# VDC RESOLUTION CHECK

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with Longwu, Yang, Barak

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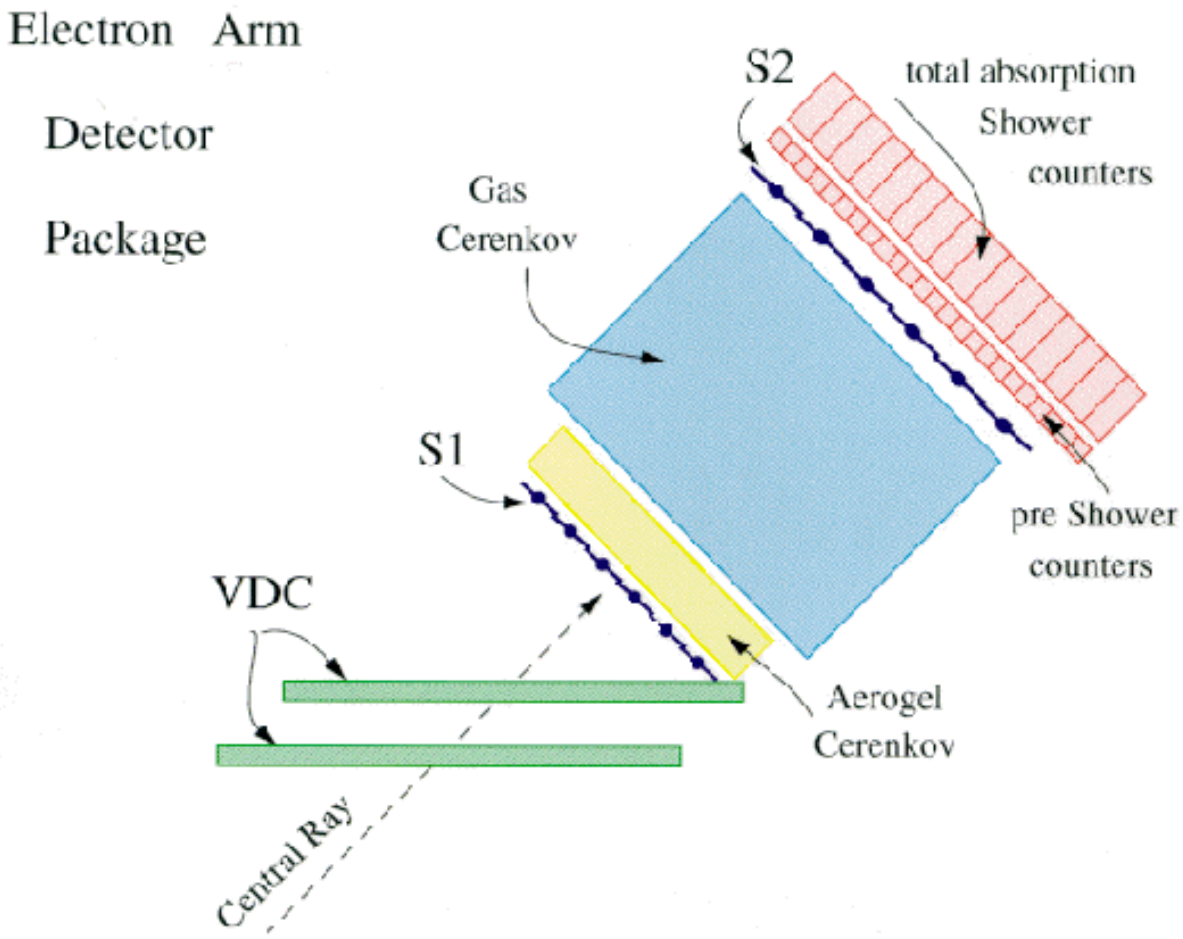
# Hall A VDC (left arm)




http://hallaweb.jlab.org/equipment/detectors/det_electrons.html

# Hall A VDC single plane

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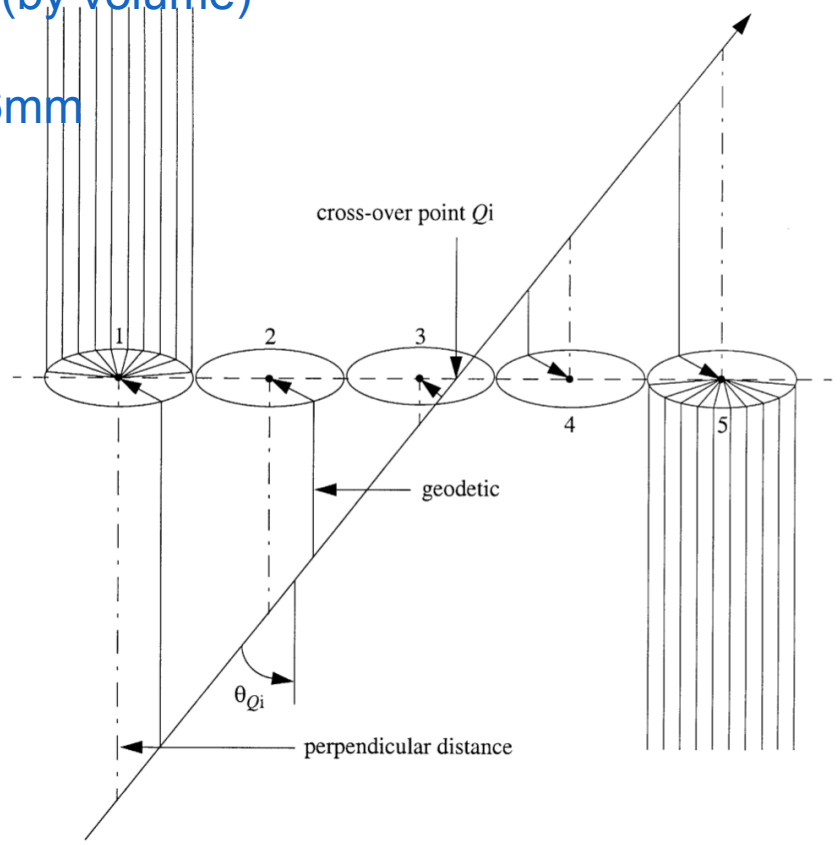
VDC gas: 50-50 Argon-Ethane (by volume)
VDC HV: -3.5 kV
VDC single plane thickness: 26mm




- 3 – 7 wires are fired
- TDC records drift time
- Convert drift time to drift distance (provided drift velocity)
- Fit drift distance to find cross-over point

# Hall A VDC

4 cross points -> reconstruct the track

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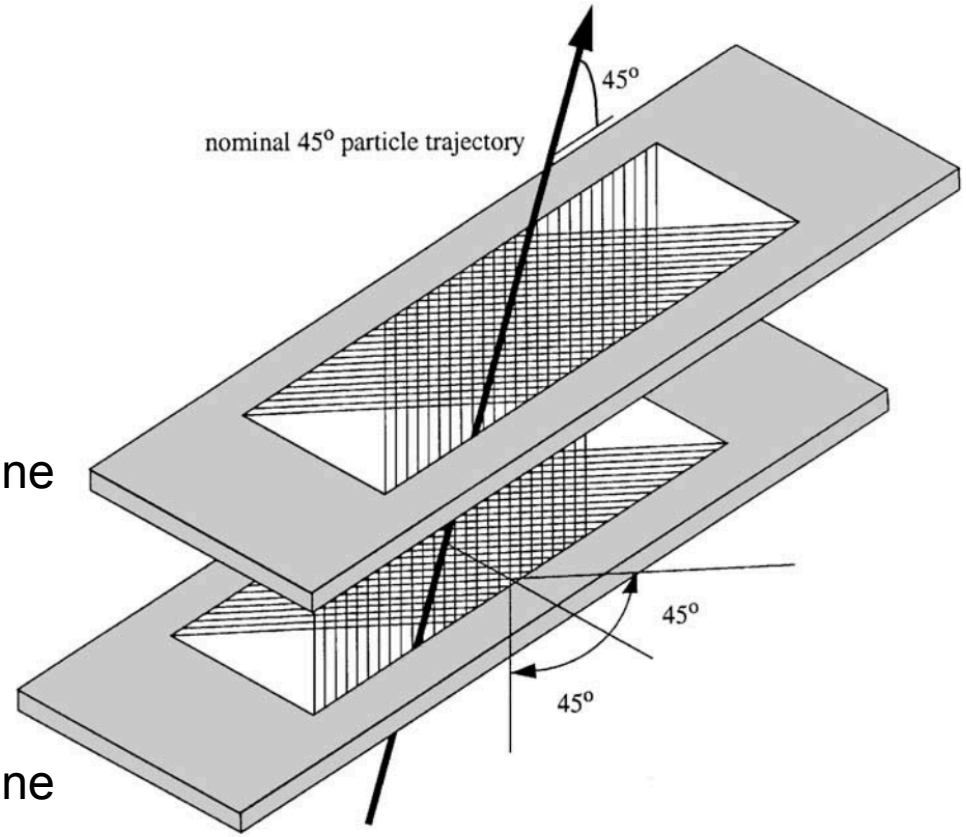


U2, V2 plane

U1, V1 plane

# Run Info

- Run #: 811
- Type: production, Ar target
- Kinematics: left=1.716 GeV/c, 20 degree (K2)
- Events: 1538 k
- Rates(T3): 22.7 Hz  (prescaler=1300)
- Cuts:
  - Trigger #3: (S0&&S2) && (GC||PR) [LEFT]
  - PID
  - acceptance

# VDC time resolution

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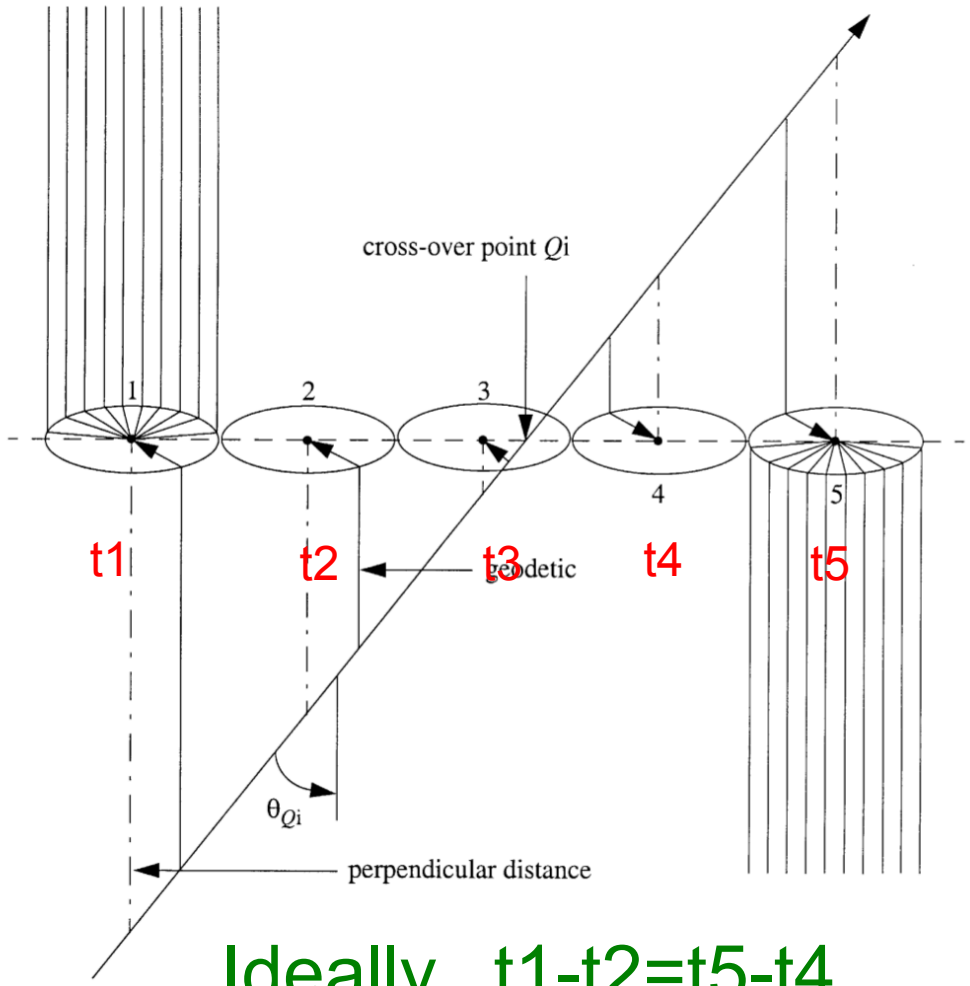
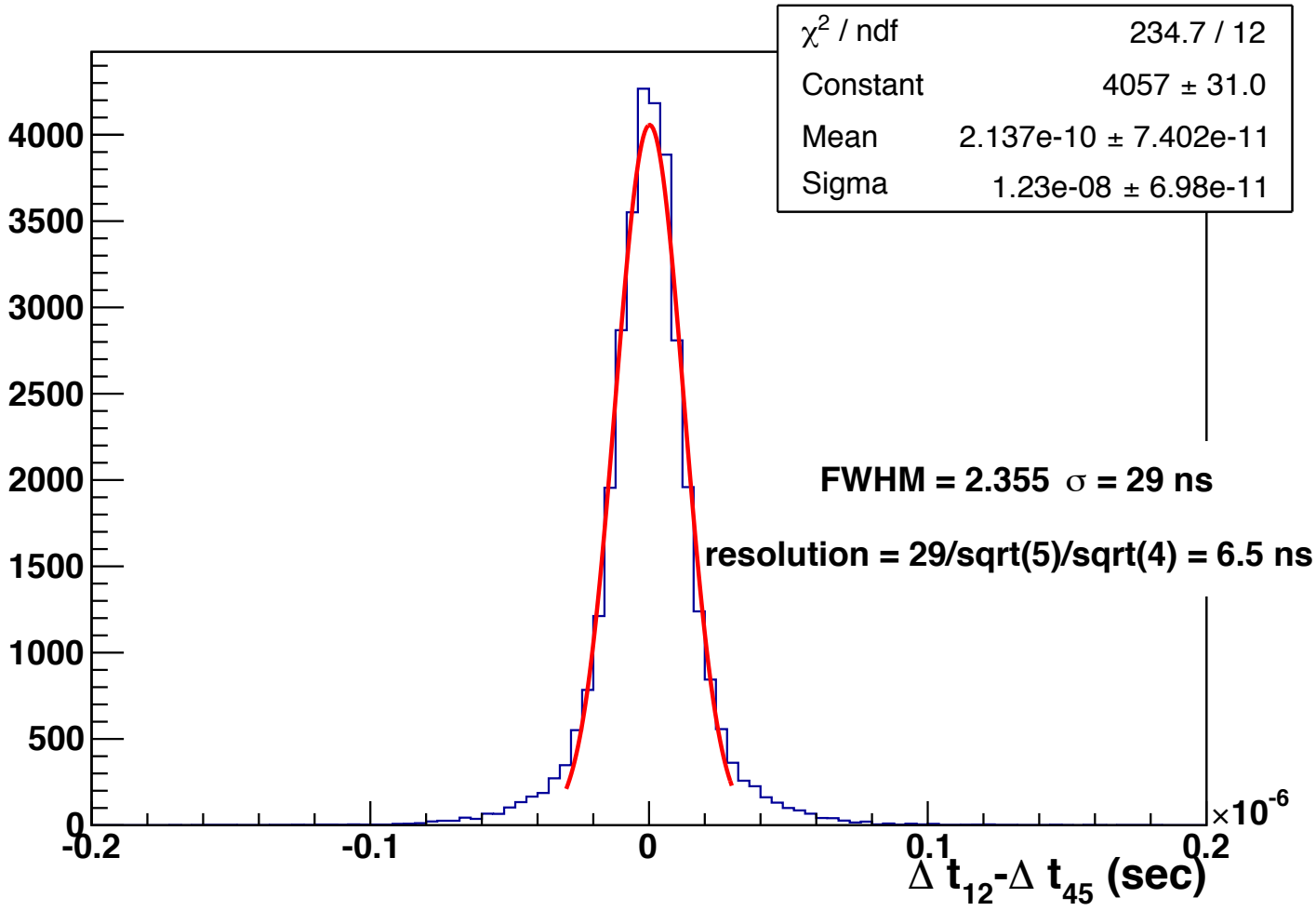



Drift time:

Ideally, t1-t2=t5-t4

# VDC Time Resolution

With 5-cell and one cluster events



# VDC Position Resolution

Residuals from fitted track

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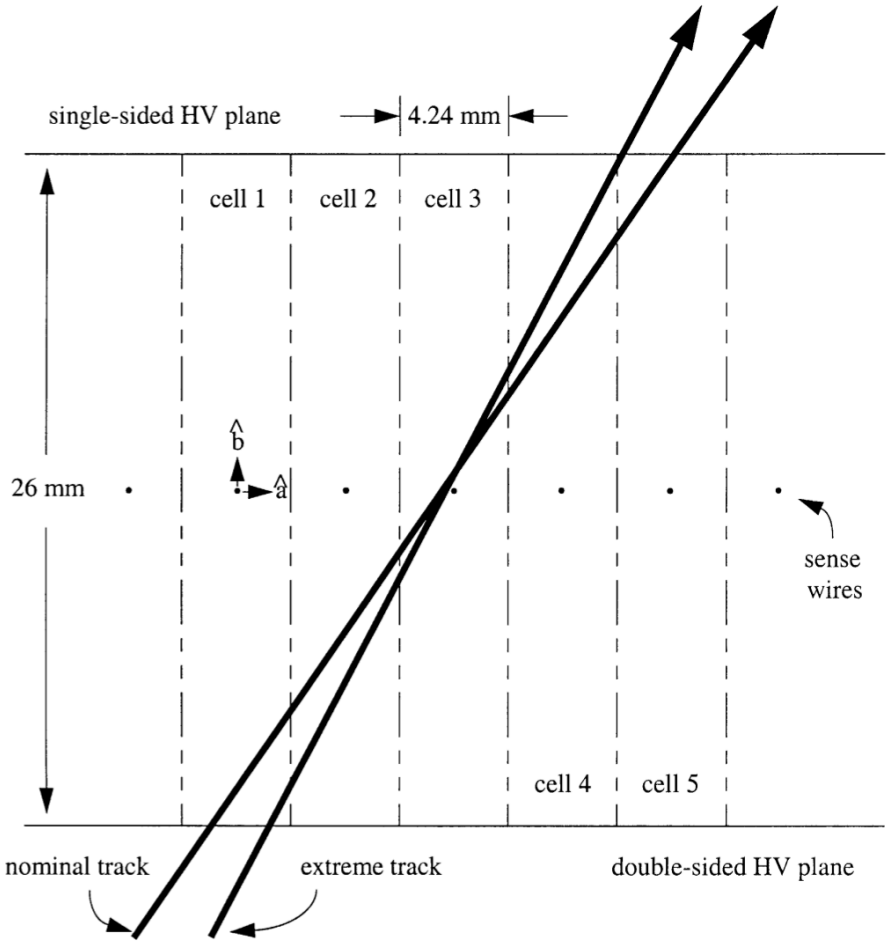
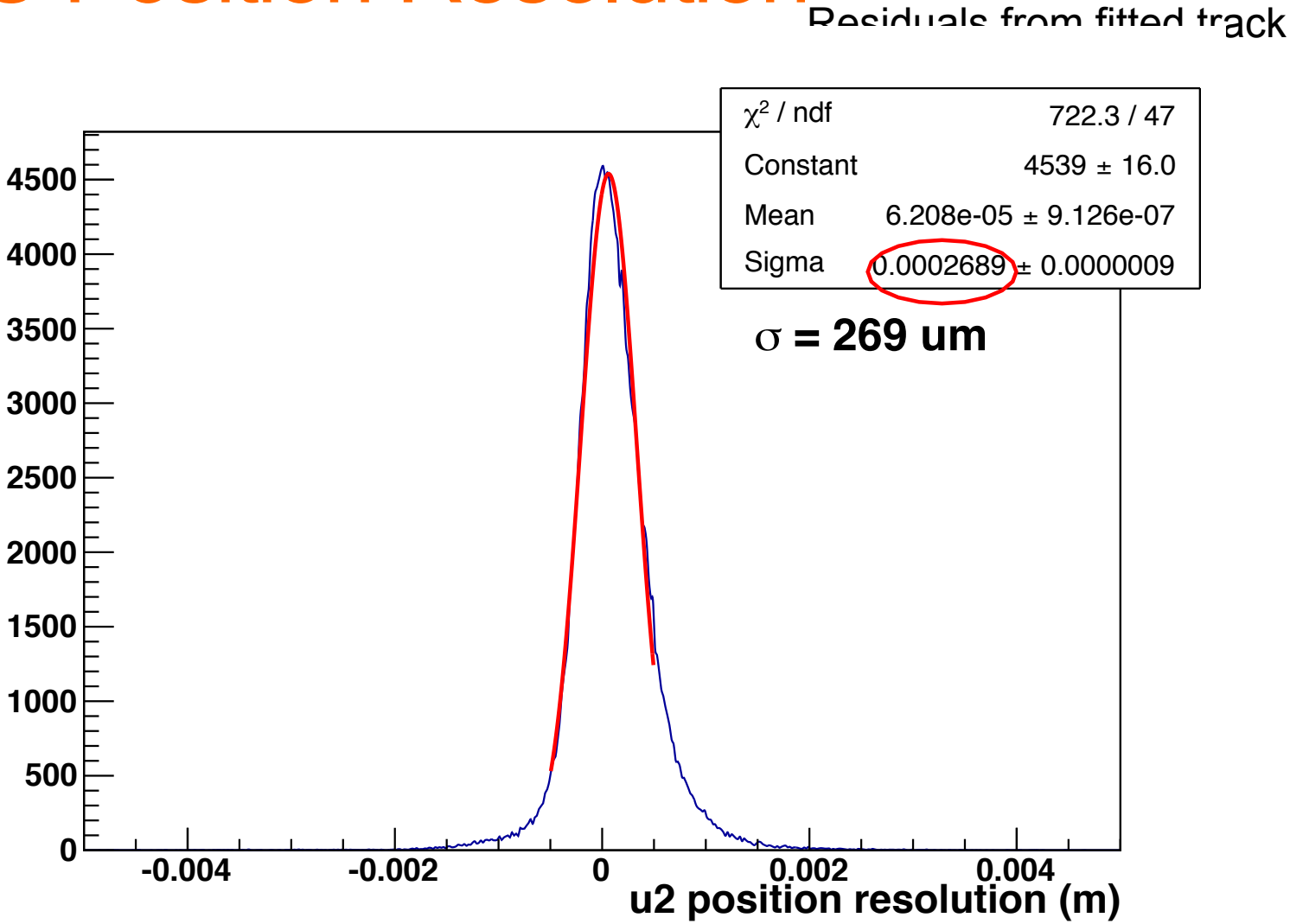
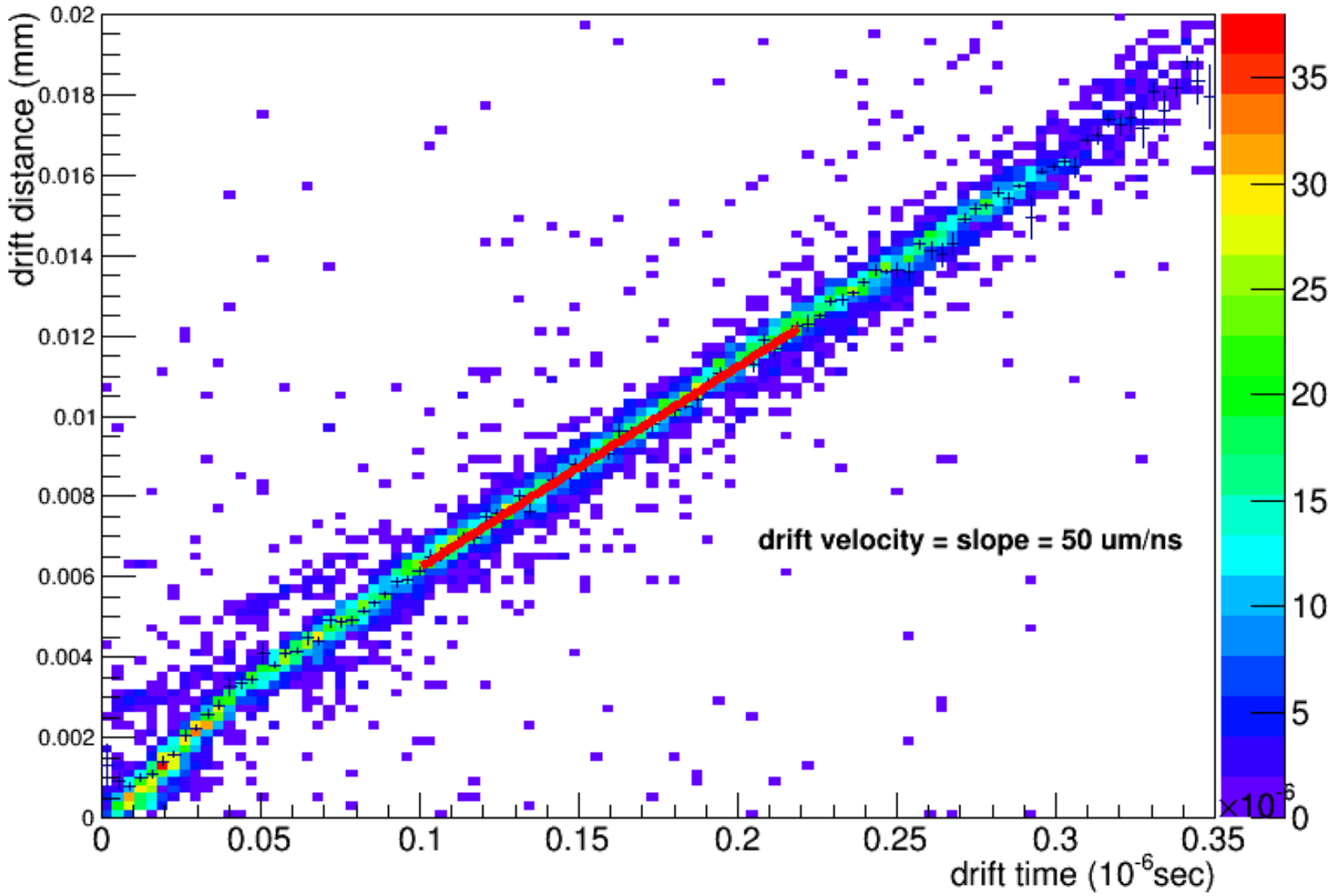


# VDC Position Resolution



# VDC Drift Velocity

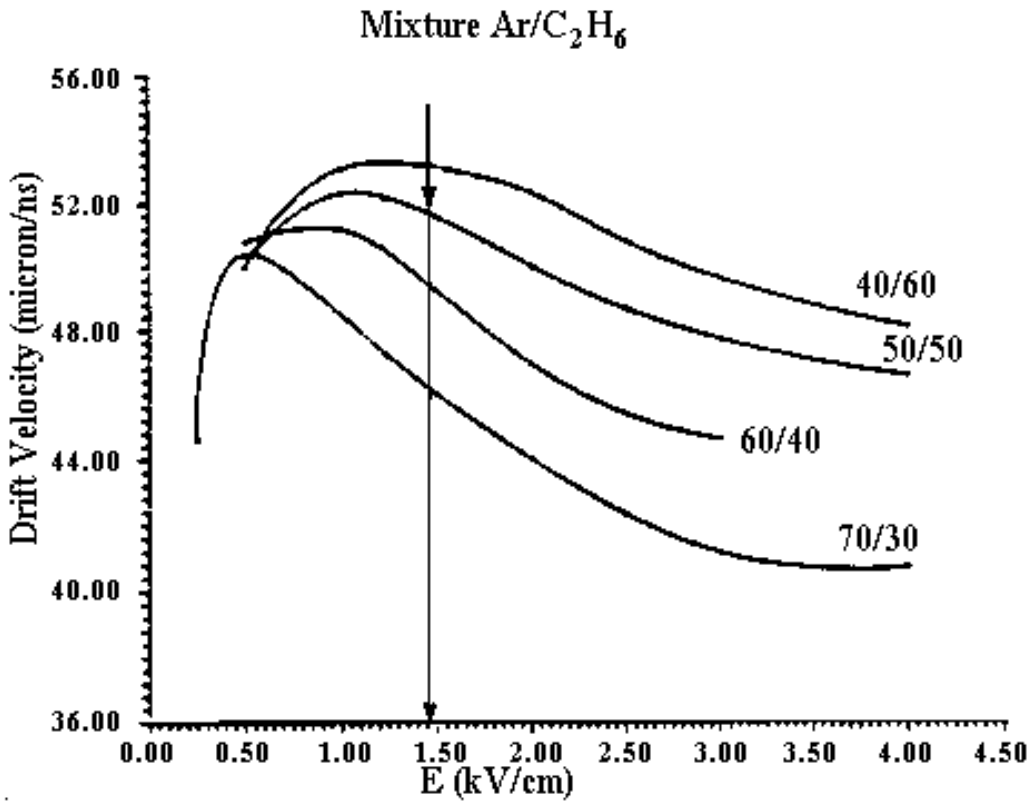


# VDC Drift Velocity

Electron drift velocity in 50/50 Ar/Ethane gas is:

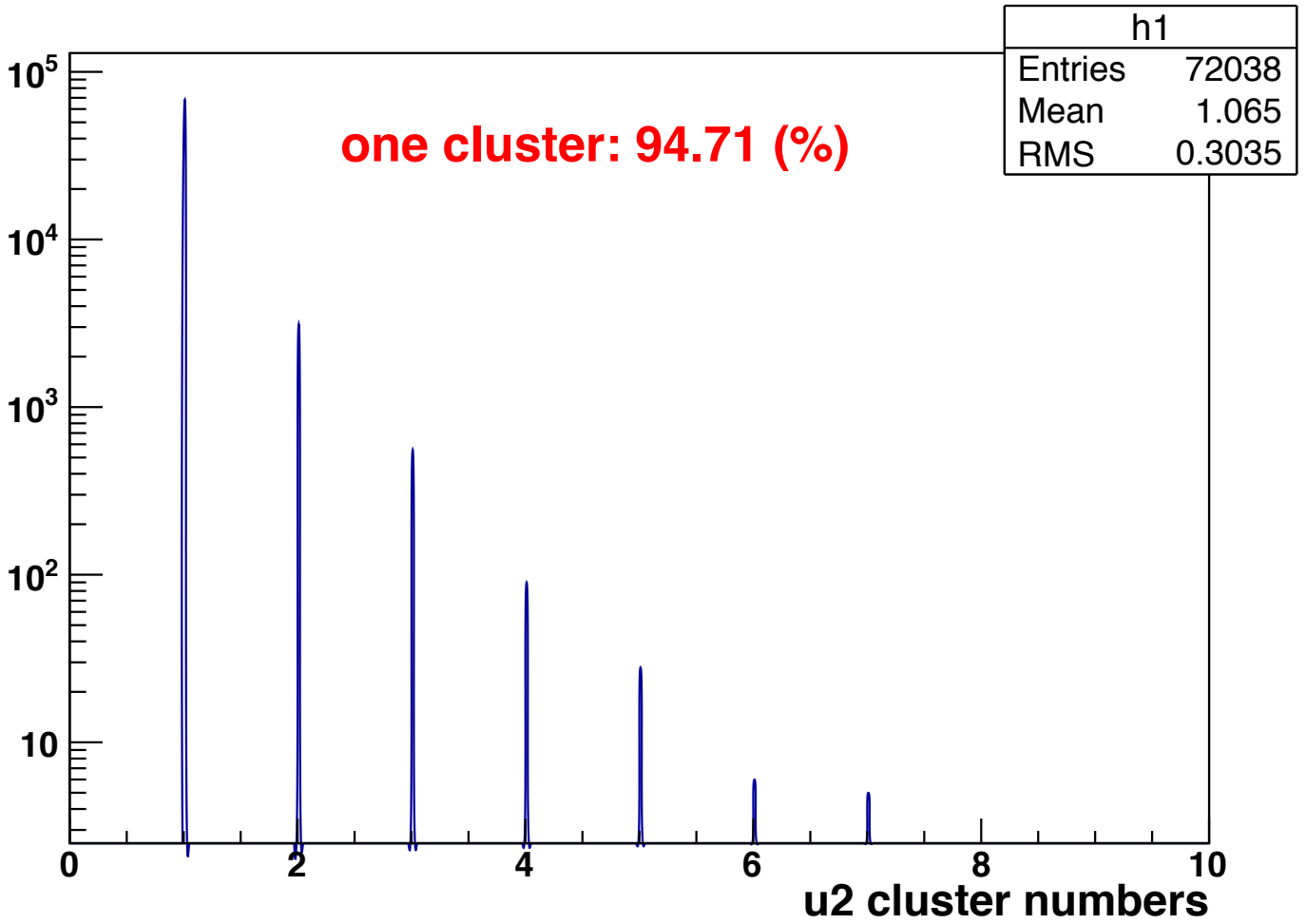
~ 50 um/ns @ 2. 69 kV/cm -> 3.5 kV/26mm*2

~ 49  um/ns @ 3.08 kV/cm -> 4.0 kV/26mm*2

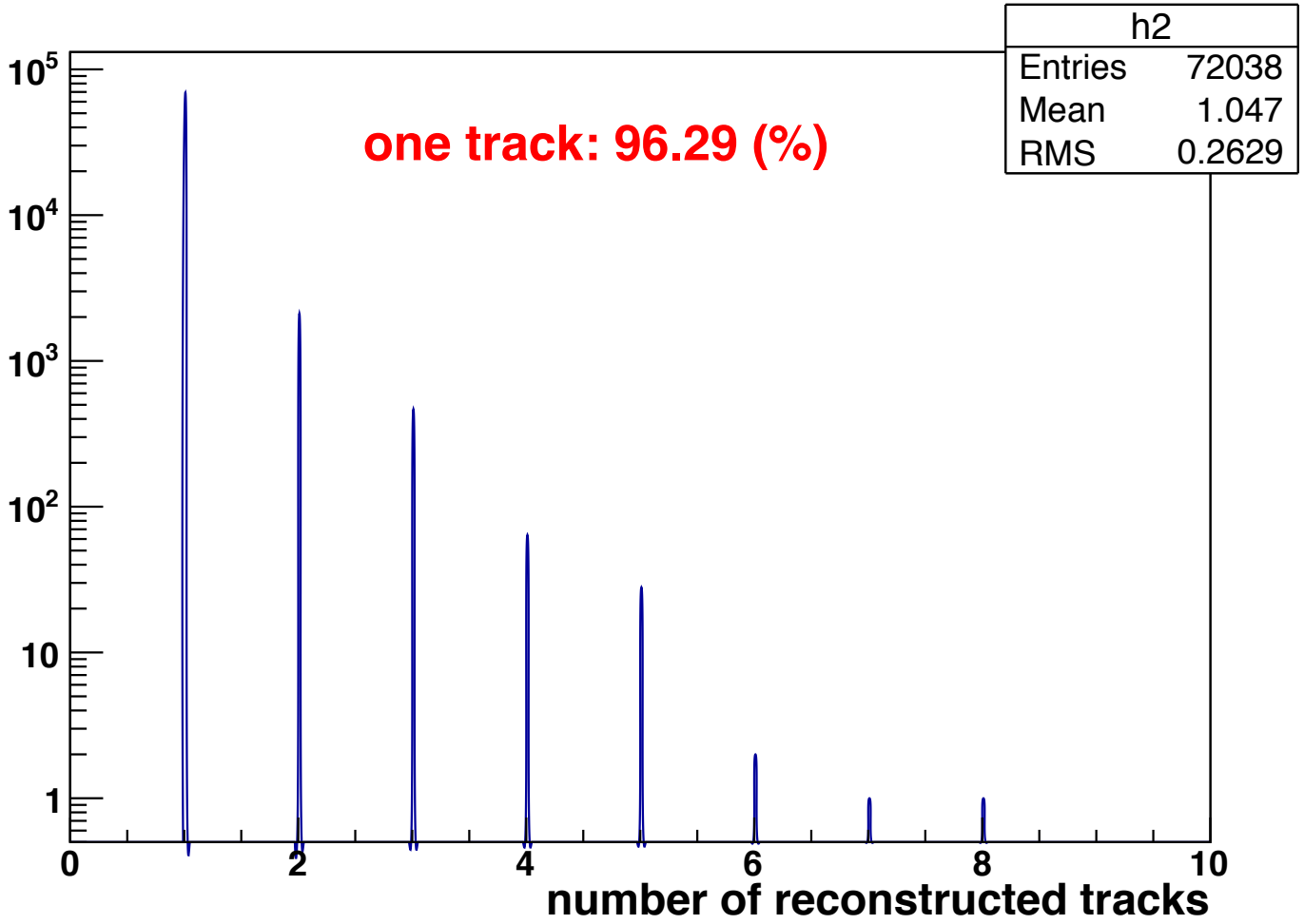



https://www.phenix.bnl.gov/WWW/tracking/dc/experts/Drift_Chamber__Principle_of_operation.html

# Tracking Efficiency



# Tracking Efficiency



*Thank you*