

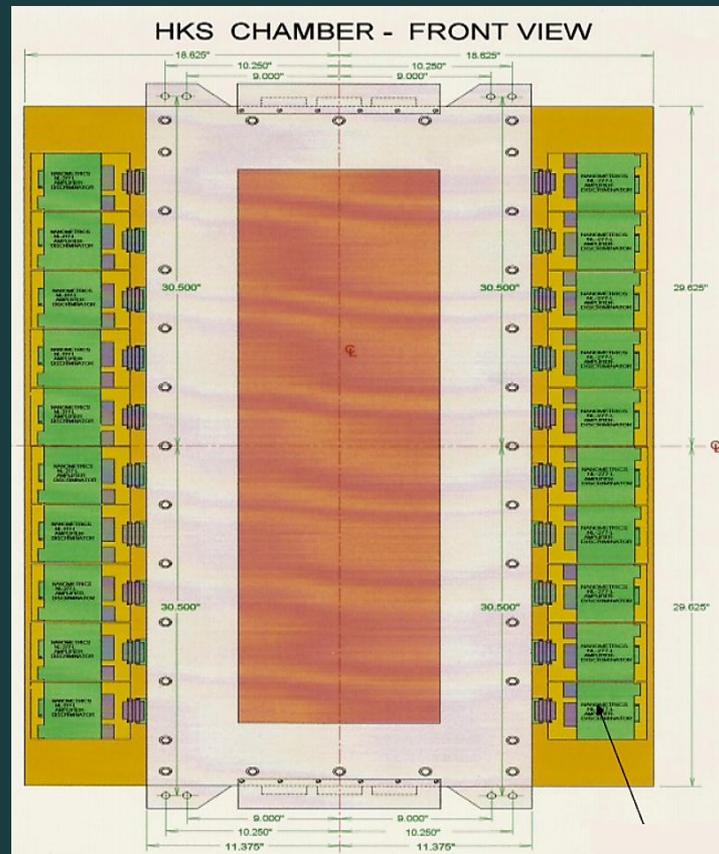
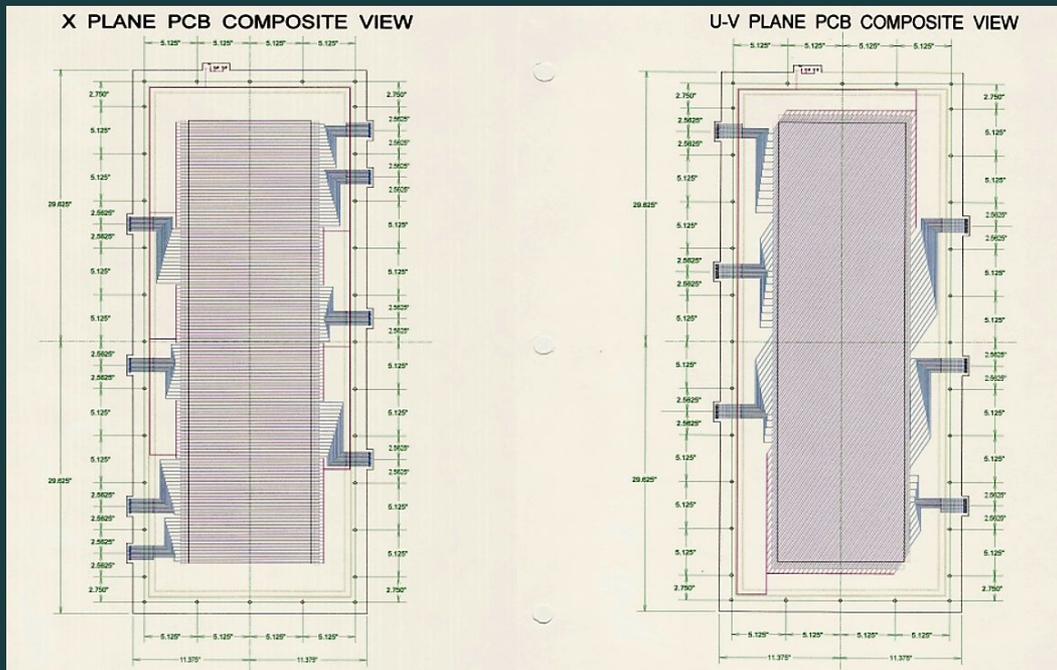
Commissioning Tests of HKS Detectors

—
Hypernuclear Collaboration Meeting

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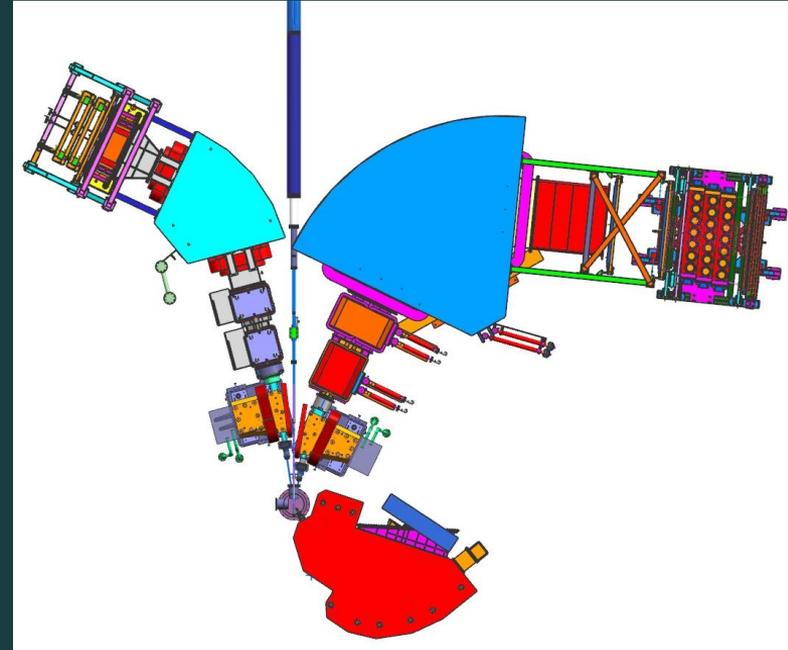
Chamber Geometry & Configuration

- 6 wire layers per chamber (X, X', U, U', V, V'), U/V at $\pm 30^\circ$
- 596 wires per chamber



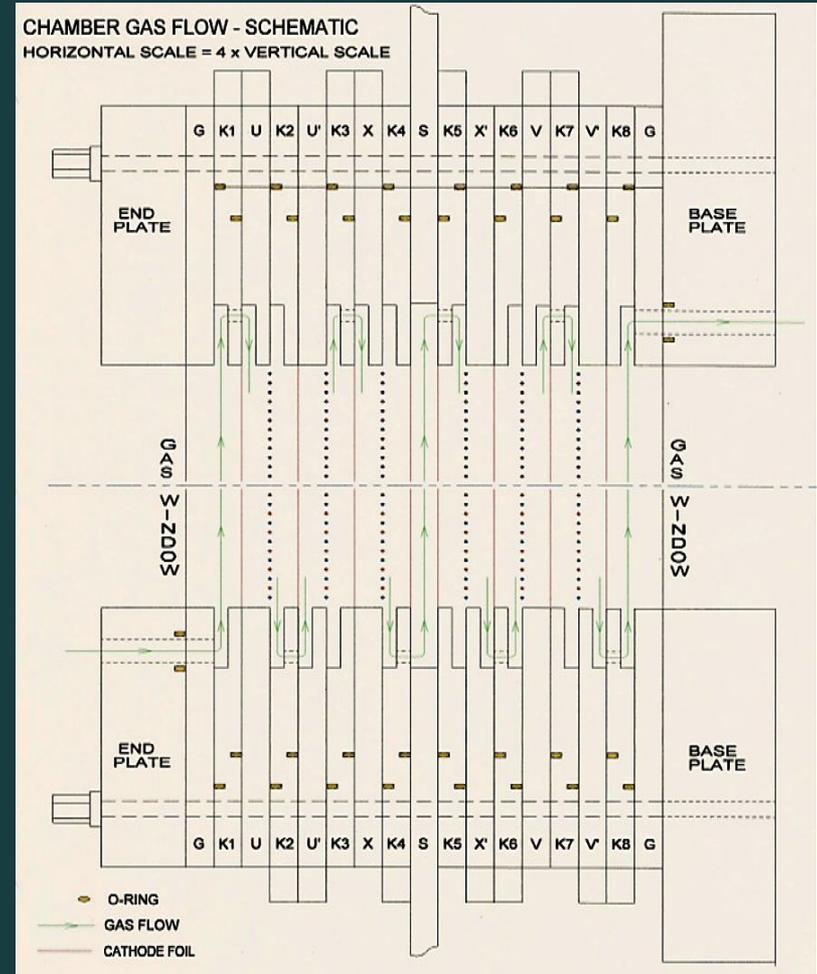
Purpose of Tests

- Commissioning of KDC 1, 2 and 3 (3 Identical Drift Chambers)
- HV plateau scans for all 6 layers per chamber (X, X', U, U', V, V'), U/V at $\pm 30^\circ$
- Full wire continuity & response checks (160 \times 4 channels per chamber)
- Determine safe and optimal operating HV



Gas Configuration

- Commissioning Gas
 - 75% Argon / 25% CO₂
 - Plateau scans performed with this gas
- Final Experimental Gas
 - Argon / Isobutane
 - HV will be re-optimized with final Ar/Ethane gas



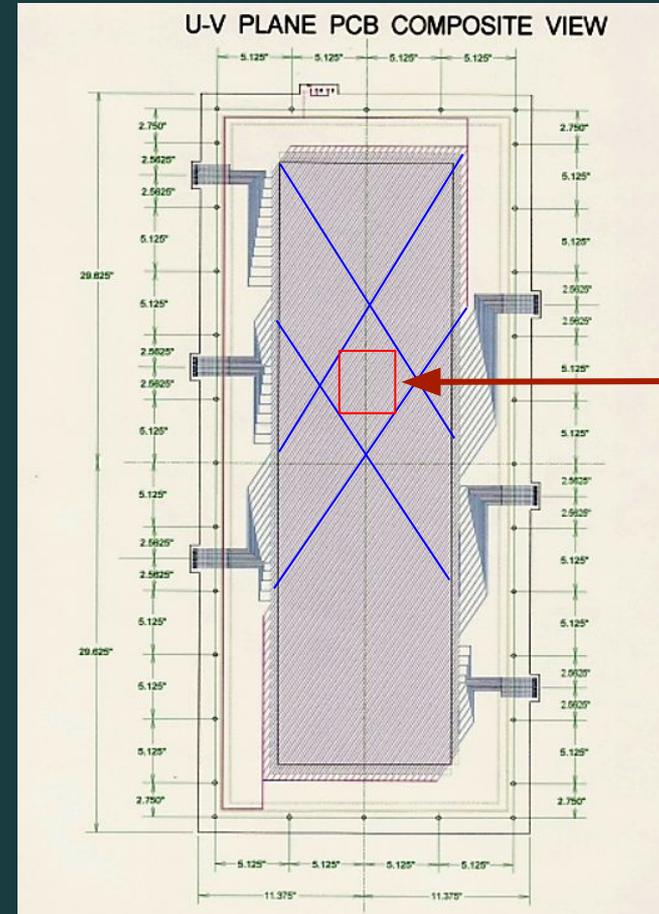
KDC3 Pre-Commissioning Repair

- Known Issue from Previous Experiment,
 - 2 broken wires identified in KDC3
- Chamber opened before testing
- Damaged wires removed
- No additional damage observed

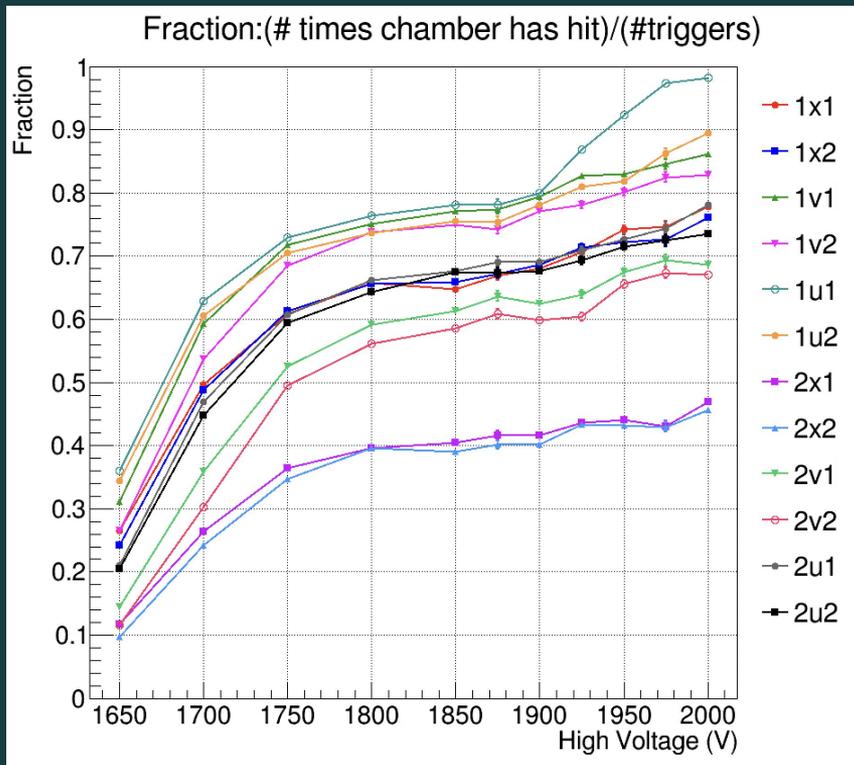


Plateau Scan

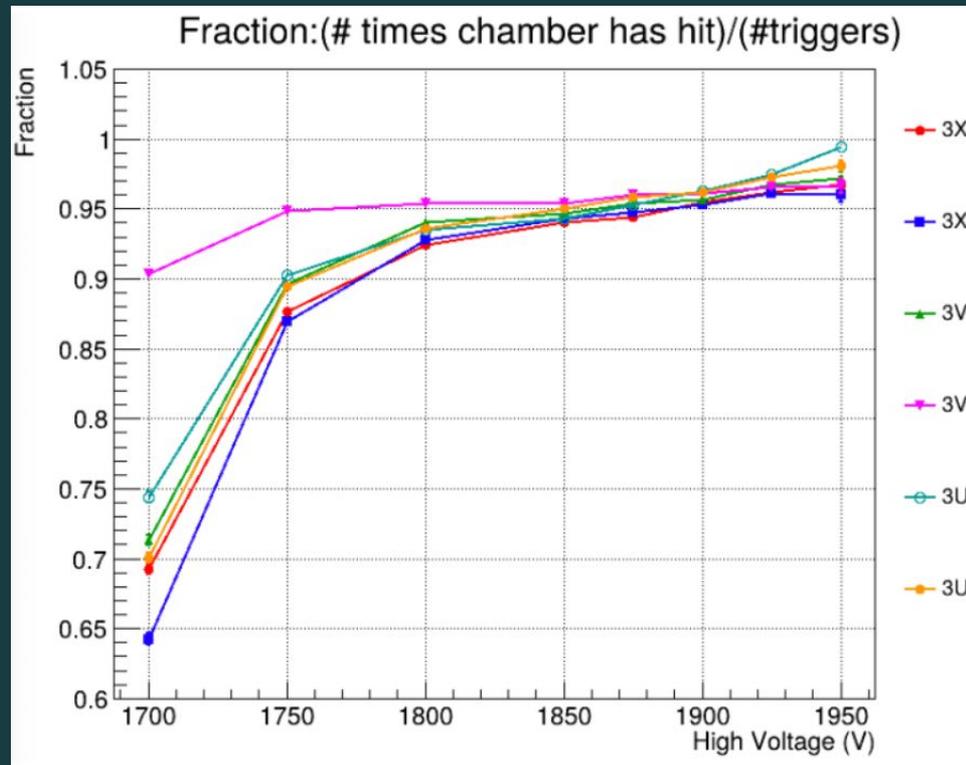
- Vertical axis = Ratio: (Number of DC hits) / (Number of triggers)
- NOT efficiency
- Plateau scan is used to determine operating HV
- With HV in plateau region → true efficiency expected > 99%
- True efficiency requires tracking and angular selection (< 8°)



Plateau Results



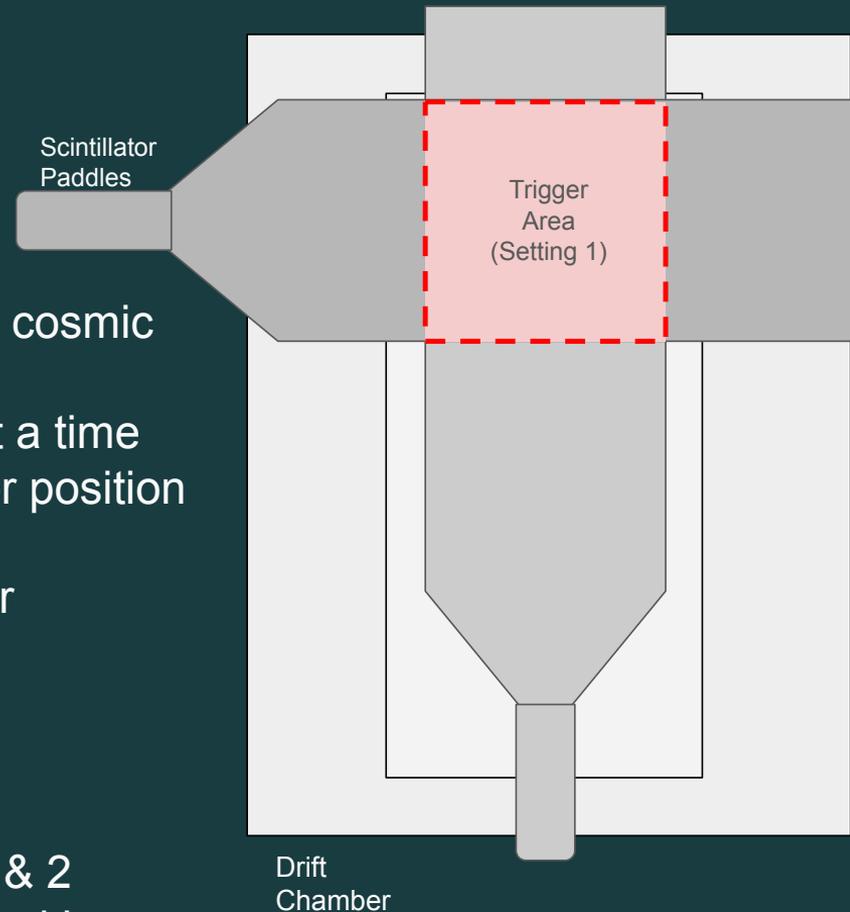
KDC 1 & 2 HV plateau scan



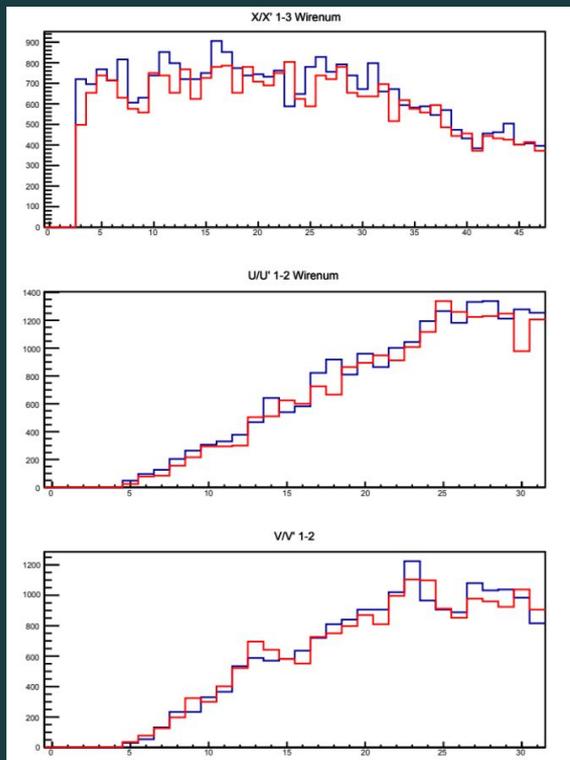
KDC 3 HV plateau scan

Wire Checks

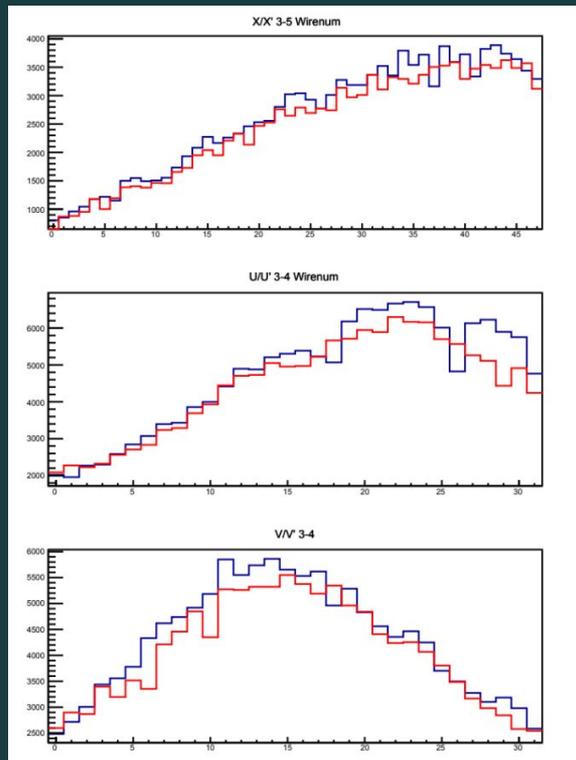
- Checked all wires in all chambers
- Total per chamber: 596 wires
- Wire Check Method
 - Used two crossed scintillator paddles as cosmic trigger
 - Trigger covered $\sim 1/3$ of chamber area at a time
 - Performed measurements in 3 scintillator position settings
 - Combined settings provided full chamber coverage
- Verified,
 - Connectivity
 - Signal response
 - No issues were detected in KDC 1 & 2
 - Some inconsistencies were observed in KDC 3



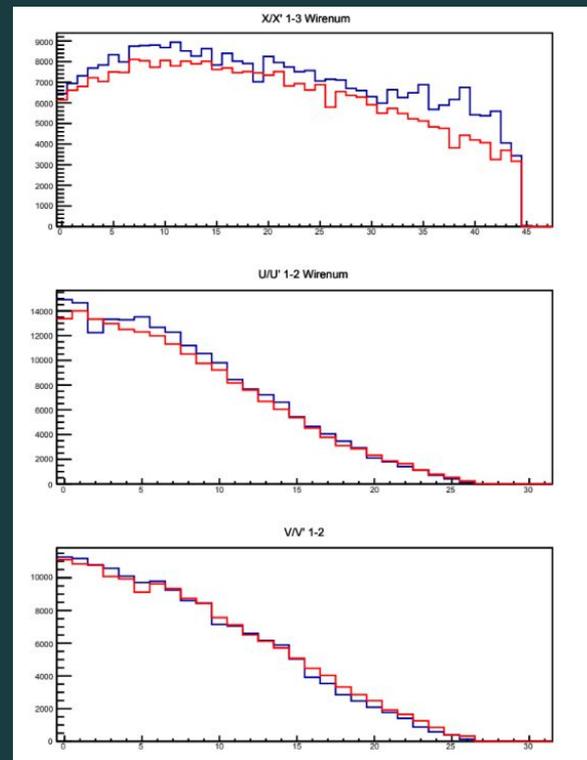
KDC1 Wire Check Results



Setting 1

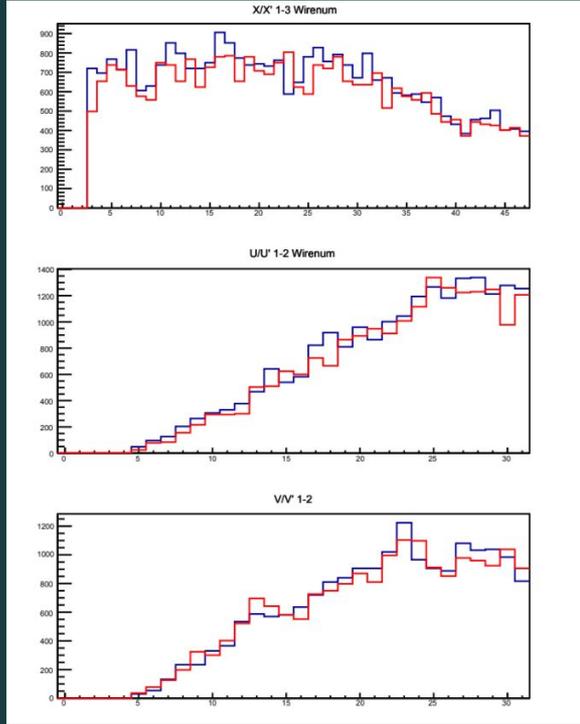


Setting 2

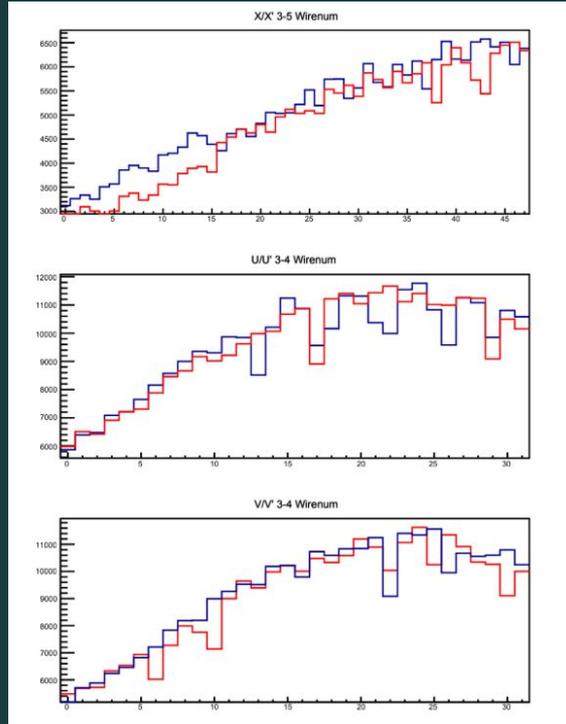


Setting 3

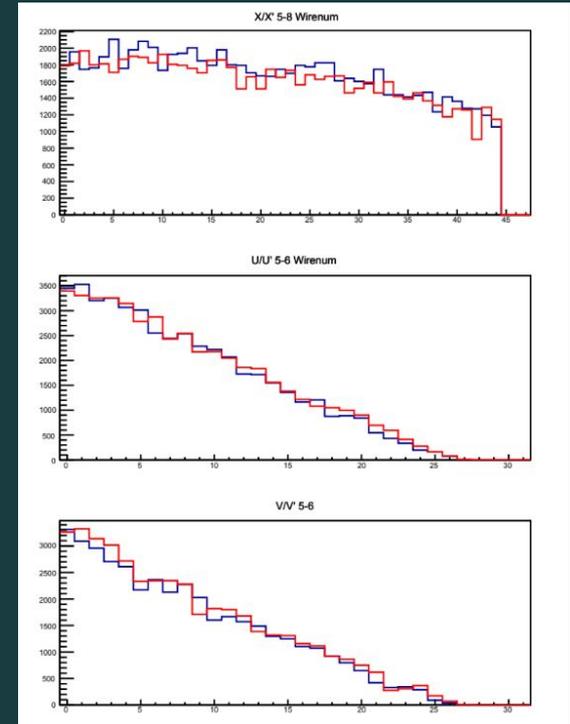
KDC2 Wire Check Results



Setting 1



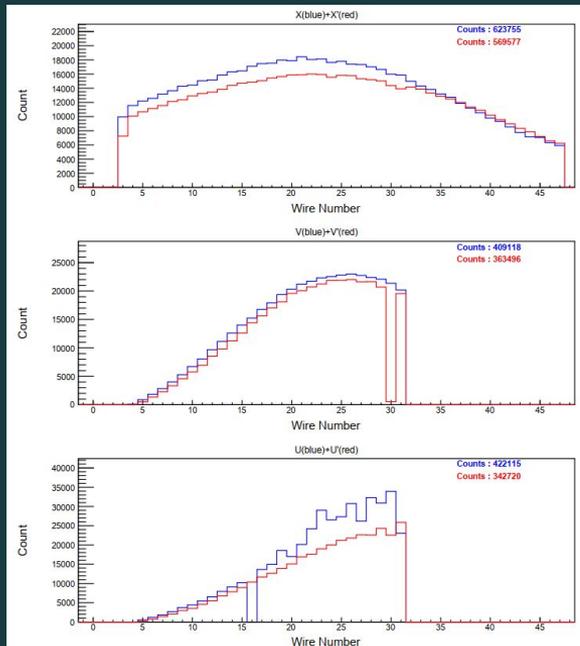
Setting 2



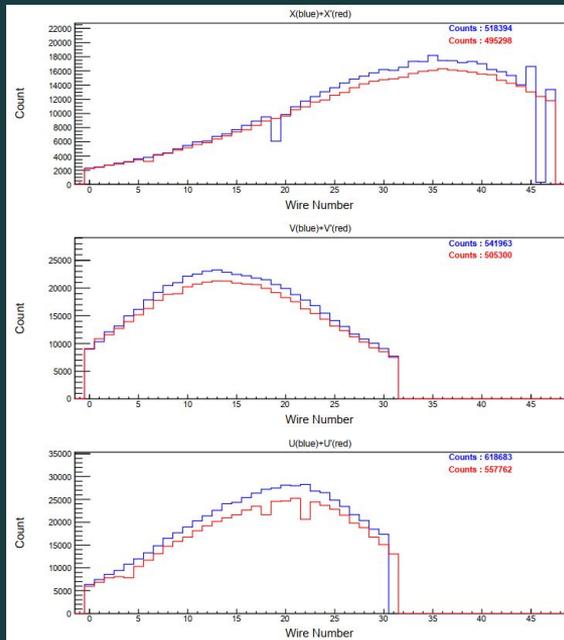
Setting 3

Setting 2 run is from the cable length test with

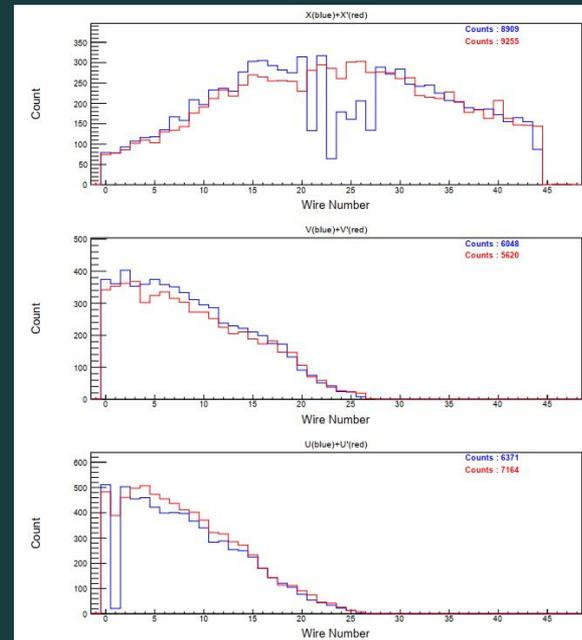
KDC3 Wire Check Results



Setting 1



Setting 2



Setting 3

Noise in X7 channels and 3 low occupancy channels

Summary

- Plateau scans completed for KDC 1, 2, 3
- Optimal HV (75% Ar gas): -1850 V
- 2 broken wires in KDC3 removed
- Full wire checks performed at optimal HV and
- Chambers operating stably
- HV will be re-optimized with final Ar/Isobutane gas

