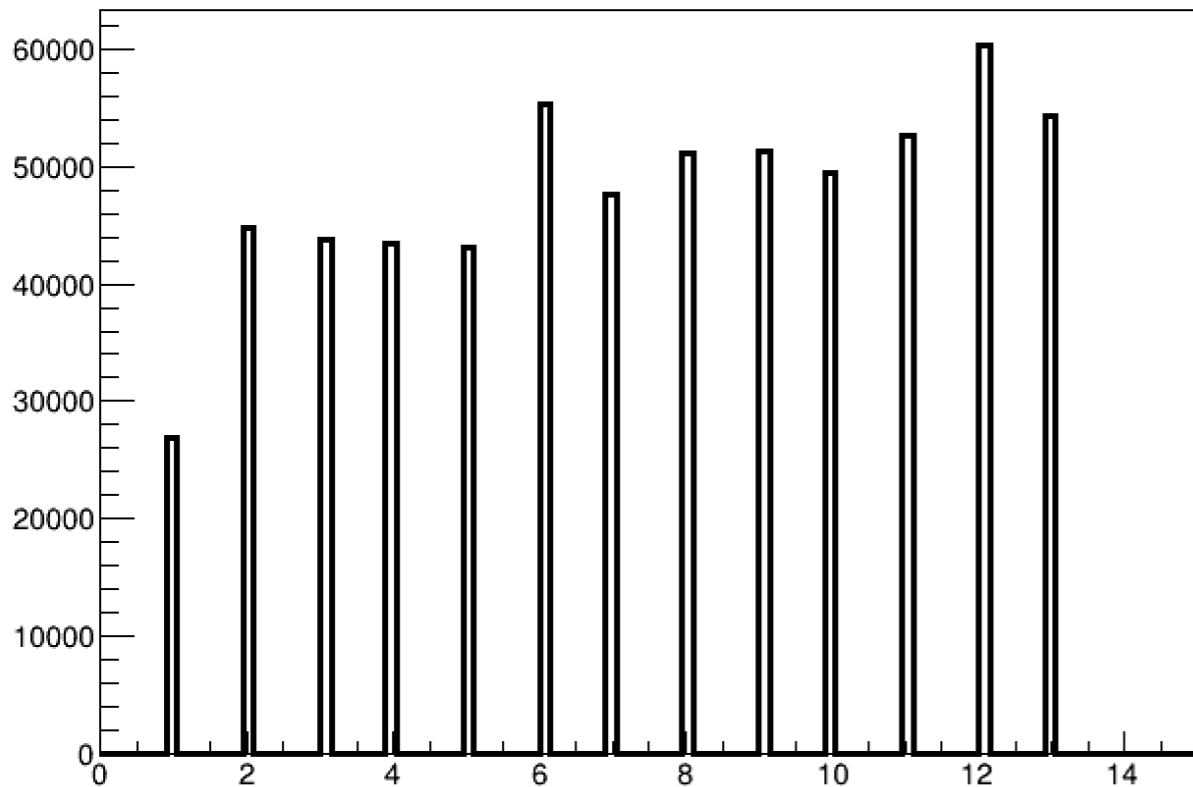


- I looked at SHMS de-focused run 11799, which covers most of the acceptance
- Made acceptance cut on de-focused run corresponding to CaFe kinematics
- Looked at SHMS X vs. Y tracks projected to plane S1X, with and without the CaFe (+5, +20)% acceptance cut (next two slides)

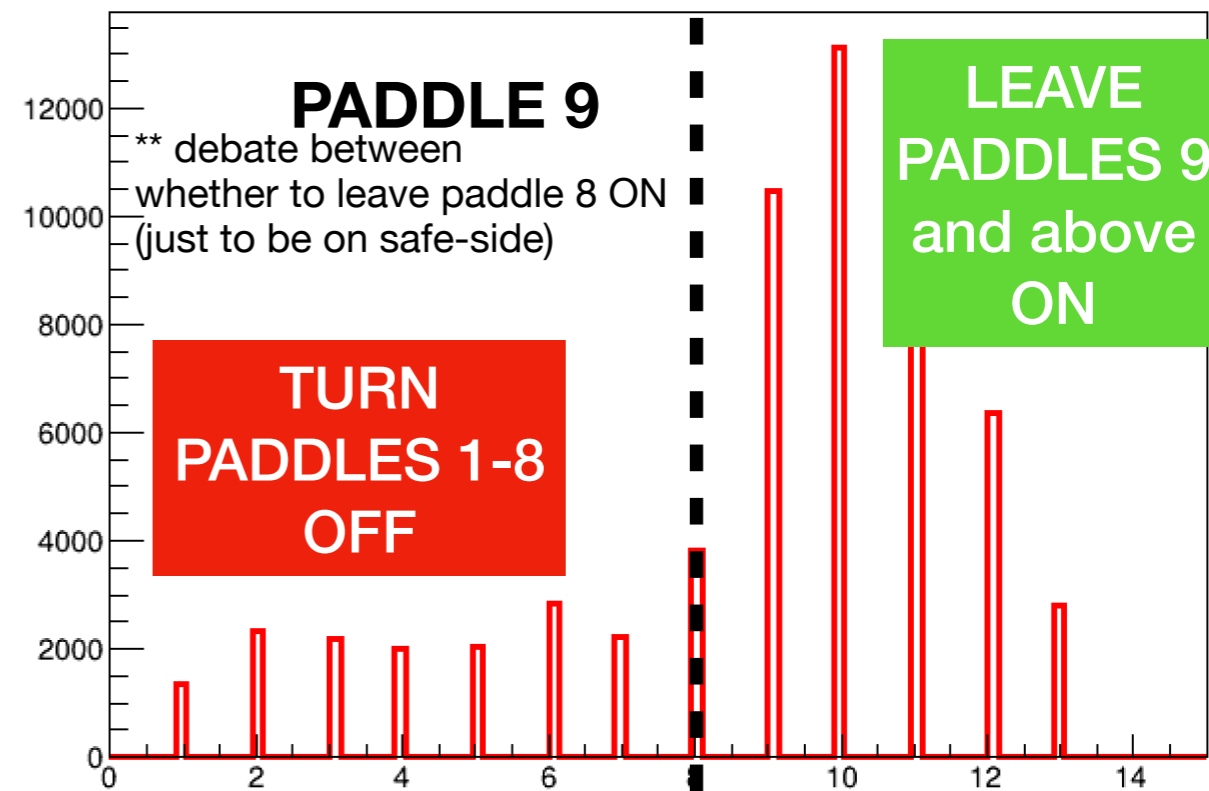
P.gtr.dp



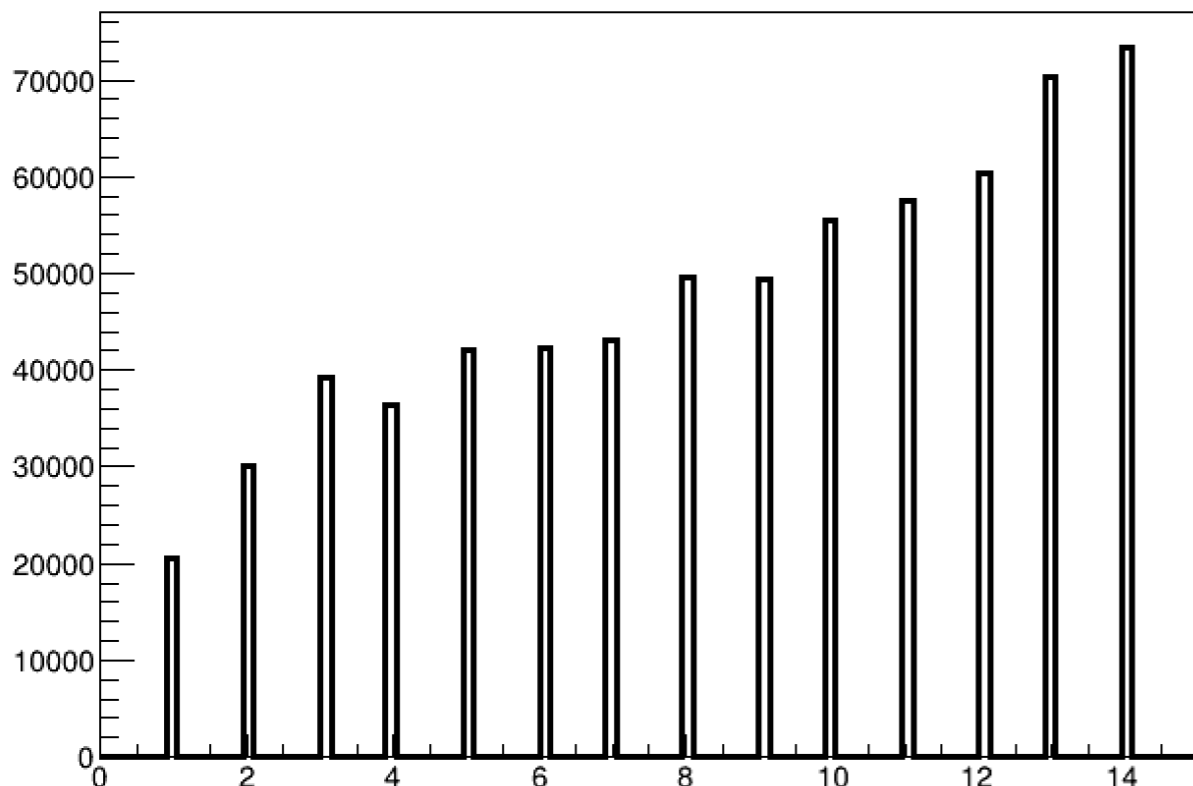
P.hod.1x.negAdcCounter



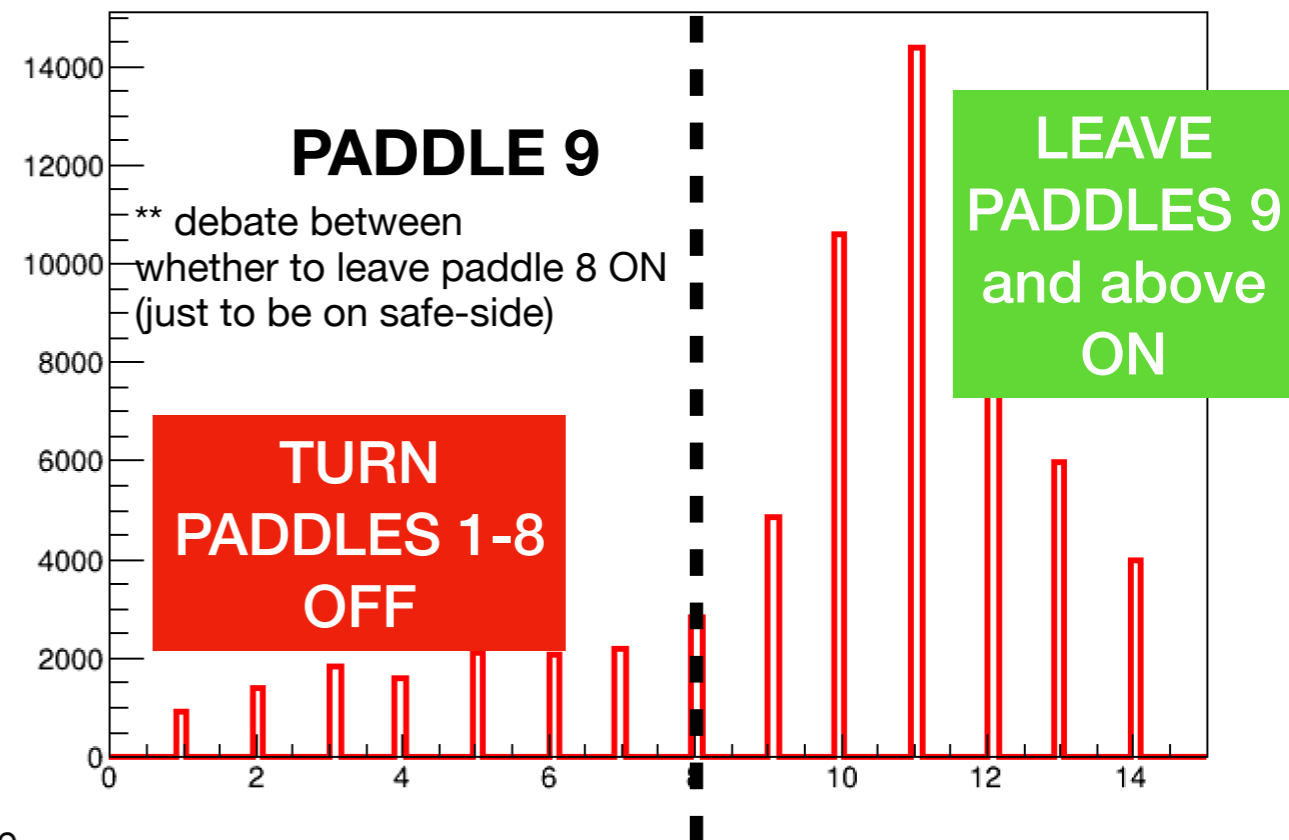
P.hod.1x.negAdcCounter {P.gtr.dp>5&&P.gtr.dp<20}



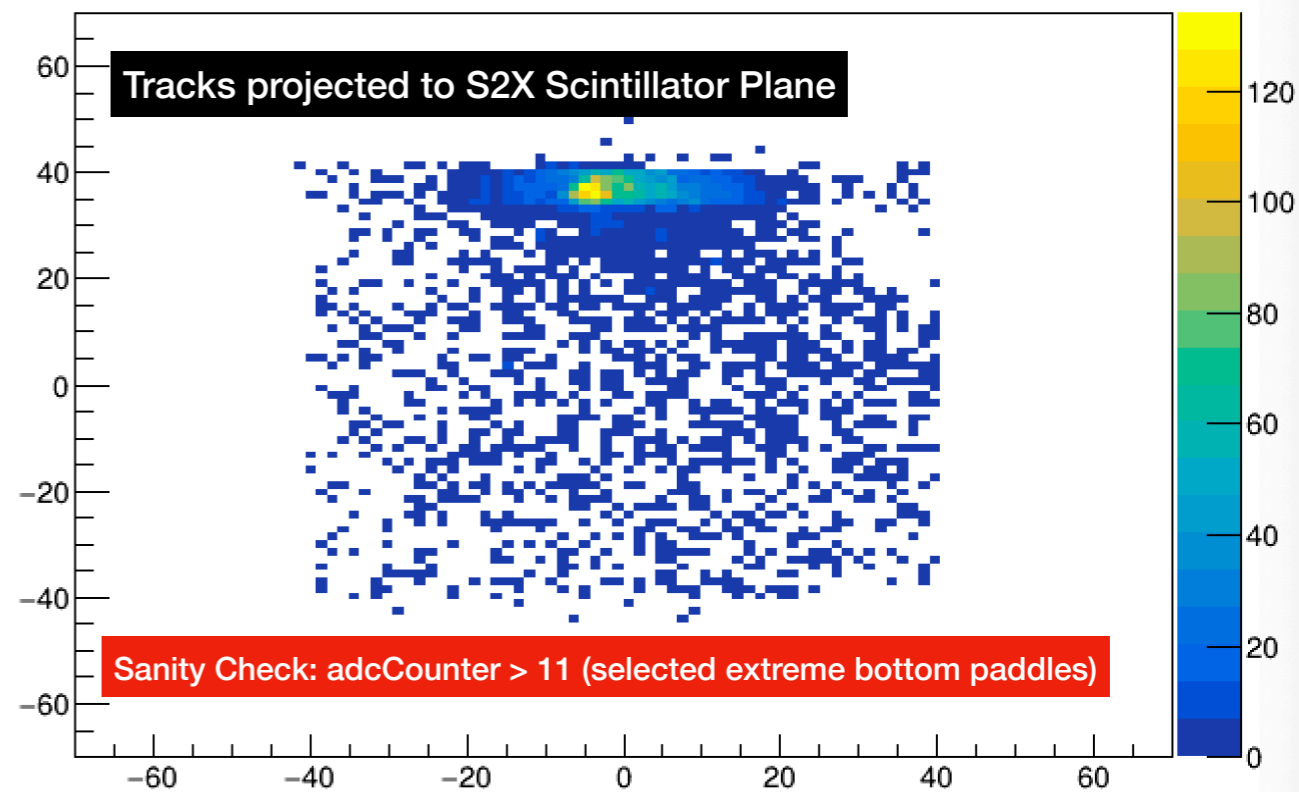
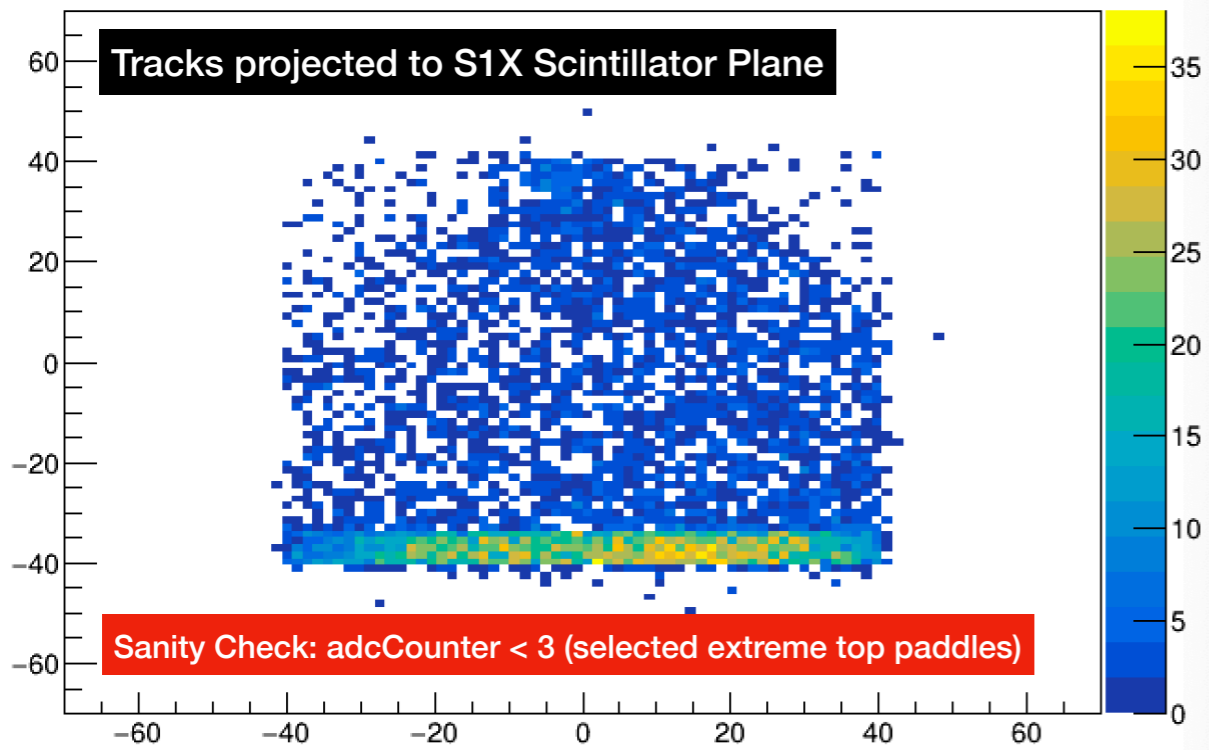
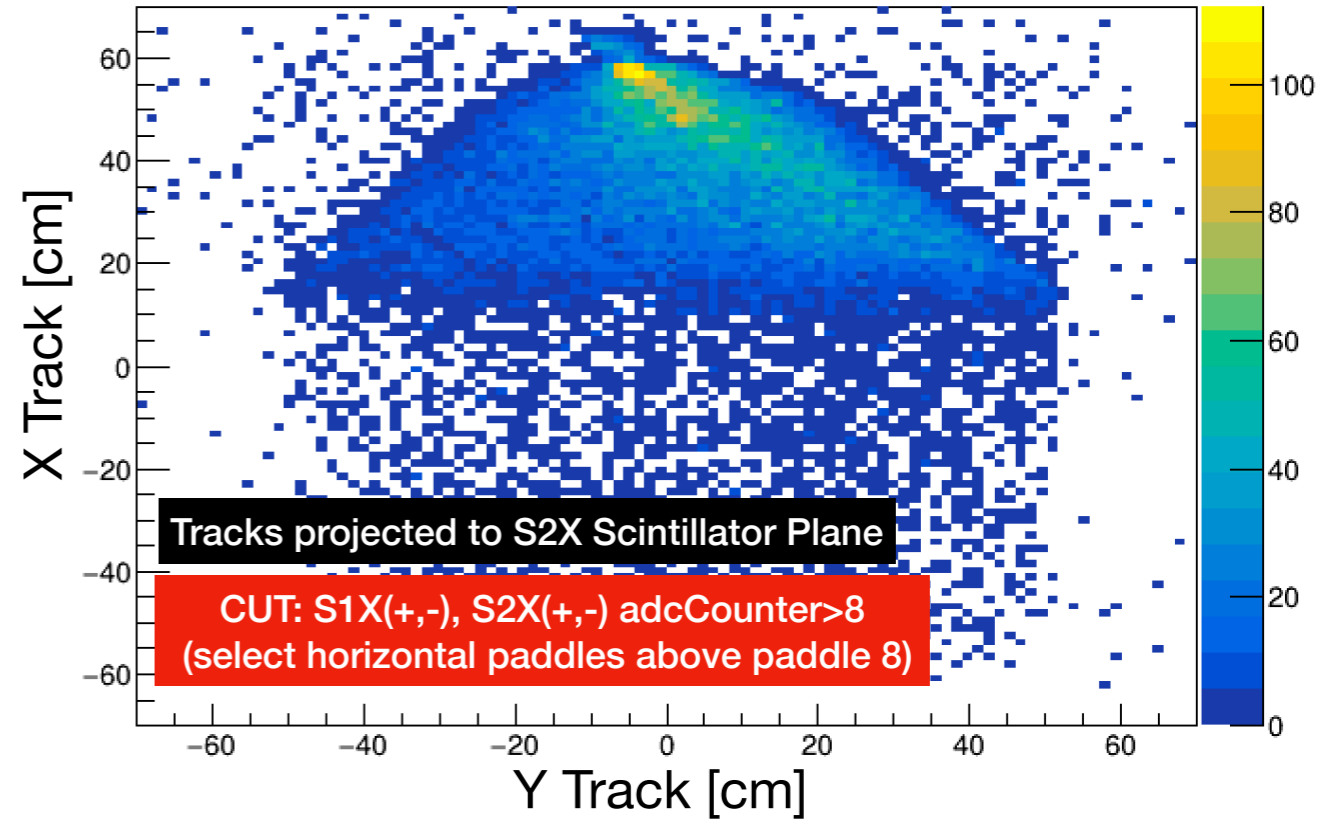
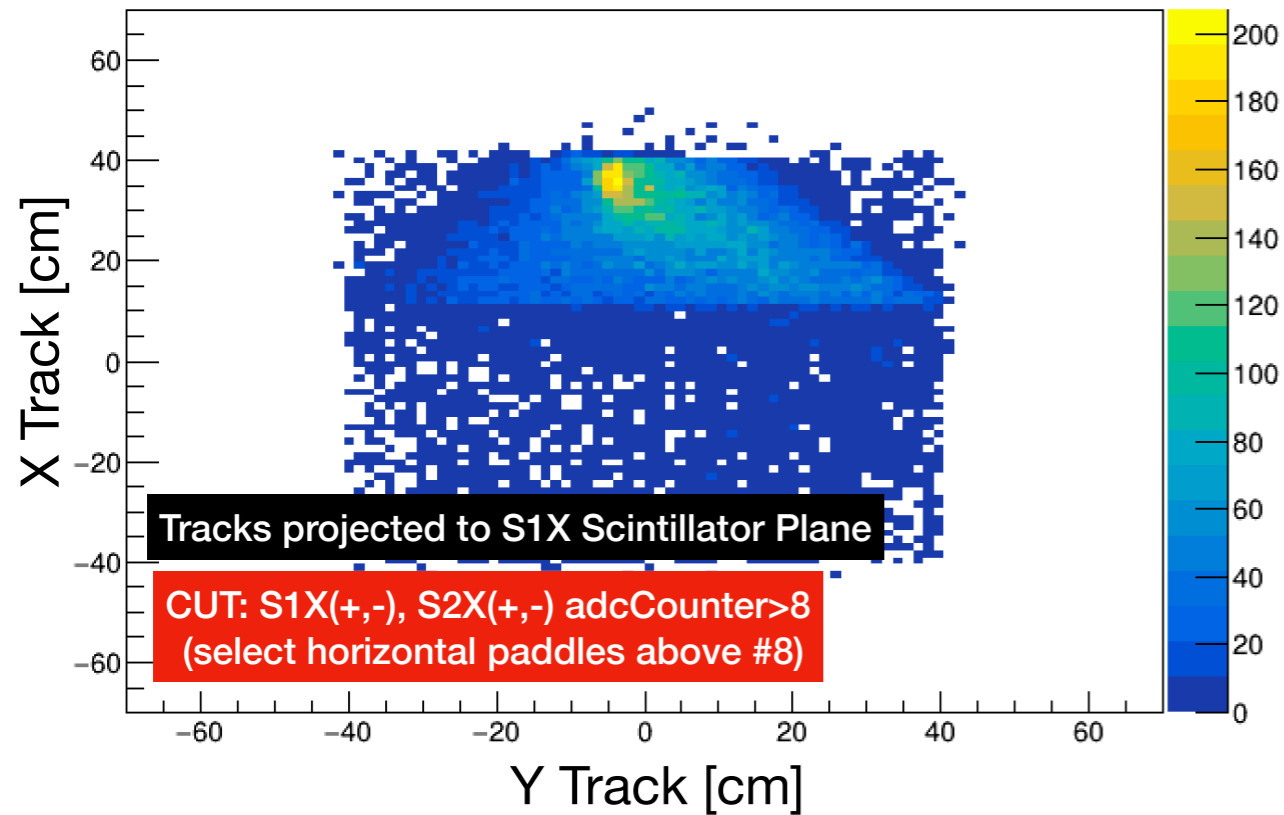
P.hod.2x.negAdcCounter



P.hod.2x.negAdcCounter {P.gtr.dp>5&&P.gtr.dp<20}

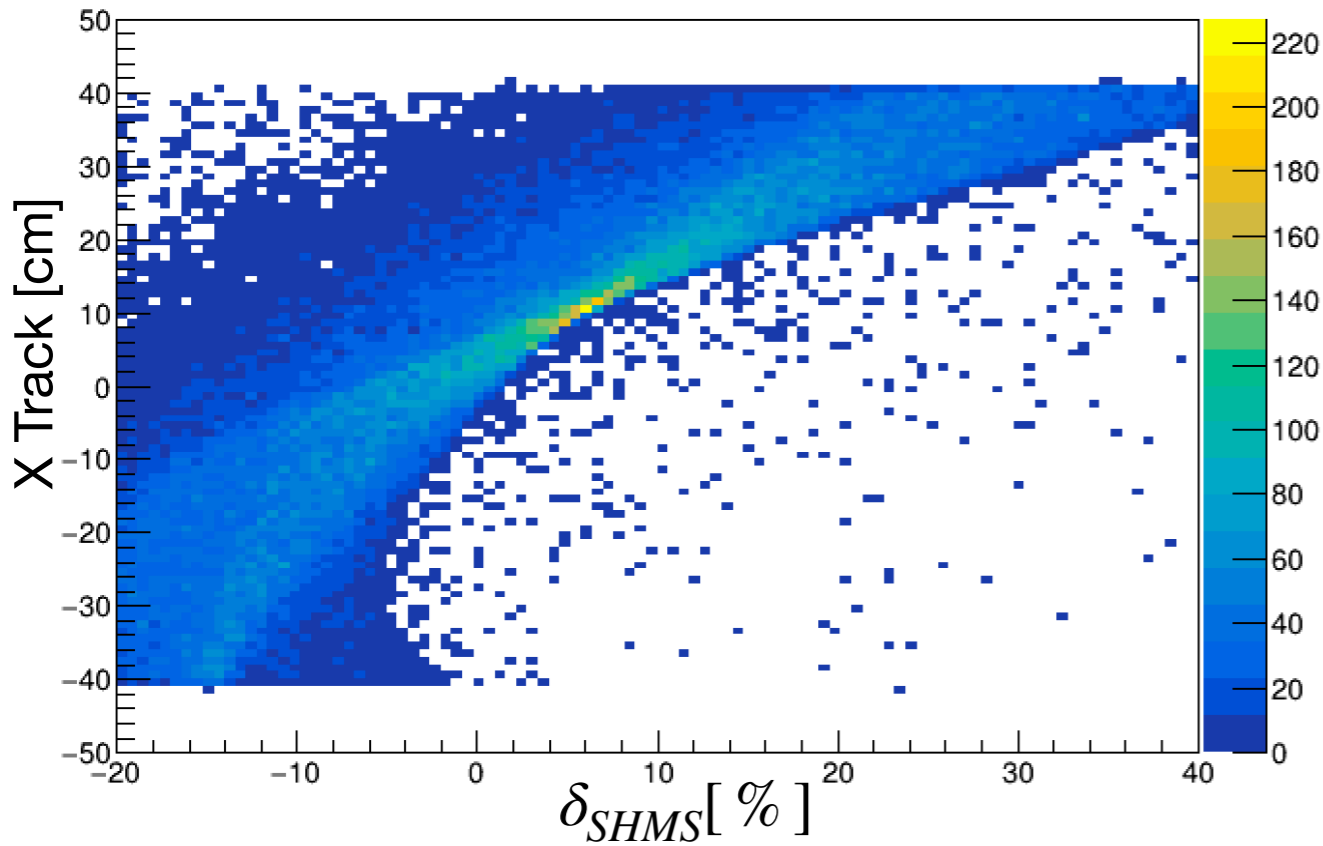


- adcCounter is the number of adc hits measured by PMT at either end of a paddle
- Selecting SHMS momentum acceptance (+5, +20)% gives which paddles had more/less hits
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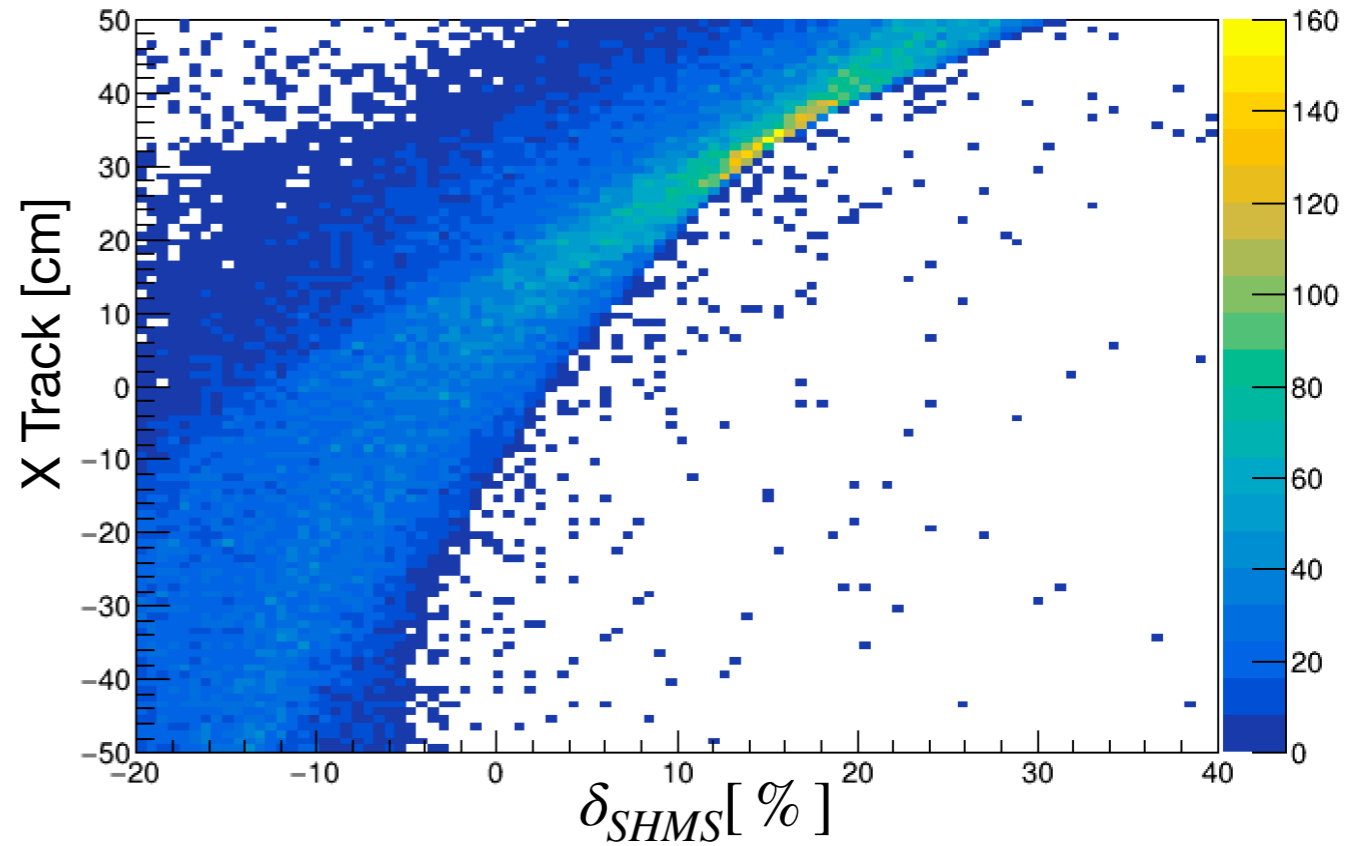


- SHMS reconstructed tracks projected to scintillator planes S1X and S2X
- ADC Counter Cut restricts scintillator paddles to be above/below the counter limit (e.g. $adcCounter < 3$ selected only paddles 1&2) (corresponds to positive momentum acceptance, and + Xtrack)

P.hod.1x.TrackXPos:P.gtr.dp

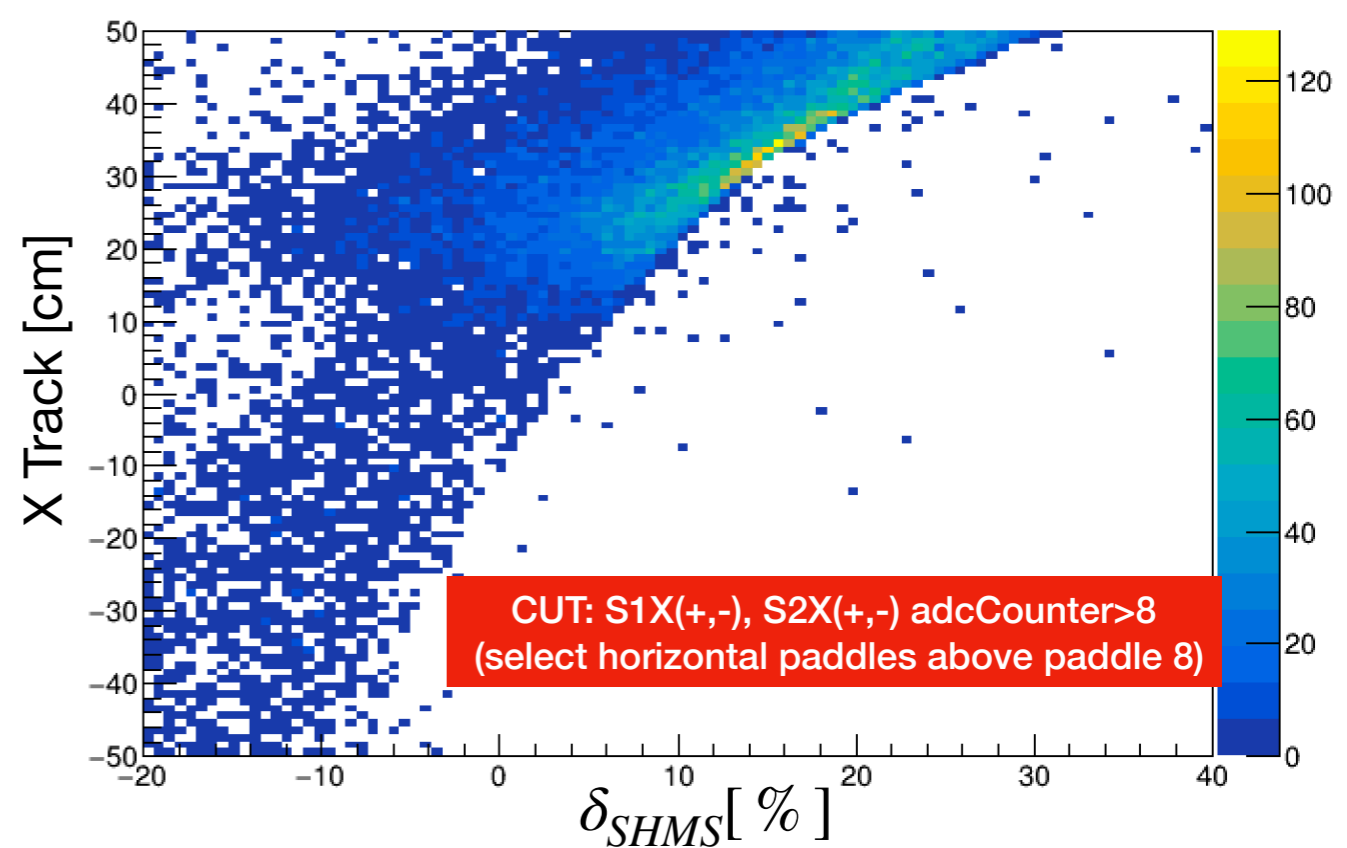
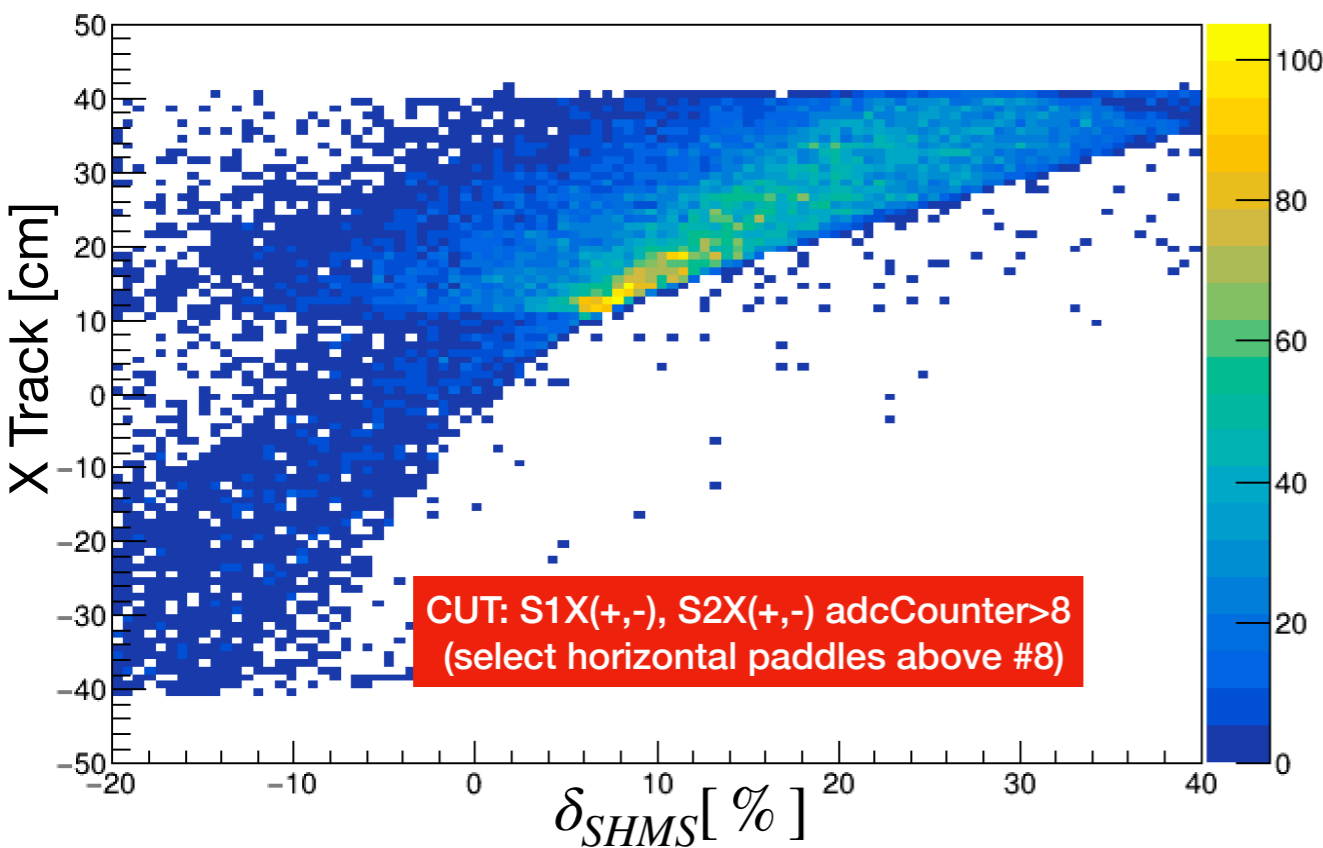


P.hod.2x.TrackXPos:P.gtr.dp



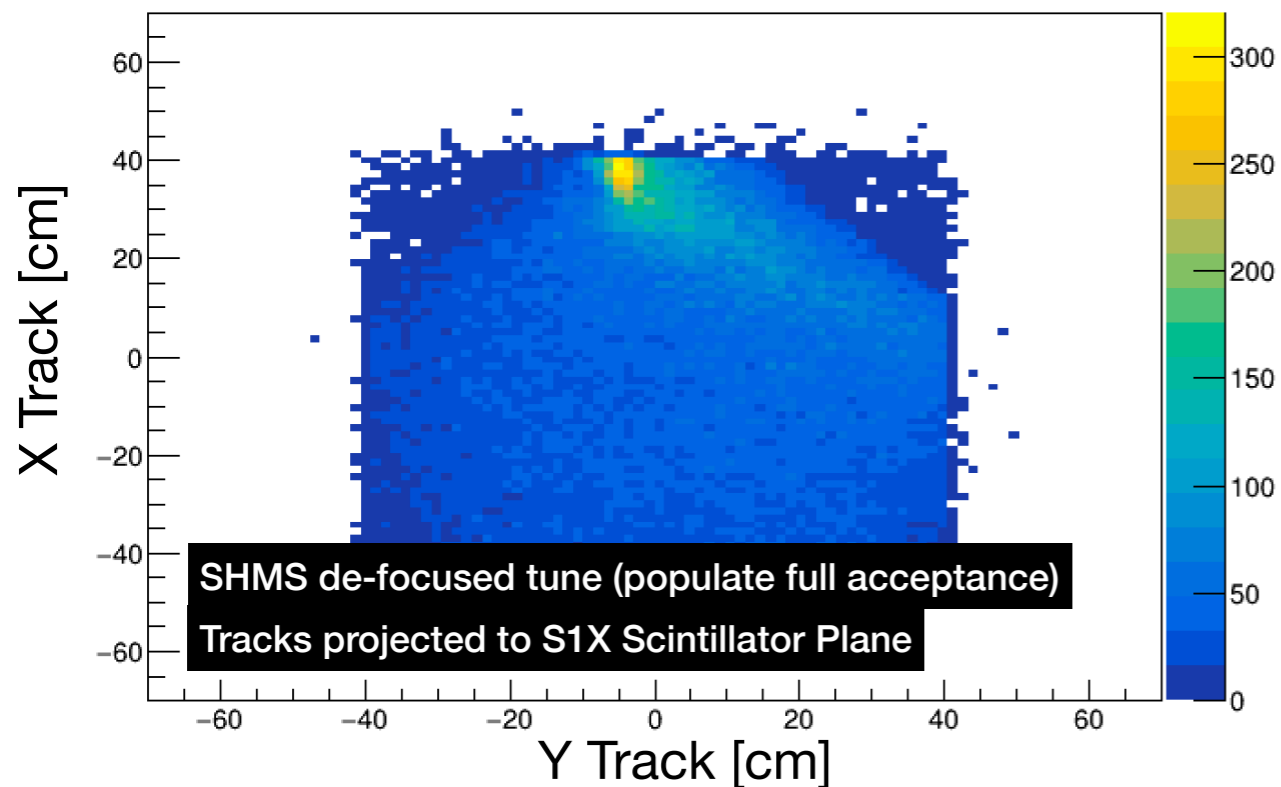
P.hod.1x.TrackXPos:P.gtr.dp (P.hod.1x.posAdcCounter>8&&P.hod.1x.negAdcCounter>8&&P.hod.2x.posAdcCounter>8&&P.hod.2x.negAdcCounter>8)

P.hod.2x.TrackXPos:P.gtr.dp (P.hod.1x.posAdcCounter>8&&P.hod.1x.negAdcCounter>8&&P.hod.2x.posAdcCounter>8&&P.hod.2x.negAdcCounter>8)



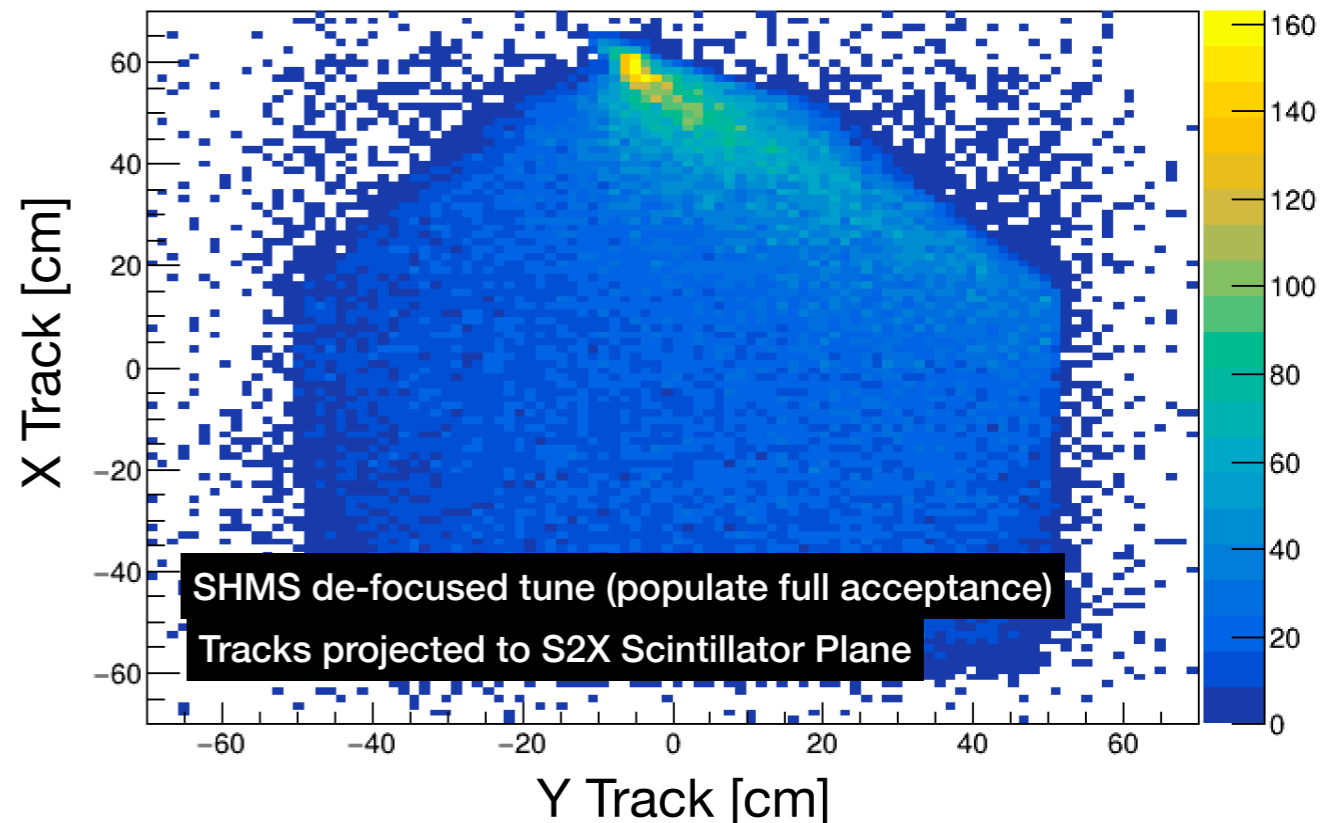
- SHMS reconstructed X-tracks projected to scintillator planes S1X and S2X versus momentum acceptance
- adcCounter >8 was applied to select S1X,S2X paddles in the lower half of the acceptance (+5, +20)%

P.hod.1x.TrackXPos:P.hod.1x.TrackYPos

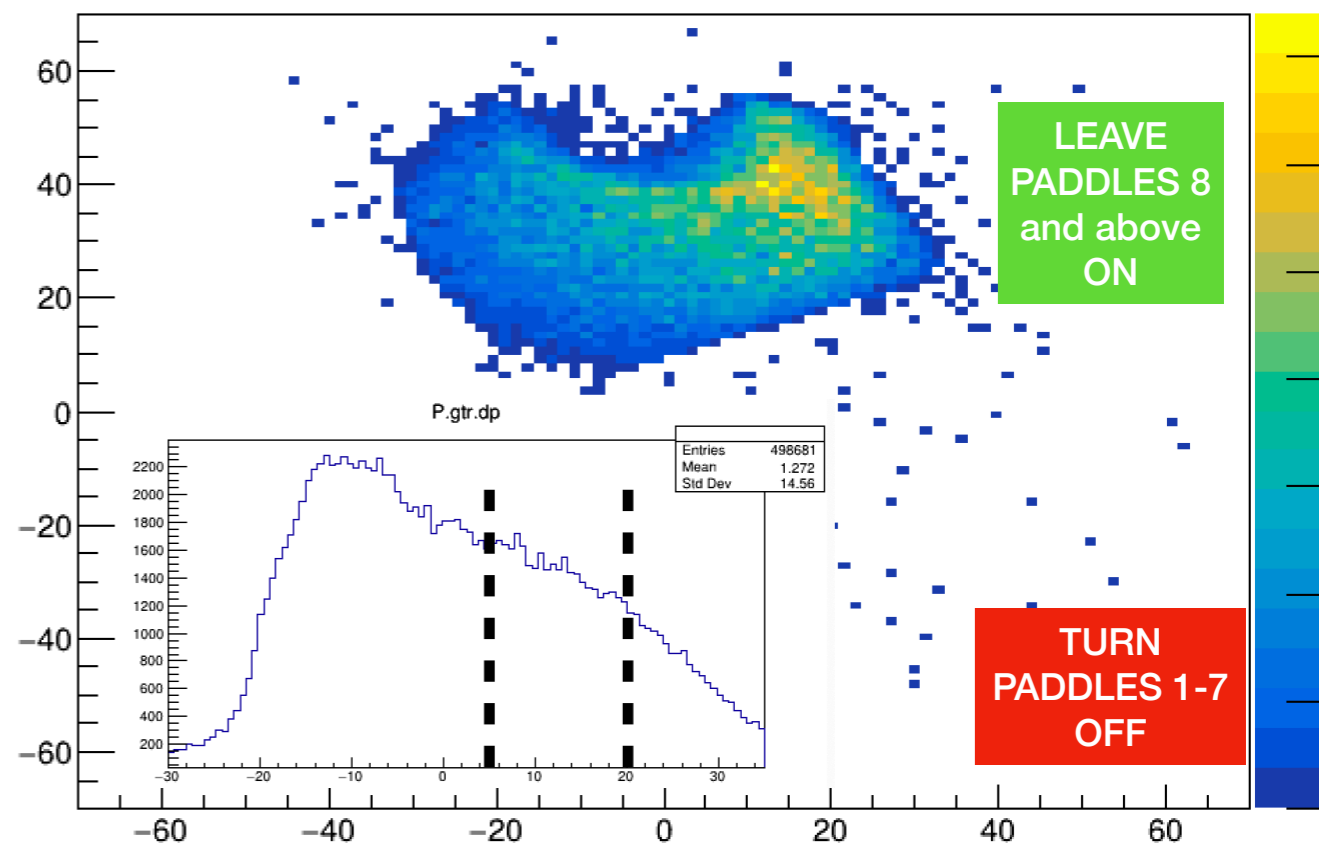
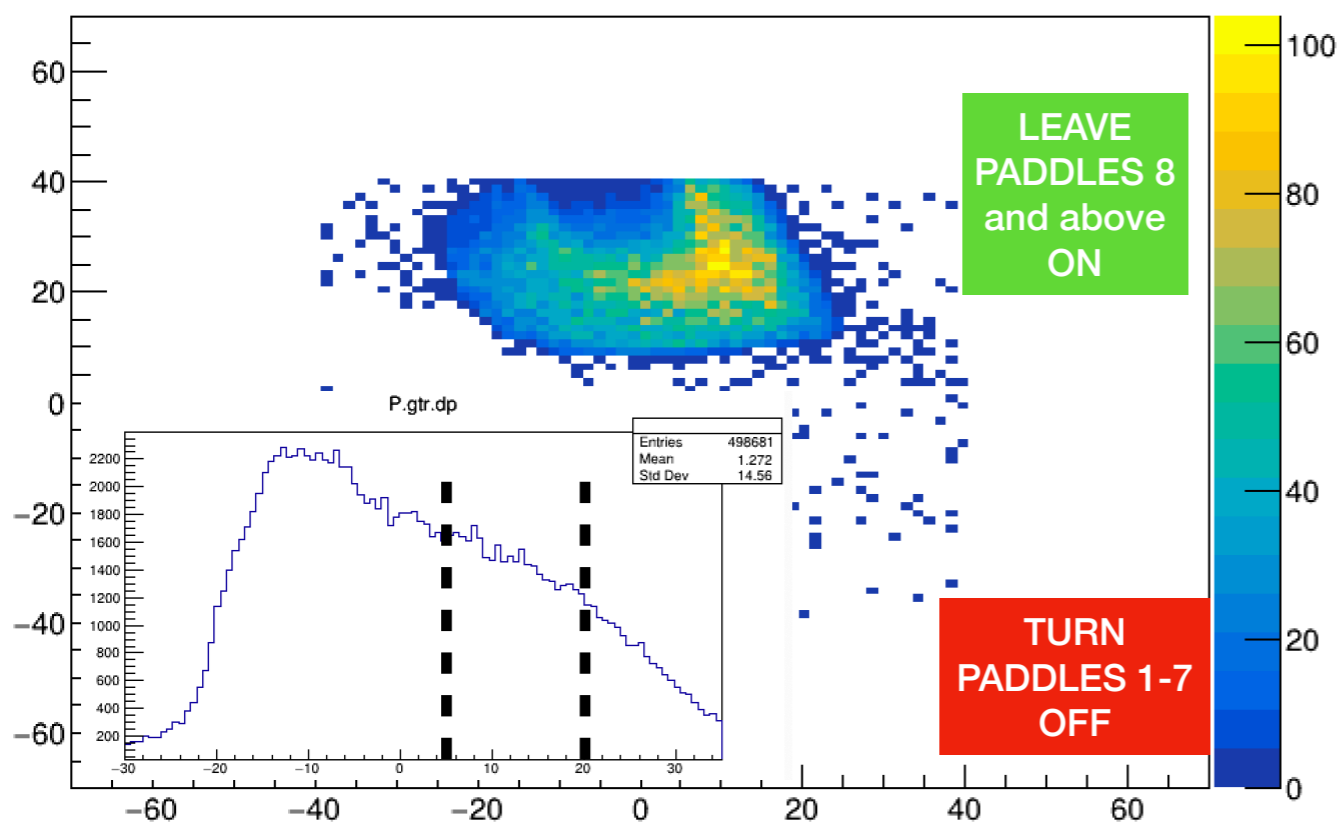


P.hod.1x.TrackXPos:P.hod.1x.TrackYPos {P.gtr.dp>5&&P.gtr.dp<20}

P.hod.2x.TrackXPos:P.hod.2x.TrackYPos



P.hod.2x.TrackXPos:P.hod.2x.TrackYPos {P.gtr.dp>5&&P.gtr.dp<20}



- SHMS reconstructed tracks projected to scintillator planes S1X and S2X
- SHMS momentum acceptance cut corresponding to CaFe acceptance of (+5, +20)% applied