Effect of SCE on TPC – Beam Matching

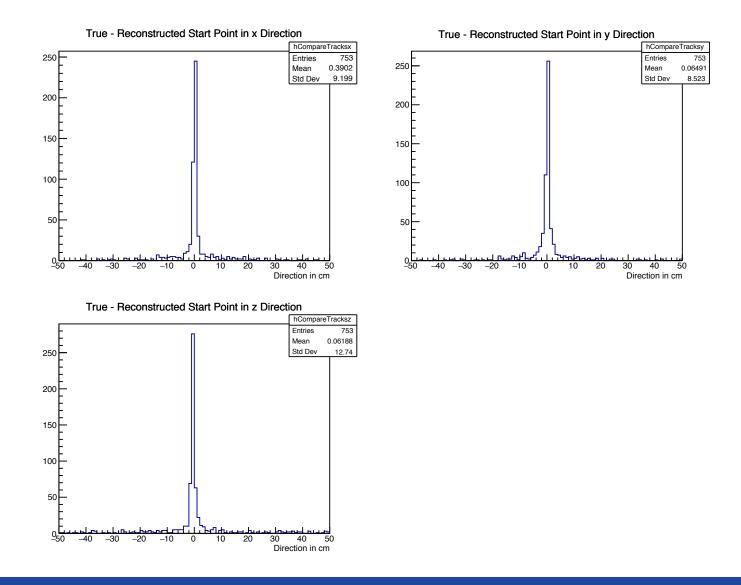
Leigh Whitehead for Jesal Mandalia DRA Meeting 20/07/17



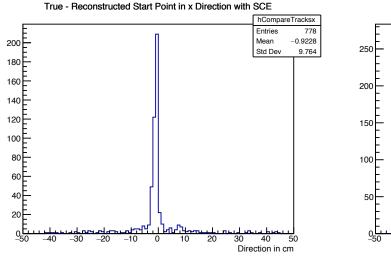
Introduction

- Our summer student Jesal has begun looking into how the space charge effect will affect the matching between the TPC and the beam
- For now, she has looked at MCC9, +3 GeV files
- Consider those tracks with a vertex position within a 1 m³ around the expected beam spot position
- Look at true-reco for the track vertex position and direction

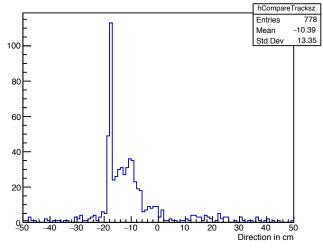
Track Vertex – No SCE

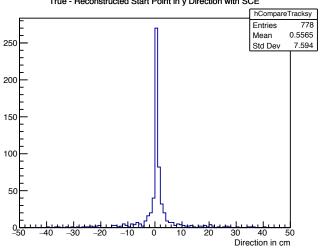


Track Vertex – SCE



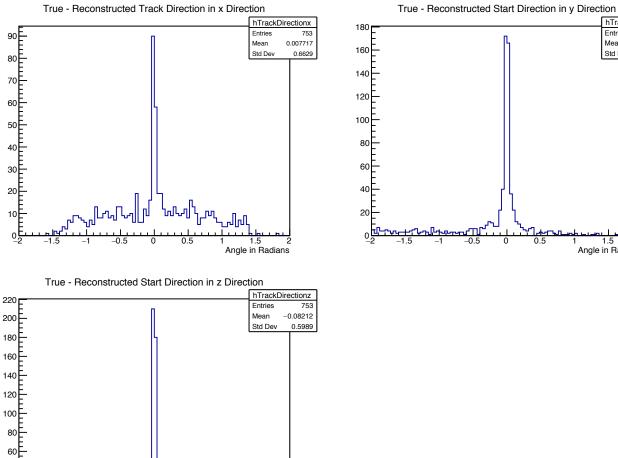
True - Reconstructed Start Point in z Direction with SCE





True - Reconstructed Start Point in y Direction with SCE

Track Vertex Direction – No SCE



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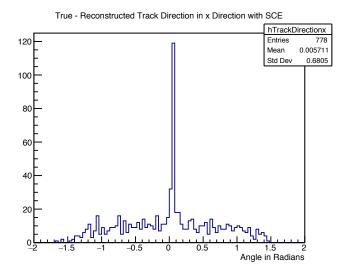
hTrackDirectiony Entries 753 Mean -0.1894 Std Dev 0.5881 0.5 1.5 Angle in Radians

2

1.5

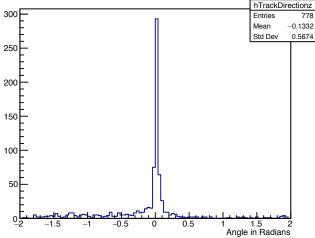
Angle in Radians

Track Vertex Direction – SCE



True - Reconstructed Start Direction in y Direction with SCE hTrackDirectiony Entries 778 160 Mean -0.2147 Std Dev 0.6573 140 120 100 80 60 40 20 05 -0.5 0 0.5 1.5 Angle in Radians

True - Reconstructed Start Direction in z Direction with SCE



Next Steps

- Jesal has begun extrapolating the reconstructed tracks back to the true production point (the start of the beam window)
- This acts as a proxy of matching back to the beam monitor since that information currently isn't stored in LArSoft
- She will present this work next week