TDIS proton detector
tracking geometry

Bogdan Wojtsekhowski, JLab
TDIS with RTPC

Electron arm – SuperBigbite

Solenoid

Target

Beam

B. Wojtsekhowski

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TDIS with RTPC

Proton Rates in the RTPC  \( L = 2.9 \times 10^{36} \)

\(^2\text{H}: 30 < \theta_p < 70 \text{ deg.} \)

\(^2\text{H}: 100 < \theta_p < 140 \text{ deg.} \)

\(^3\text{H}: 30 < \theta_p < 70 \text{ deg.} \)
In TDIS proton detector the radial drift distance is tripled -

10 cm -> 15 us time

At projected H2 luminosity rate is high:

15x170 tracks per event
1) Magnetic and electrical fields are parallel
2) Readout is divided to the 10 planes
TDIS MRI for mTPC
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$p_{\perp}$ reconstructed from fit: 2.5% off the actual value
Track reconstruction in mTPC

Most of the tracks have crossing the HV&GEM planes

Max drift time

HV plane

GEM plane
Track reconstruction in mTPC

Max drift time

Many tracks for 150 MeV/c proton without single crossing of the HV&GEM planes

Such type tracks have very large uncertainty in Z and T
New consideration for mTPC

Max drift time

Many tracks for 150 MeV/c proton without crossing the HV&GEM planes

Minimum radial pixel varies with Z

Conical shape of the inner electrode removes Z-independence of the track pattern

Projected accuracy for Z is about 5 mm, for the time full modeling is needed.