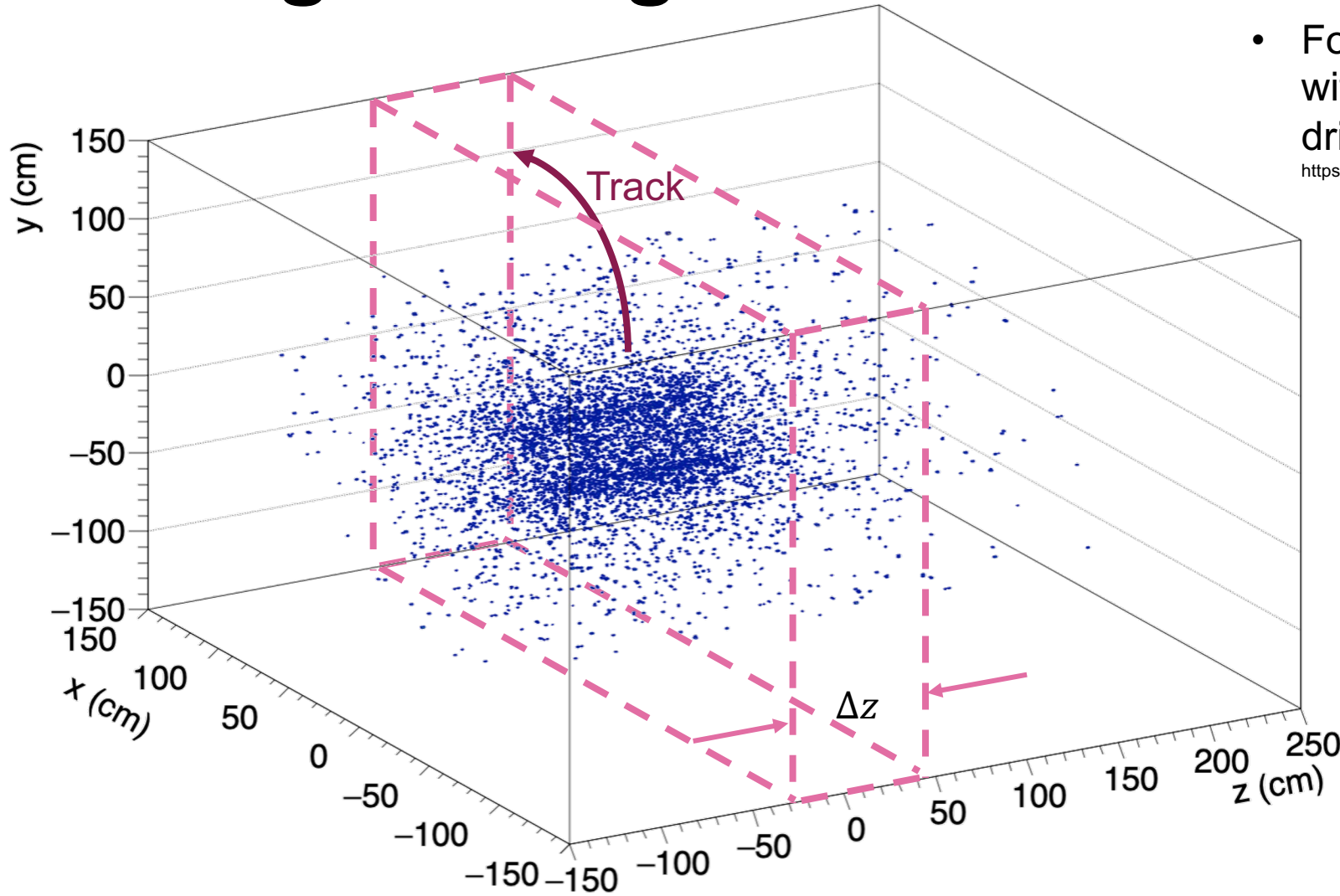


Updated Synchrotron Radiation Hit Distribution in the TPC

Cheuk-Ping Wong

04-21-2025

Slicing in Longitudinal Direction



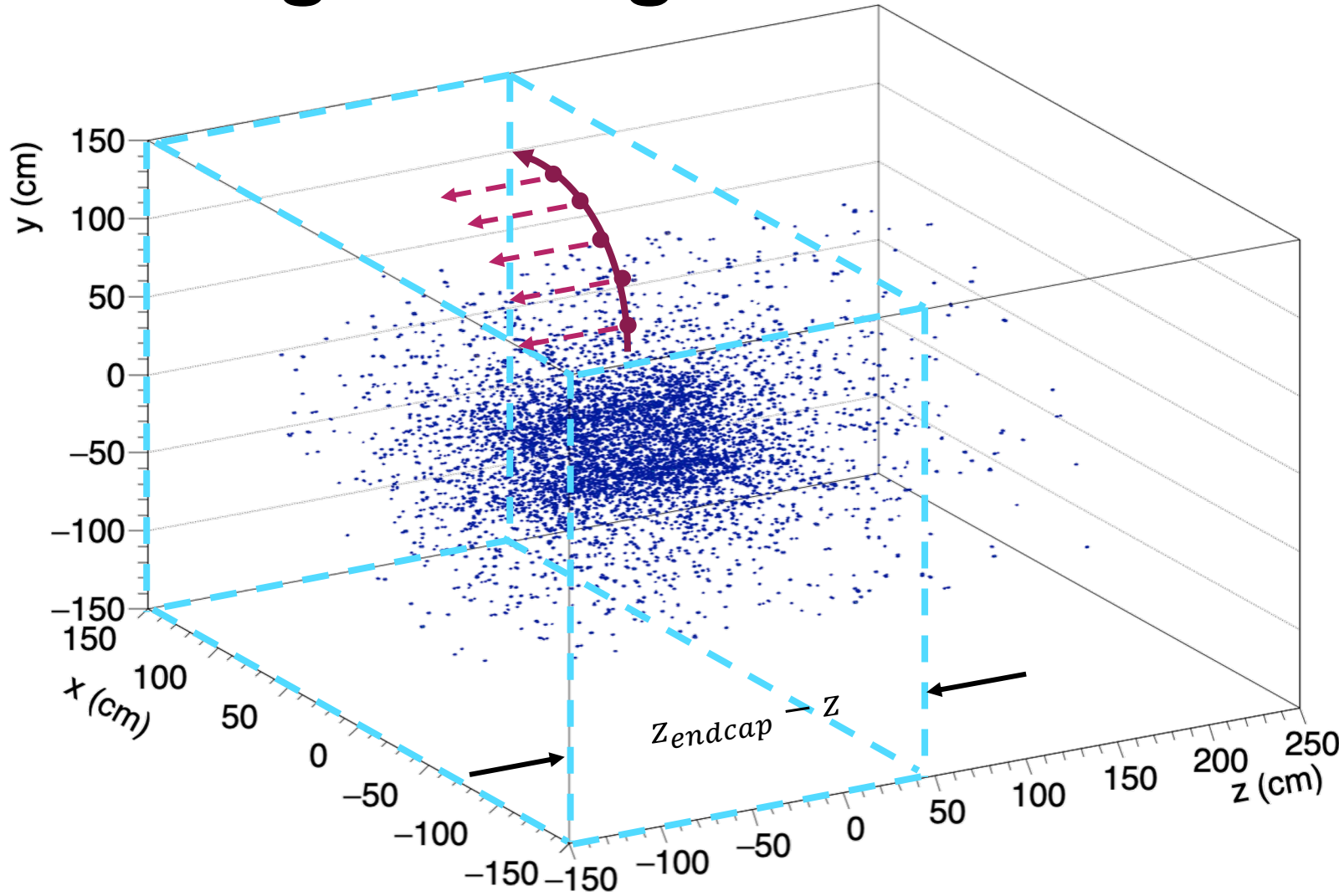
- For an Ar-CF₄-iC₄H₁₀ (95-3-2) mixture, with a drift field (E_d) of 500 V/cm, the drift velocity v_d is about 74.5 $\mu\text{m/ns}$

https://tpc_gas.cfnssbu.physics.sunysb.edu/tpc_gas/HTML_Gases_Argon/split_data.html

- The drift distance Δz is written as $\Delta z = v_d \times \Delta t$

Δt	Δz
5 μs Silicon integration window	37.25 cm
10.2ns Branch crossing	0.76mm
12 μs Event rate	89.4cm

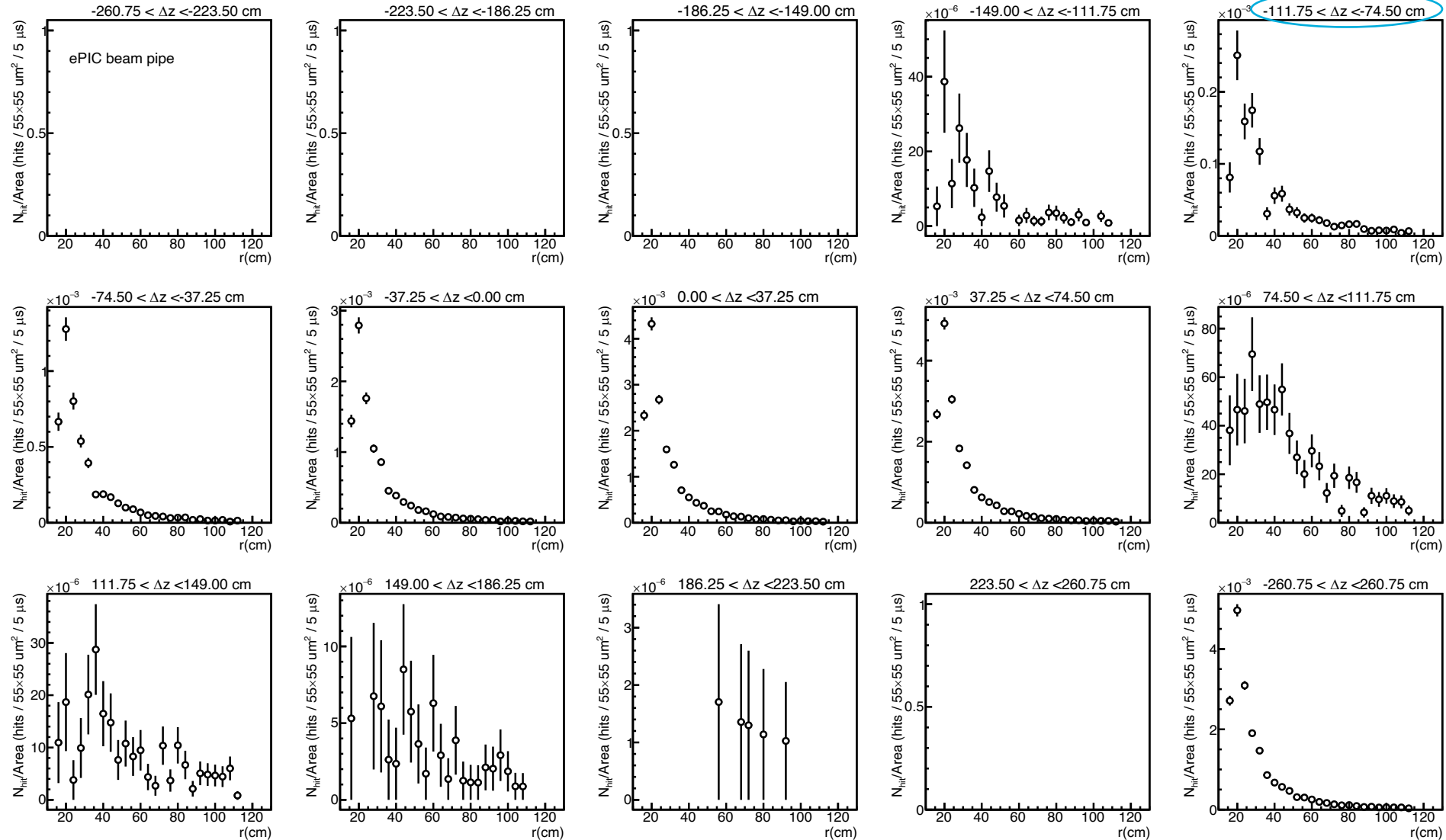
Slicing in Longitudinal Direction



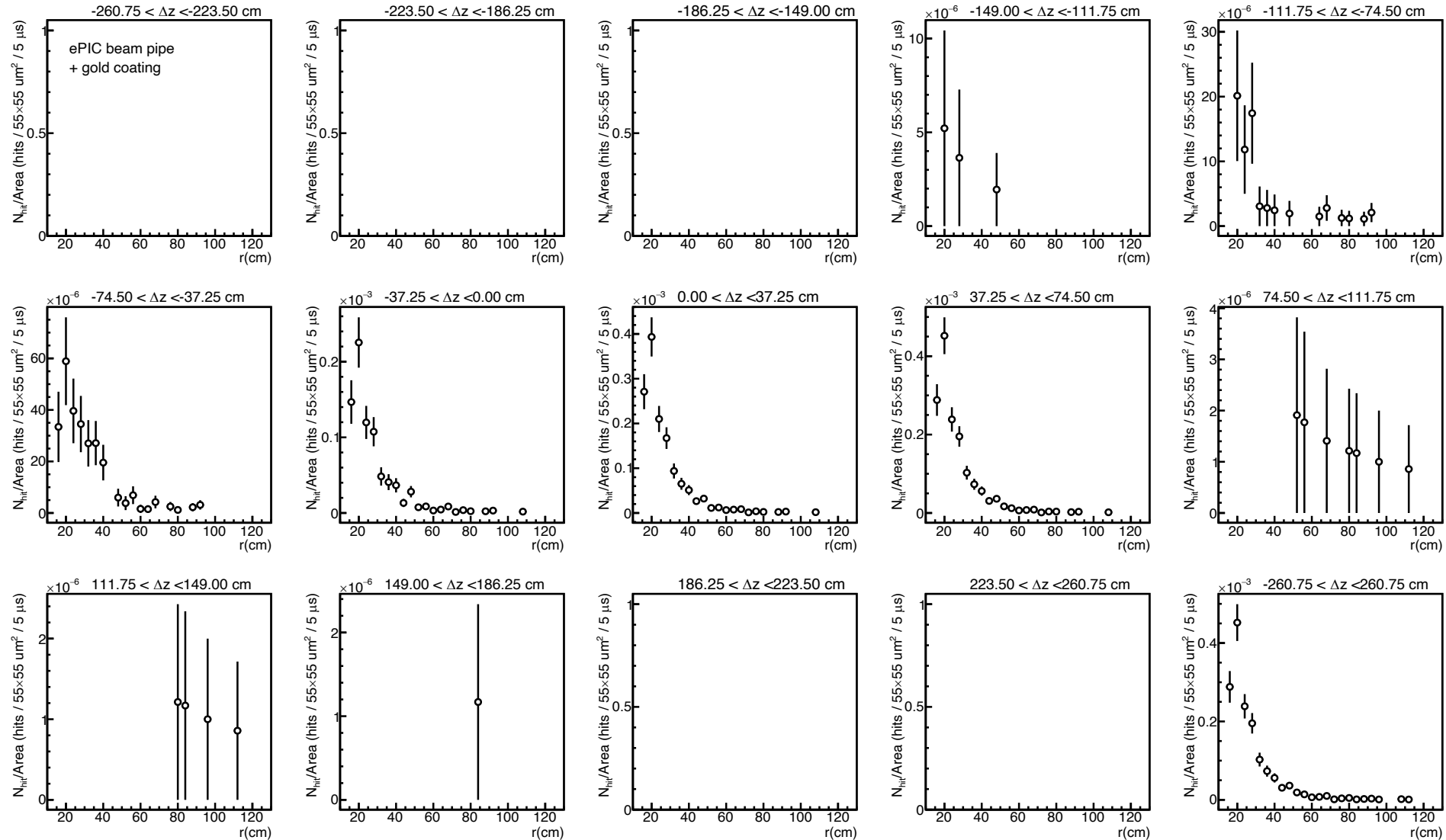
However, the amount of the SR background hits along the drift path of the track hits depends on the total drift distance that is from the endcap to the z position of the track hit

Hit Density (ePIC Beam Pipe)

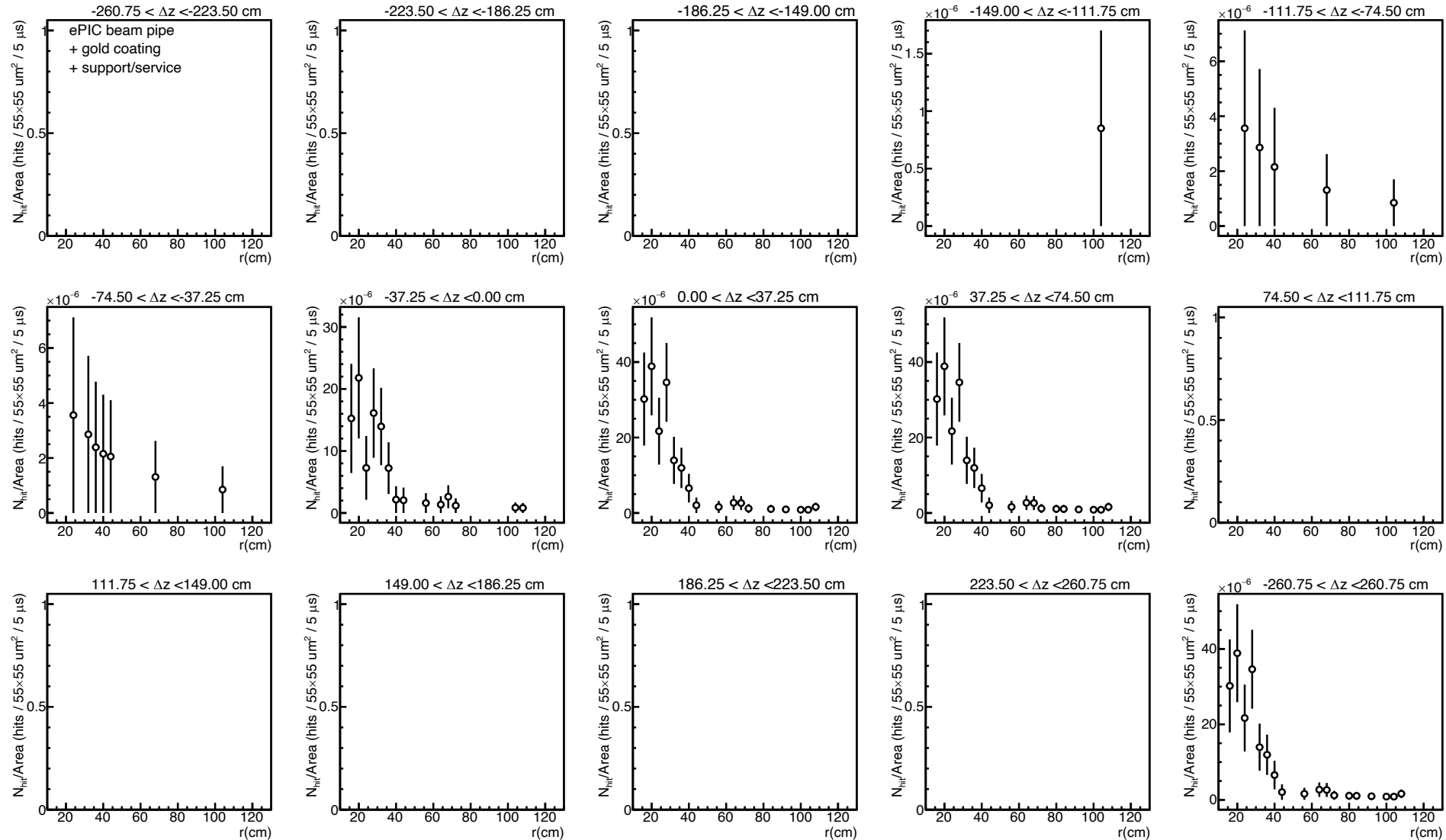
Track hits z window



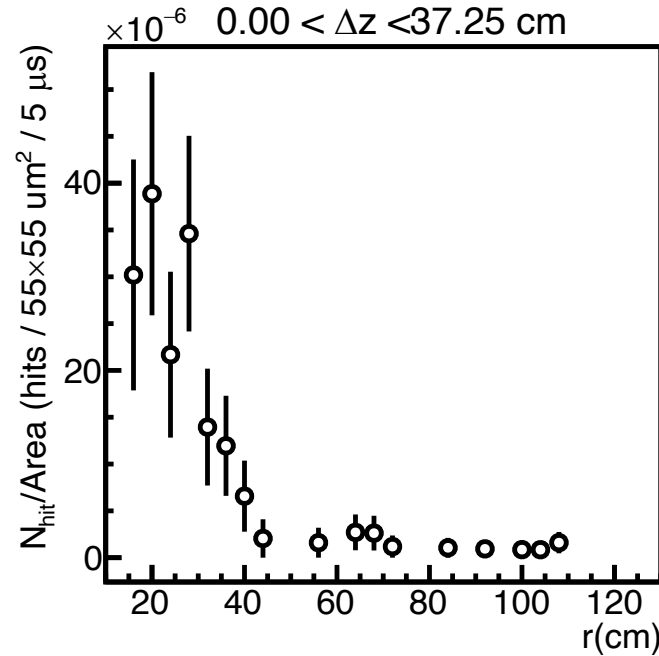
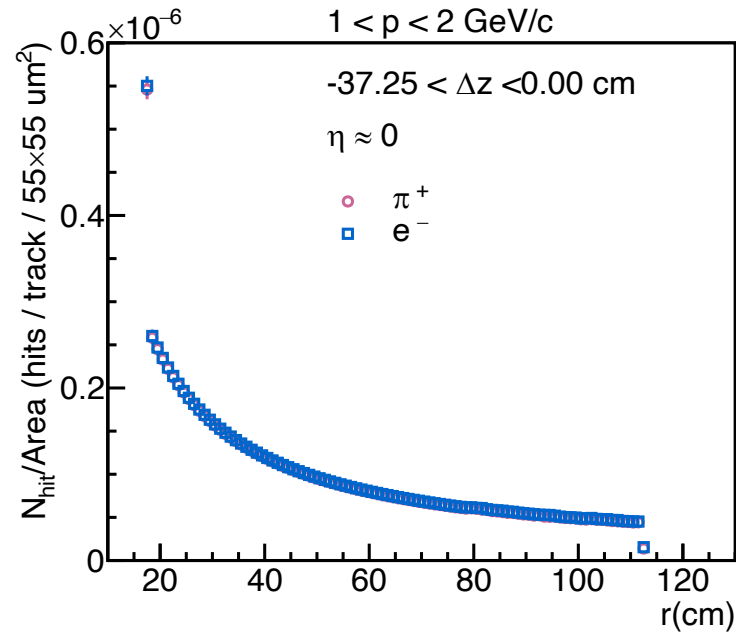
Hit Density (ePIC Beam Pipe+Gold Coating)



Hit Density (ePIC Pipe+Gold Coating+Service)



Single-Track Hit Density



The hit density of SR is 67 times higher than the single track at small r