USING THE (n,2p) REACTION TO SEARCH FOR A PREEXISTING NUCLEAR Δ^{++} COMPONENT

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The Nucleus

- Traditional nucleus

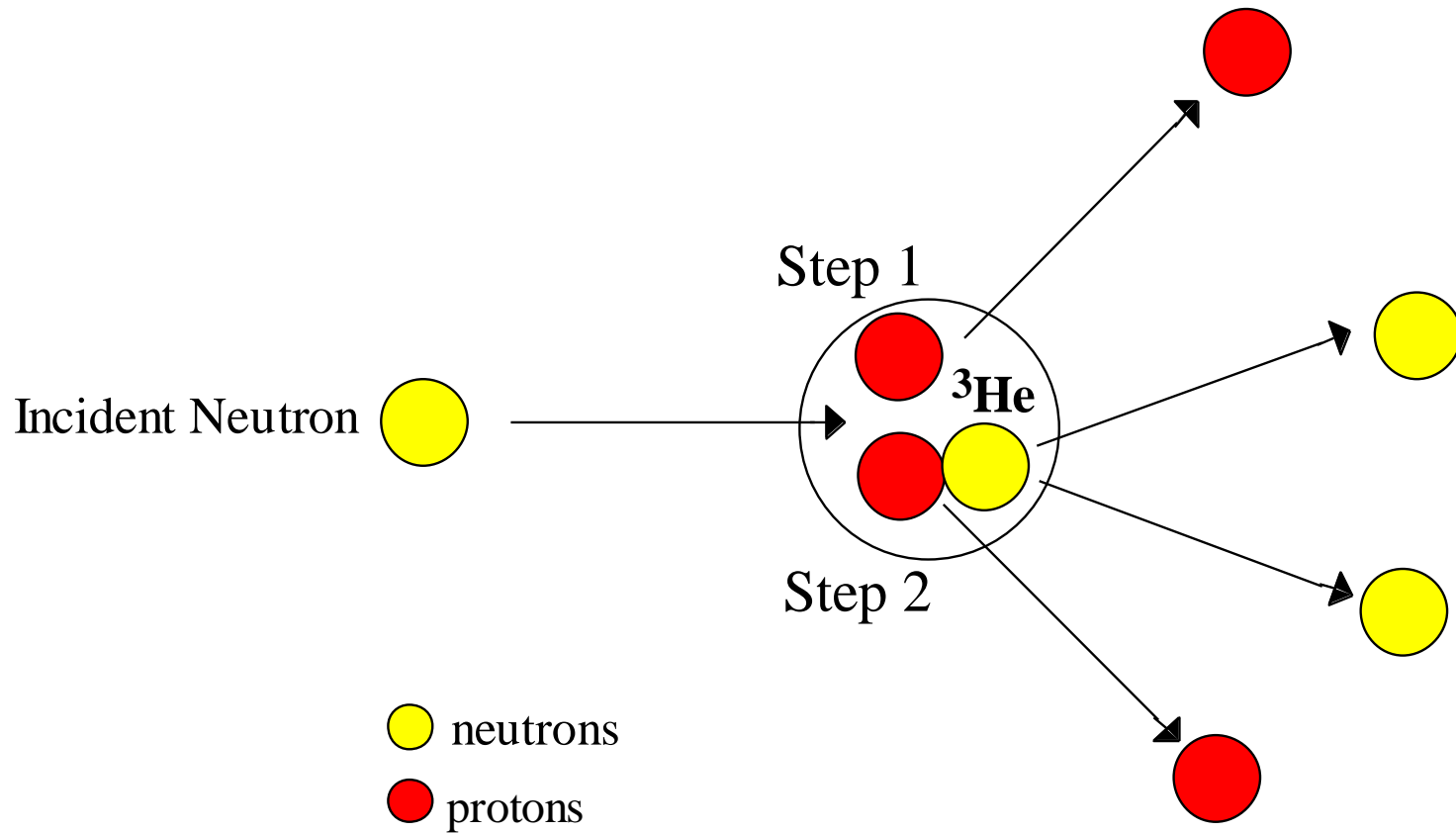 **n, p   ~ 938.5 MeV**

- Δ component
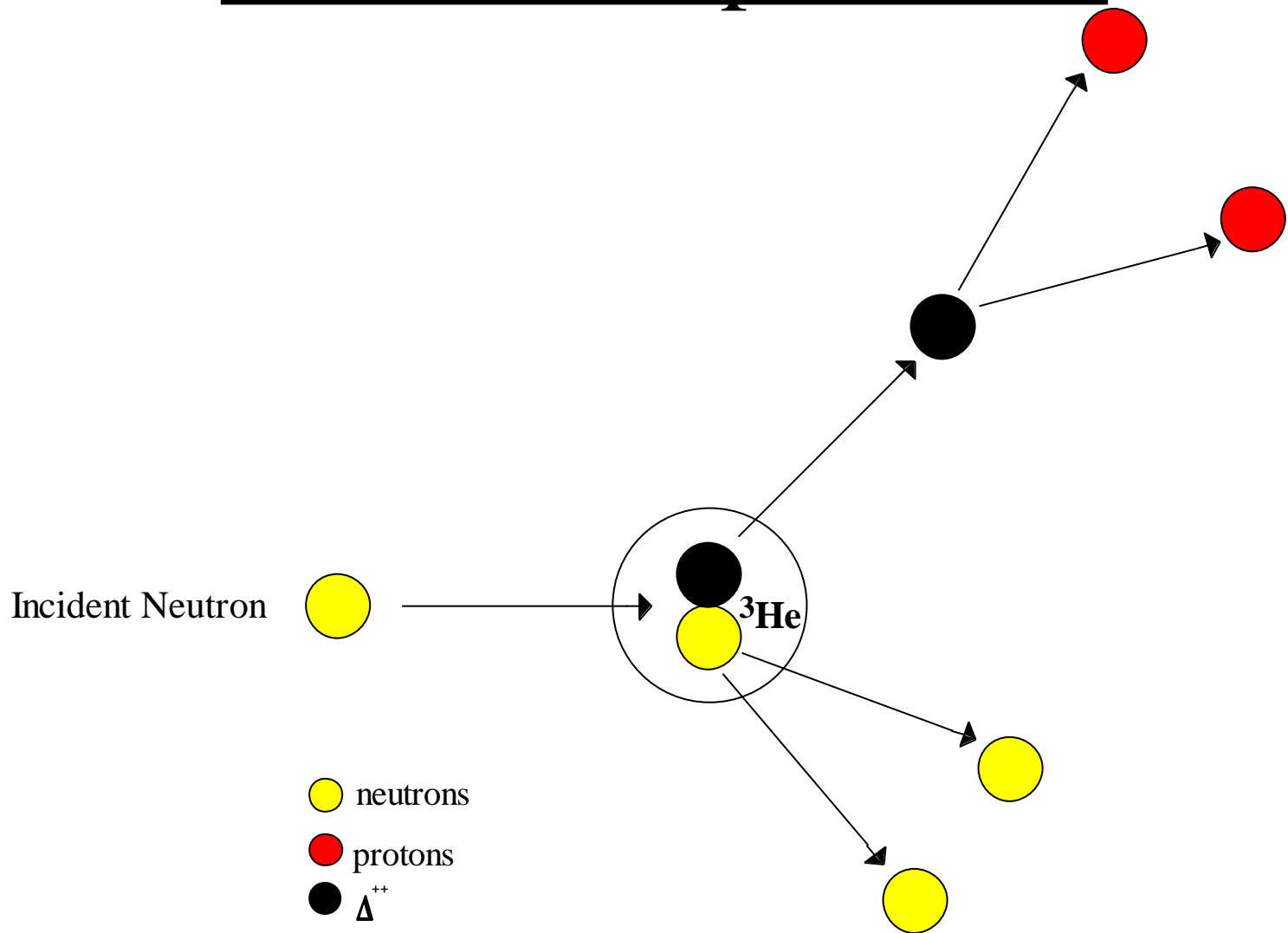
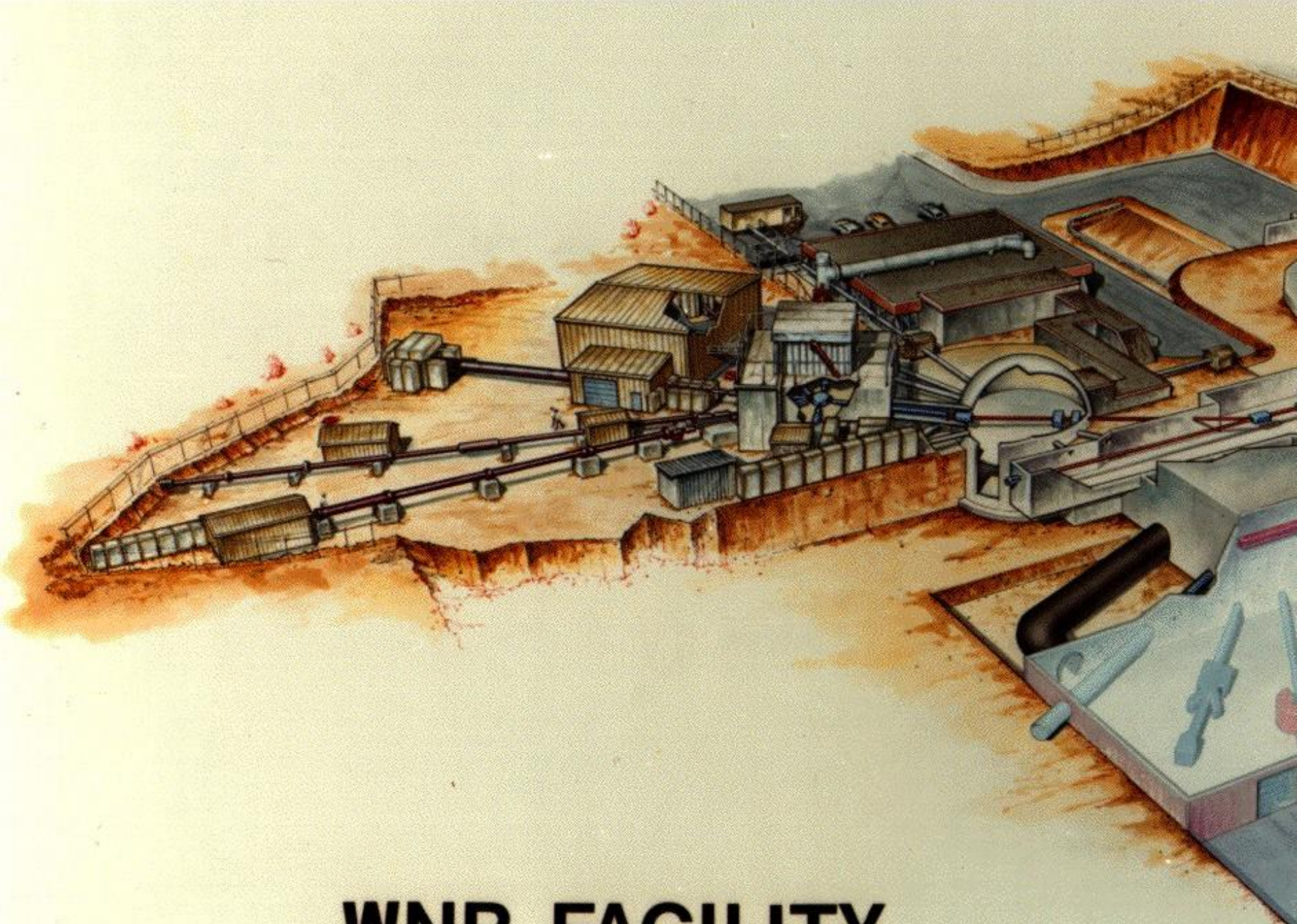 Δ^{++}

  Δ^{+} **~1232 MeV**

  Δ^{o}

  Δ^{-}

Two Step Process

Incident Neutron

Step 1

Step 2

³He

neutrons

protons

Δ^{++} One Step Process

Incident Neutron

^{3}He

neutrons

protons

Δ^{++}

WNR FACILITY

Permanent Magnets

Wire Chambers

Scintillators

Fission Chamber

Beam Line

End of Beam Pipe

Target

45°

45°

Wire Chambers

Scintillators
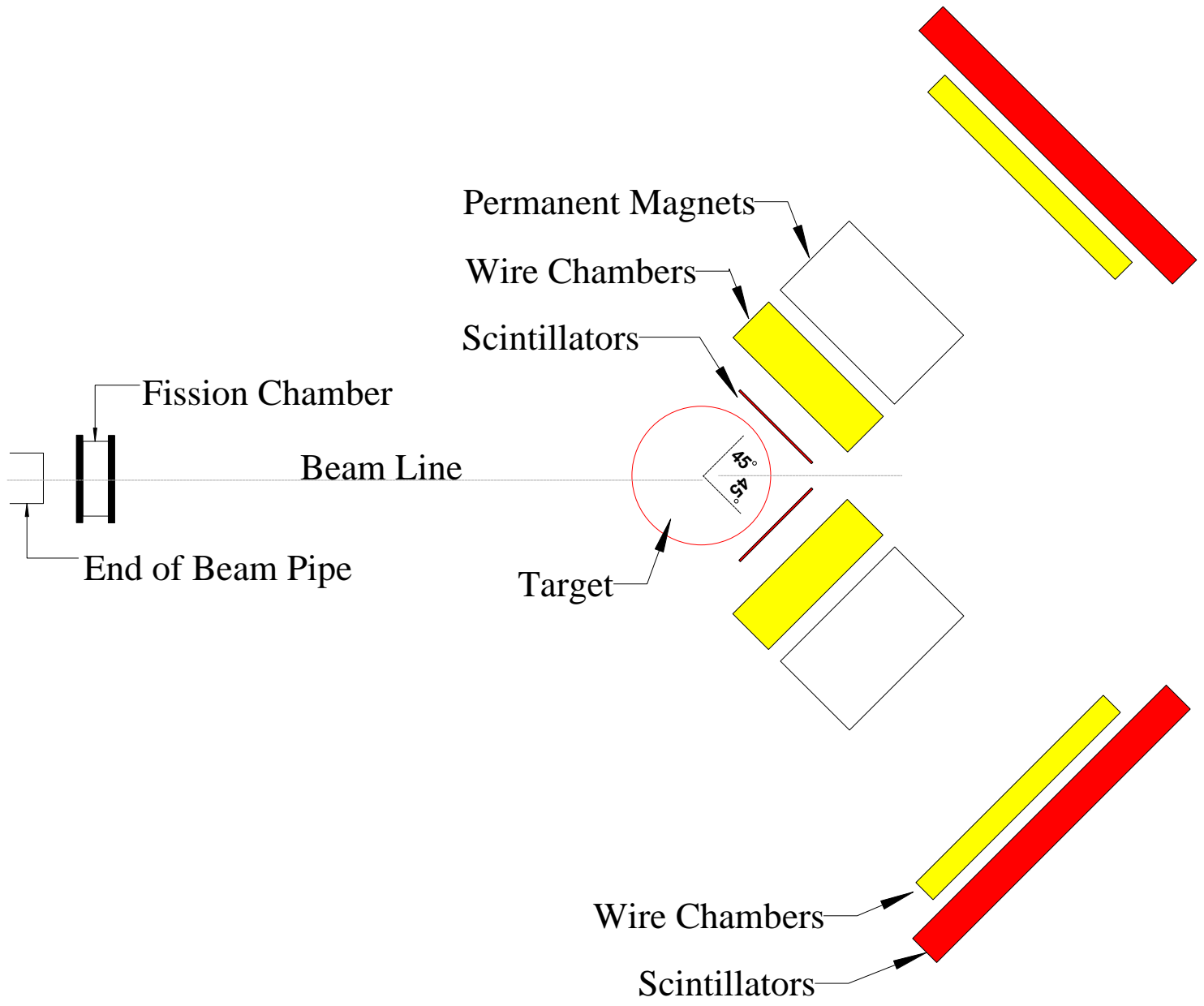
Experimental Area

Drift Chamber: Side View

Cathode wire

Anode wire

2.5 ns/cm
delay line

ADC

Differential Amplifier
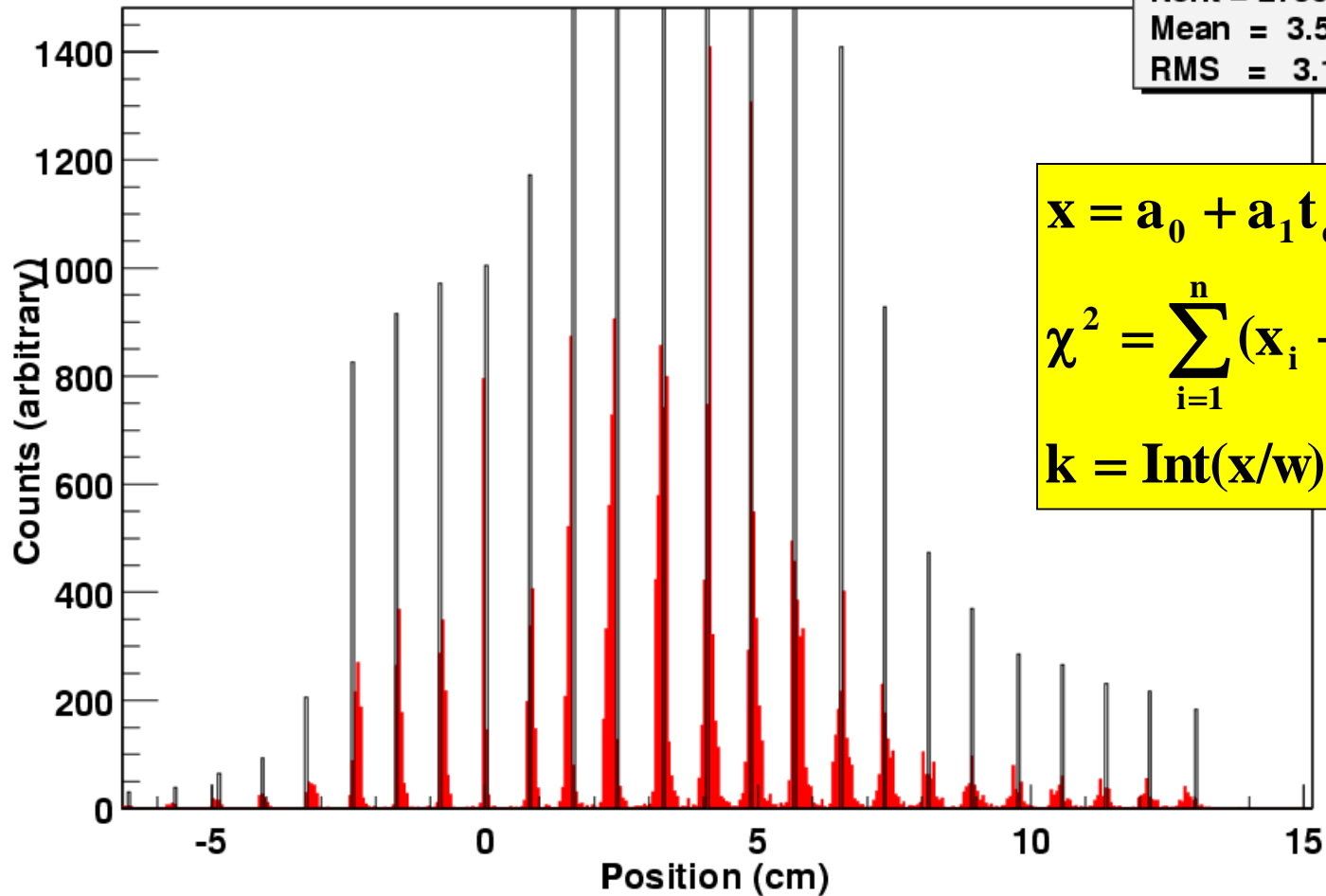
+HV

+HV

T Left   TDC

TDC   T Right
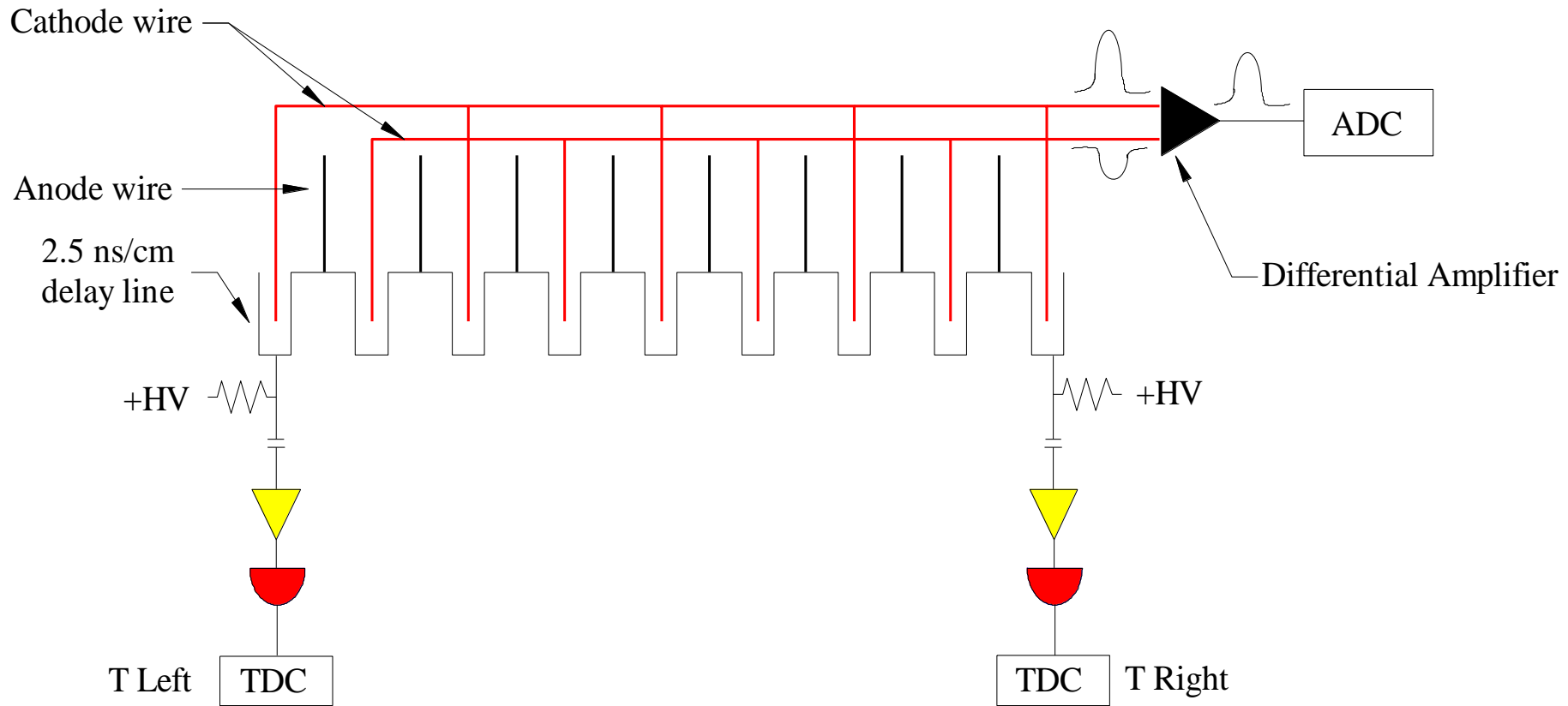
Analysis

event position = wire position +/- drift distance

- Which wire?
- Drift distance
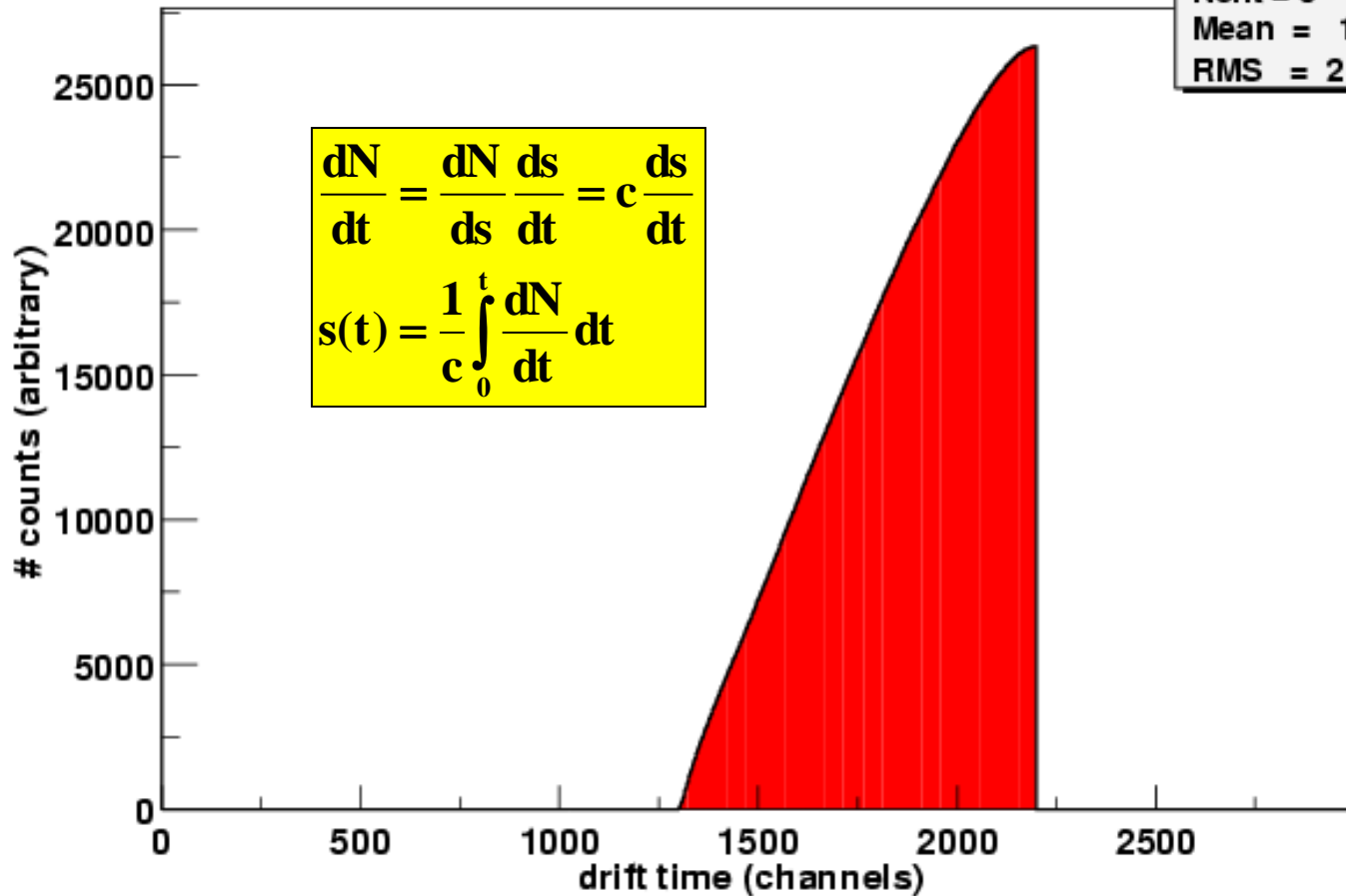- Which side?

Closest Wire to Event

WC1X1POS   RUN 195

resultx
Nent = 27069
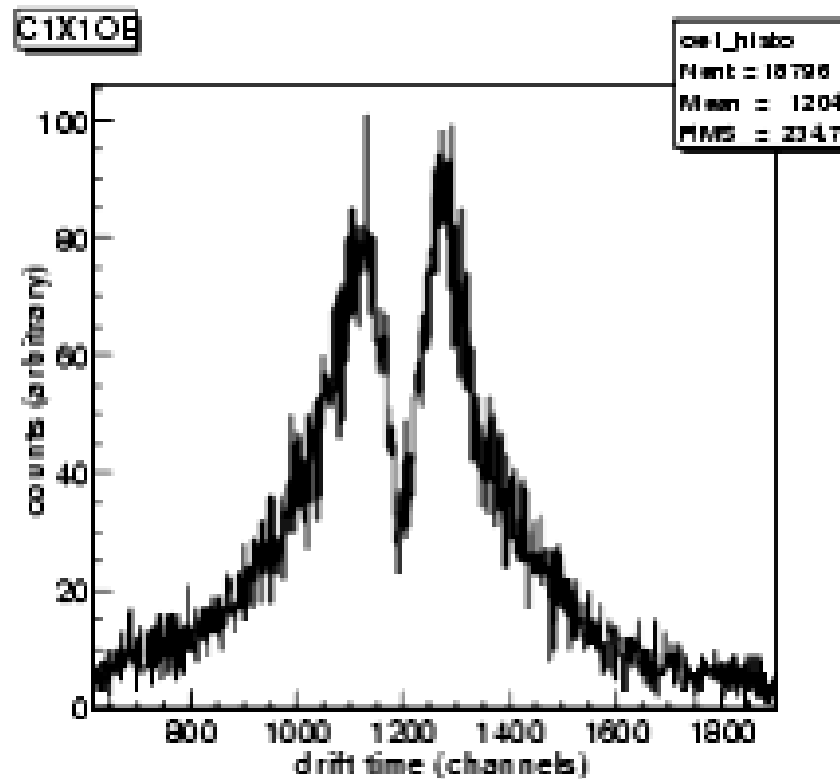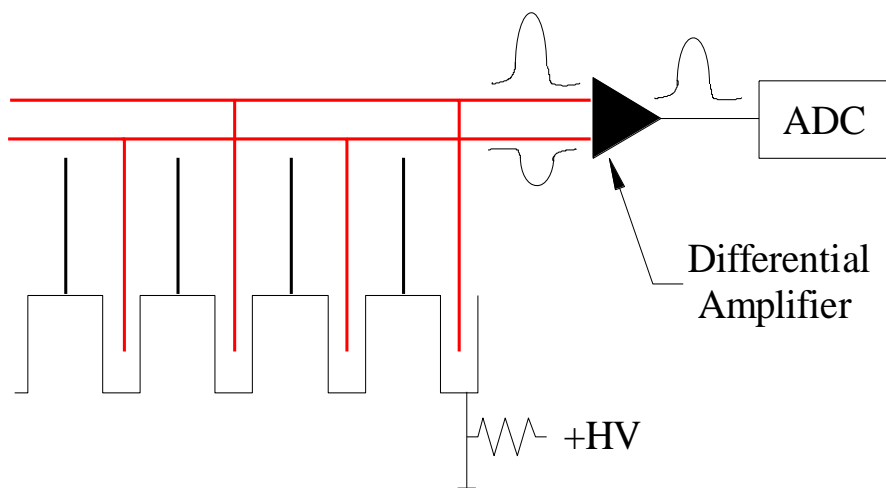Mean = 3.542
RMS =   3.13

$$x = a_0 + a_1 t_d + a_2 t_d^2$$

$$\chi^2 = \sum_{i=1}^{n} (x_i - k_i)^2$$

$$k = \text{Int}(x/w)w$$

Find Drift Distance

WC1X1SUM   RUN 195

integrate
Nent = 0
Mean = 1887
RMS = 214.4

$$\frac{dN}{dt} = \frac{dN}{ds}\frac{ds}{dt} = c\frac{ds}{dt}$$

$$s(t) = \frac{1}{c}\int_0^t \frac{dN}{dt}\,dt$$

counts (arbitrary)

drift time (channels)
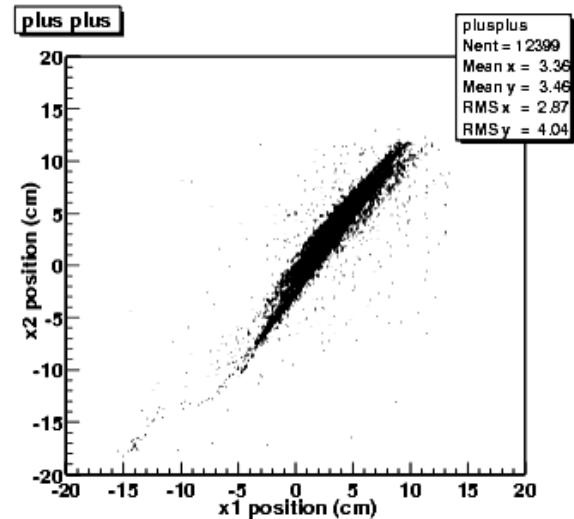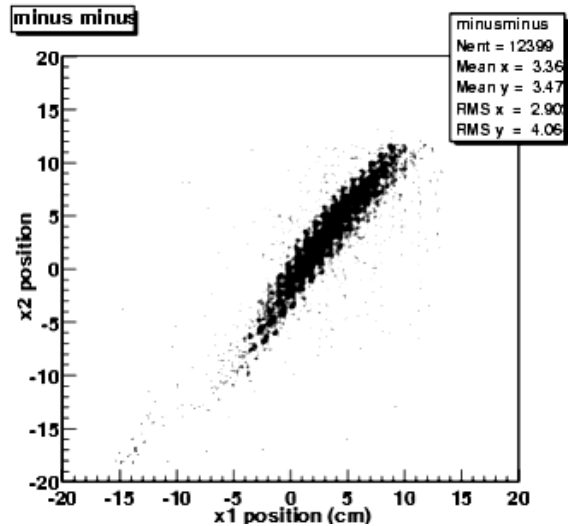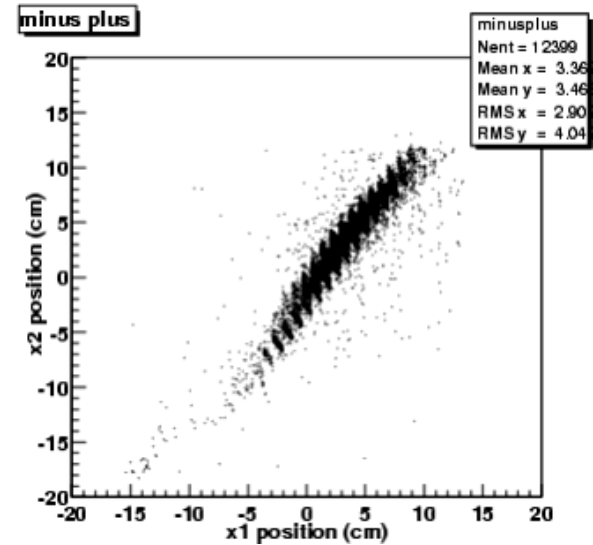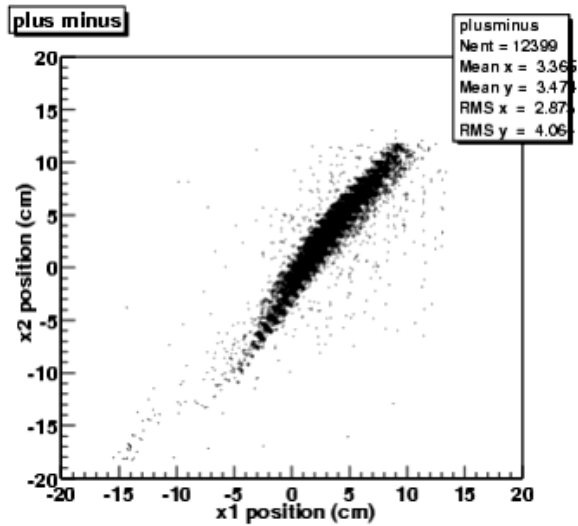
Which Side of Wire?

Add or Subtract Drift Distances

Future Work

- Position relative to the beam line
- Trace back to the target