Status of new Drift and Straw chambers for ANKE

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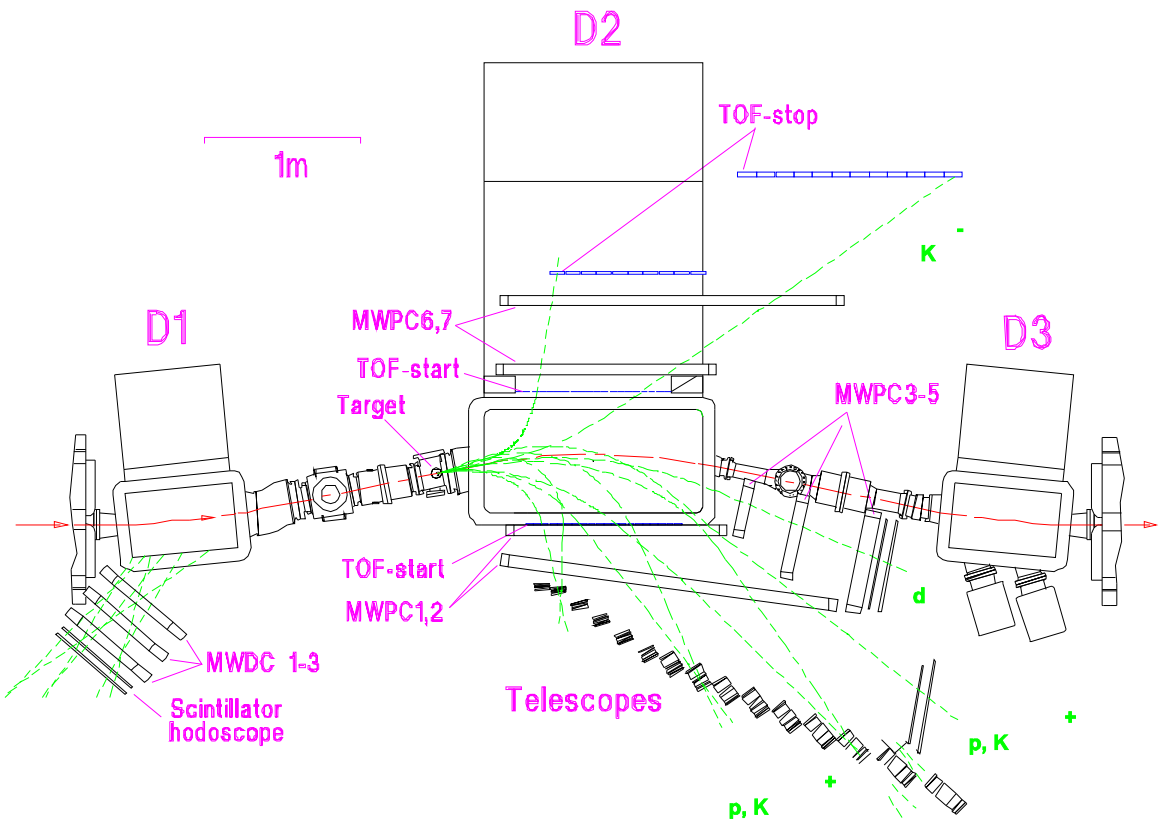
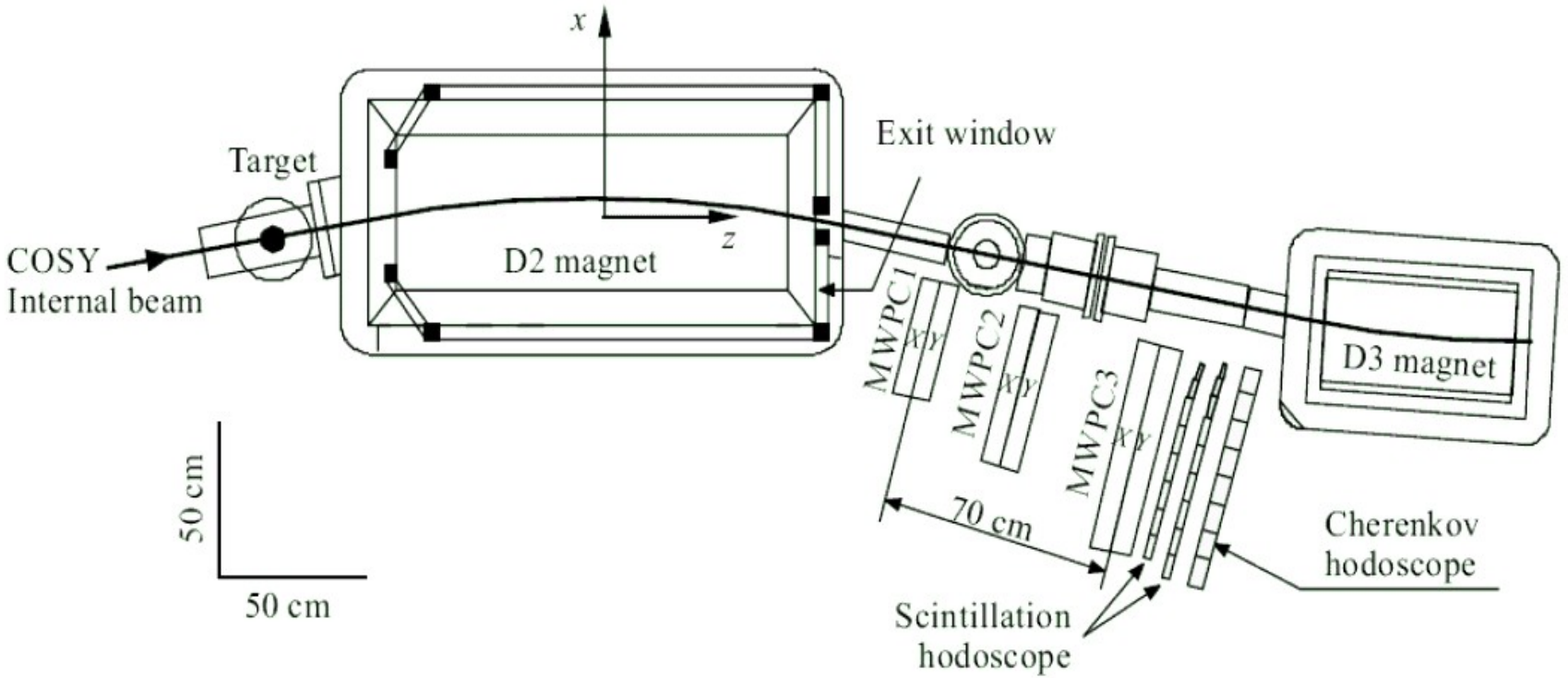

D2
1m
TOF-stop
K
-
D1
MWPC6,7
TOF-start
Target
D3
MWPC3-5
TOF-start
MWPC1,2
d
MWDC 1-3
Scintillator
hodoscope
Telescopes
p, K
+
+
p, K

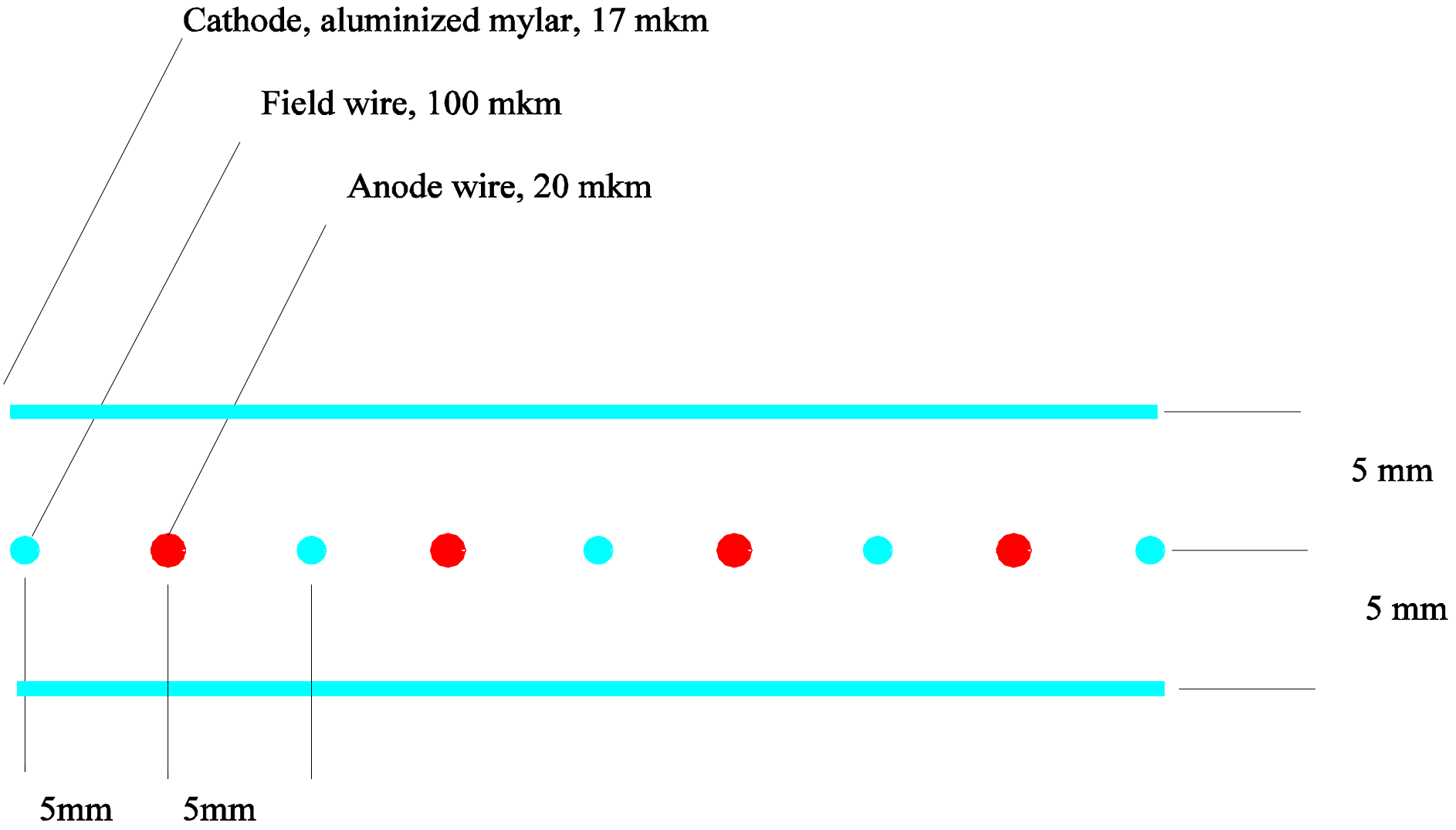

x
z
Target
COSY
Internal beam
D2 magnet
Exit window
MWPC1
MWPC2
MWPC3
xy
D3 magnet
70 cm
Cherenkov
hodoscope
Scintillation
hodoscope
50 cm
50 cm

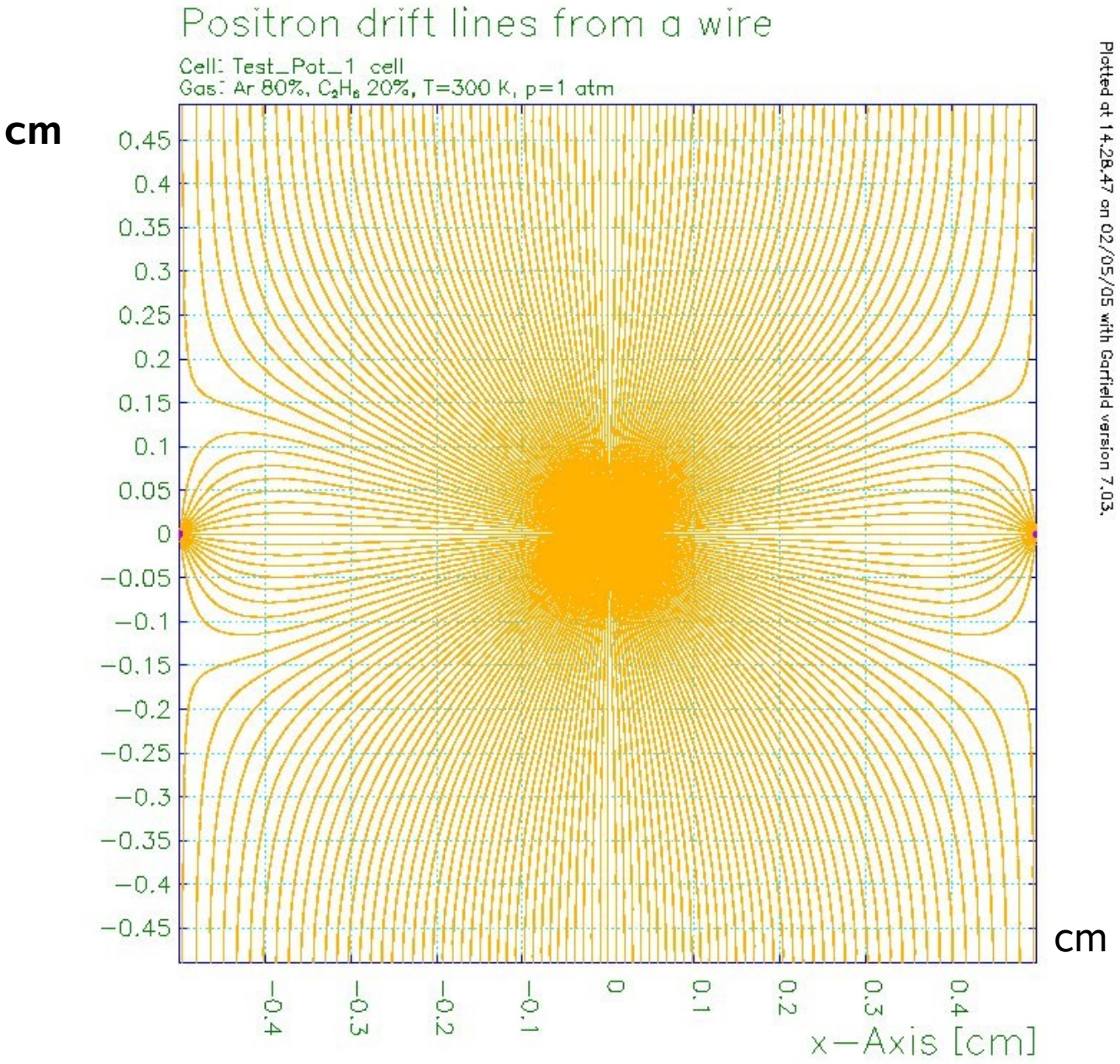
1st version MWPC1, MWPC2, MWPC3:
X1,strip,Y1,strip
pitch ~ 1mm -> resolution RMS ~0.3 mm

MWPC2, 43x39 cm2, X12, Y12, strips 18 deg.
MWPC3, 53x39 cm2, X12, Y12, strips 18 deg.:
pitch~ 2 mm -> resolution RMS ~0.58 mm

Drift chambers to keep moderate quantity of electronics channels and have good resolution

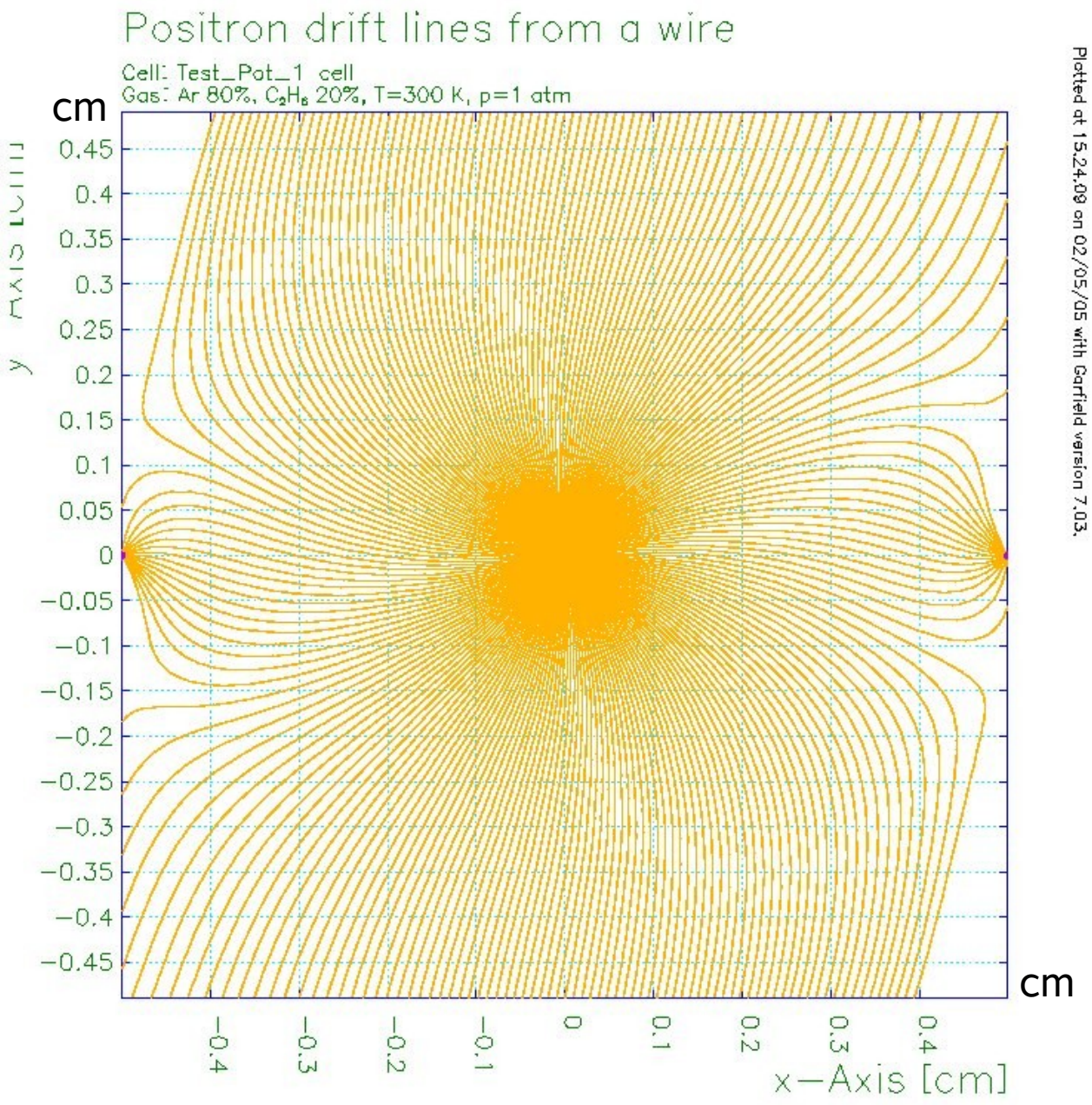
New amplifier-discriminators CMP16 and new TDC F1


Cathode, aluminized mylar, 17 mkm
Field wire, 100 mkm
Anode wire, 20 mkm
5 mm
5 mm
5mm
5mm

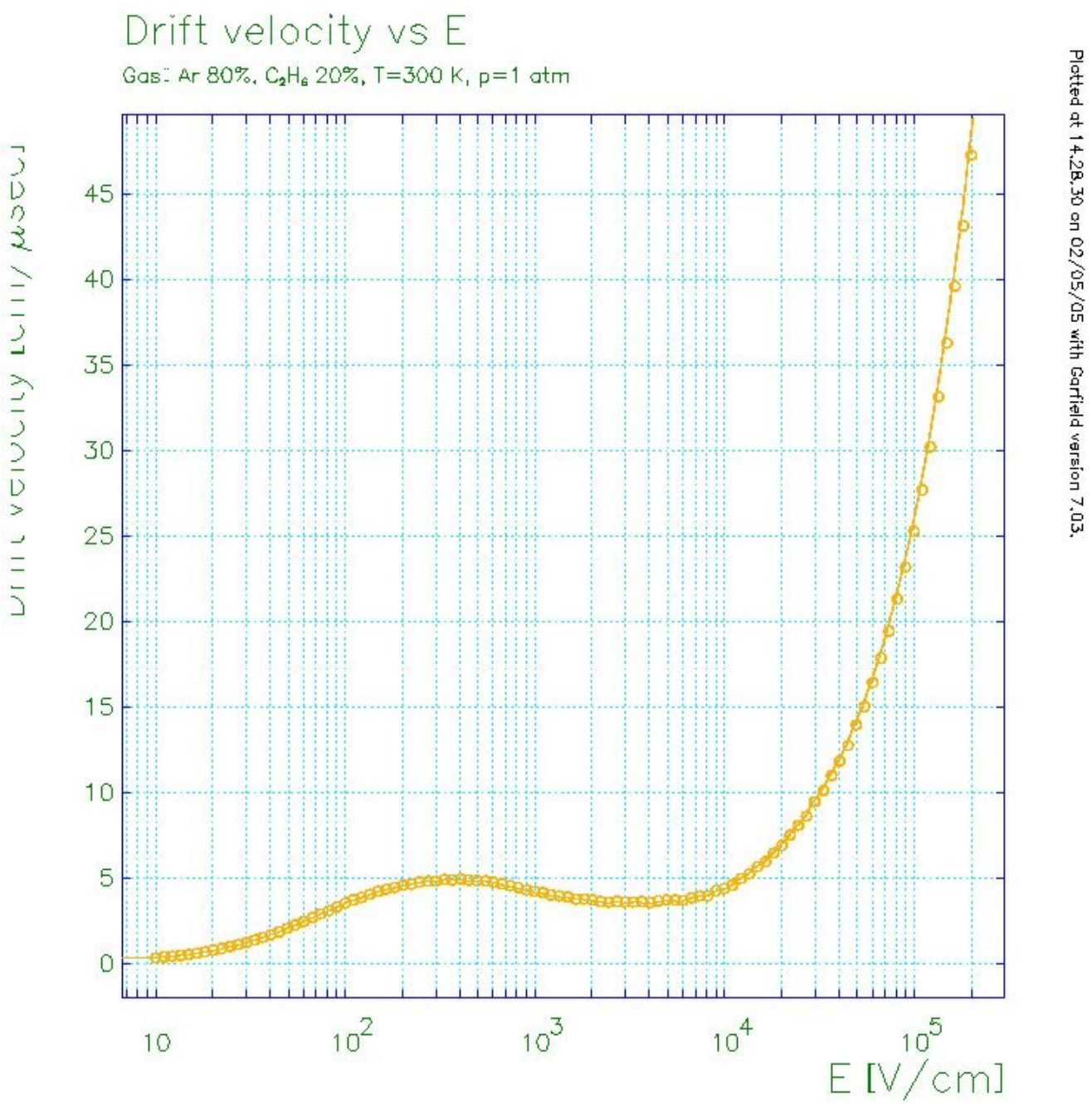


80%Ar+20% C2H6

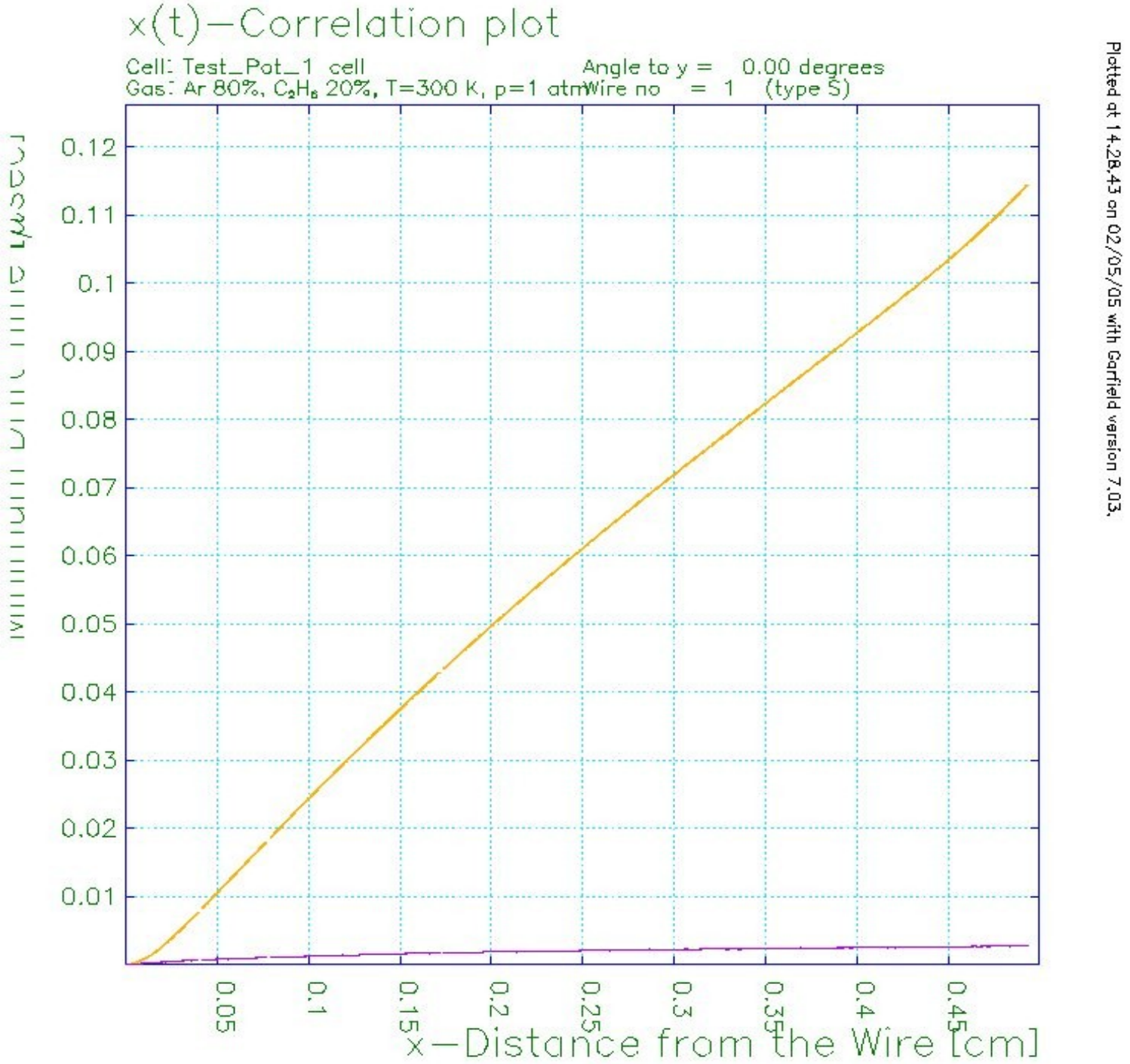
1350 -1400 V


Positron drift lines from a wire
Cell: Test_Pot_1 cell
Gas: Ar 80%, C2H6 20%, T=300 K, p=1 atm
Plotted at 15.24.09 on 02/05/05 with Garfield version 7.03.
cm
cm
0.45
0.4
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0
−0.05
−0.1
−0.15
−0.2
−0.25
−0.3
−0.35
−0.4
−0.45
−0.4
−0.3
−0.2
−0.1
0
0.1
0.2
0.3
0.4
x—Axis [cm]

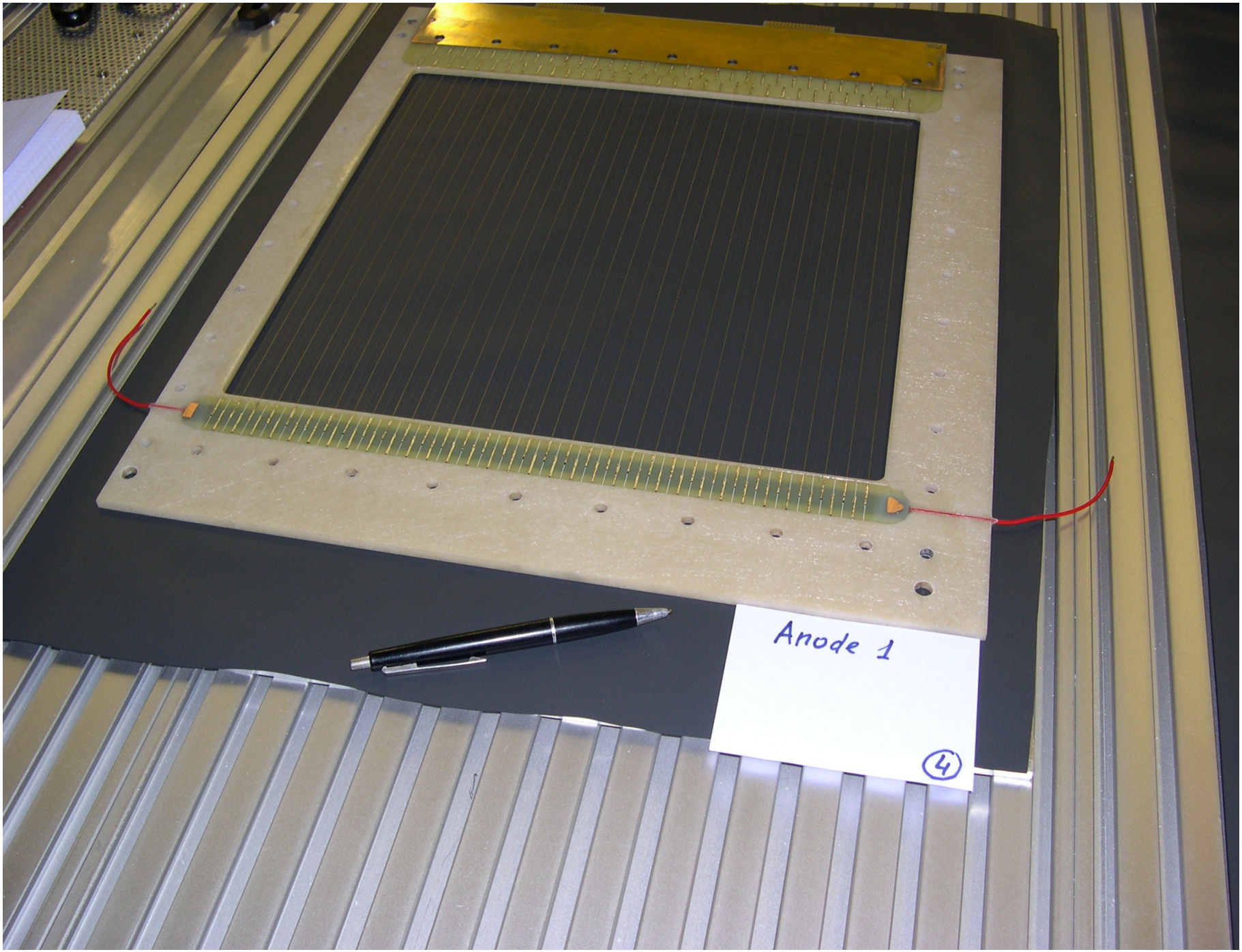
Bz=0.2 T, 1350 V

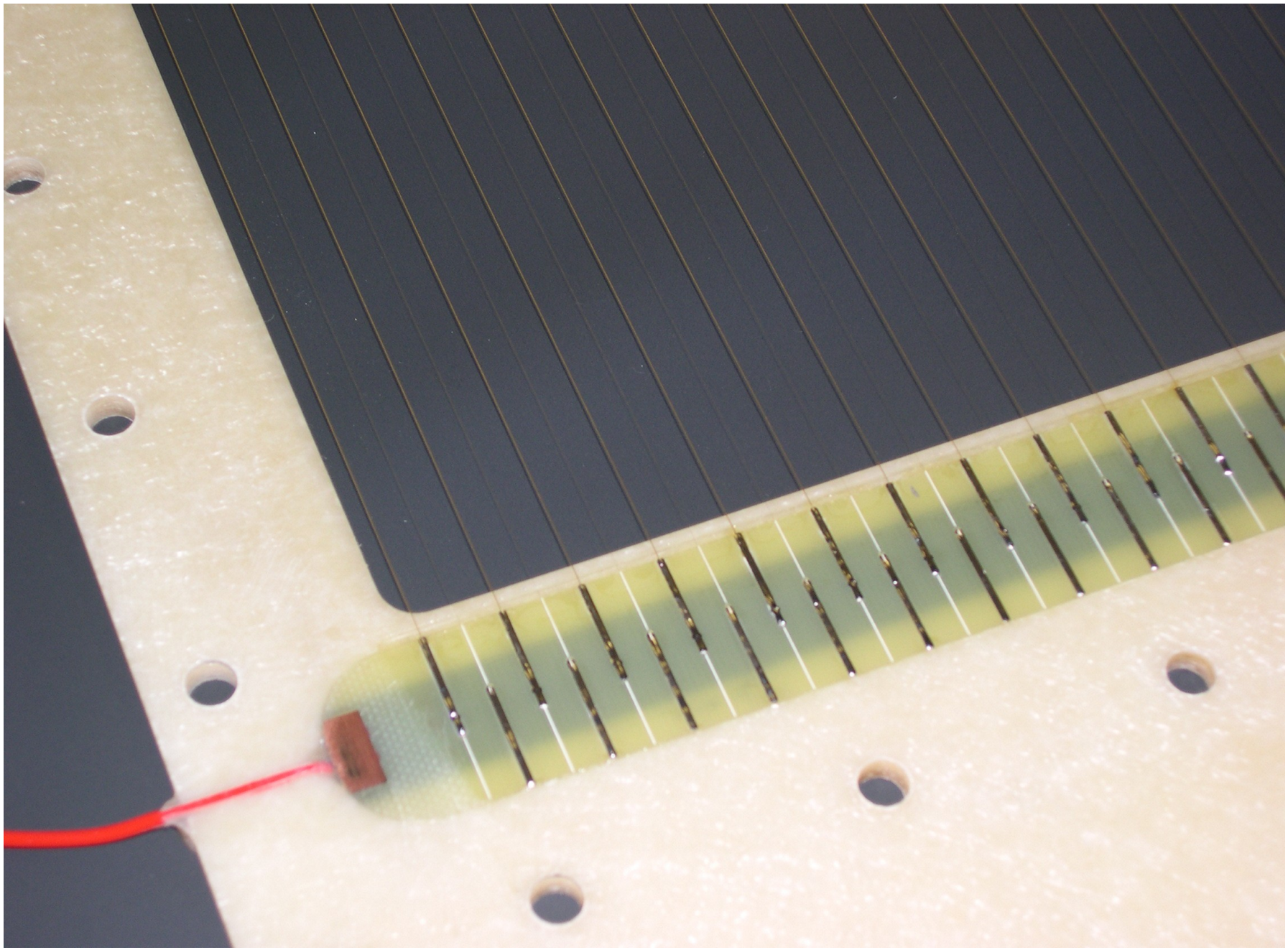


Plotted at 14:28:30 on 02/05/05 with Garfield version 7.03.

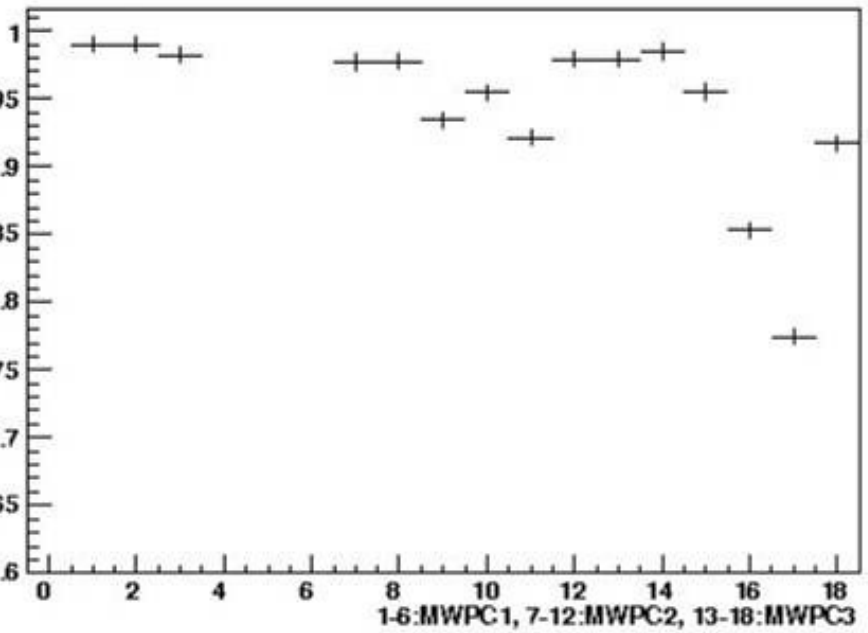


Plotted at 14.28.43 on 02/05/05 with Garfield version 7.03.

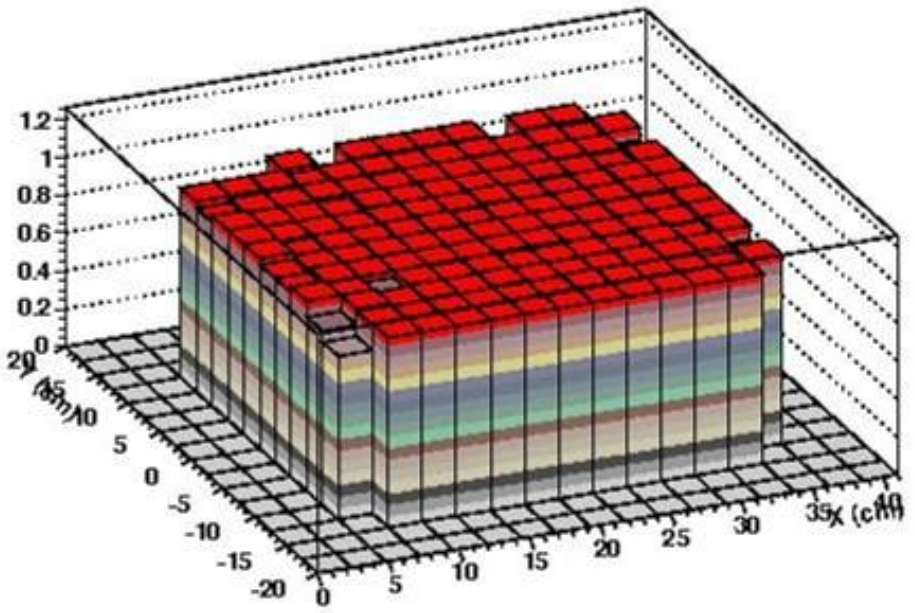

Anode 1
4



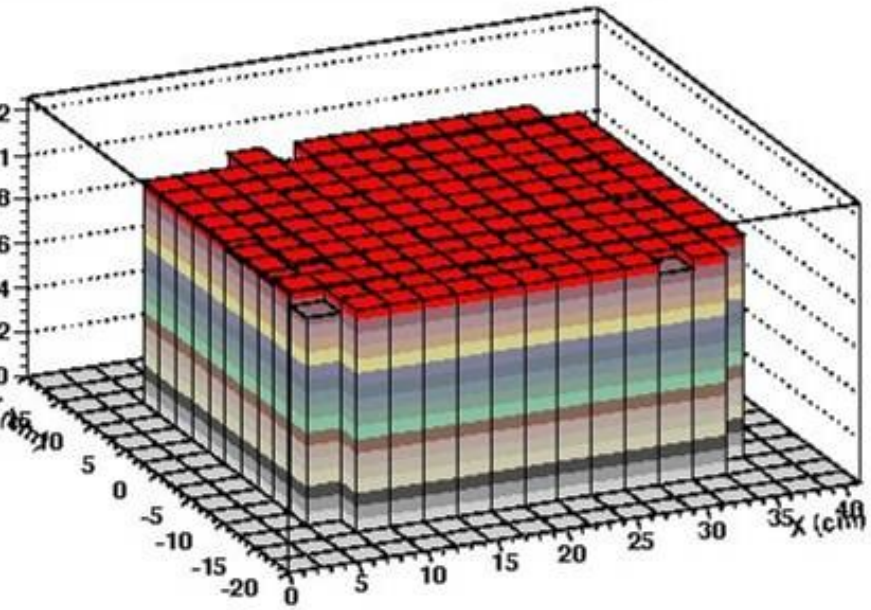
Monitor



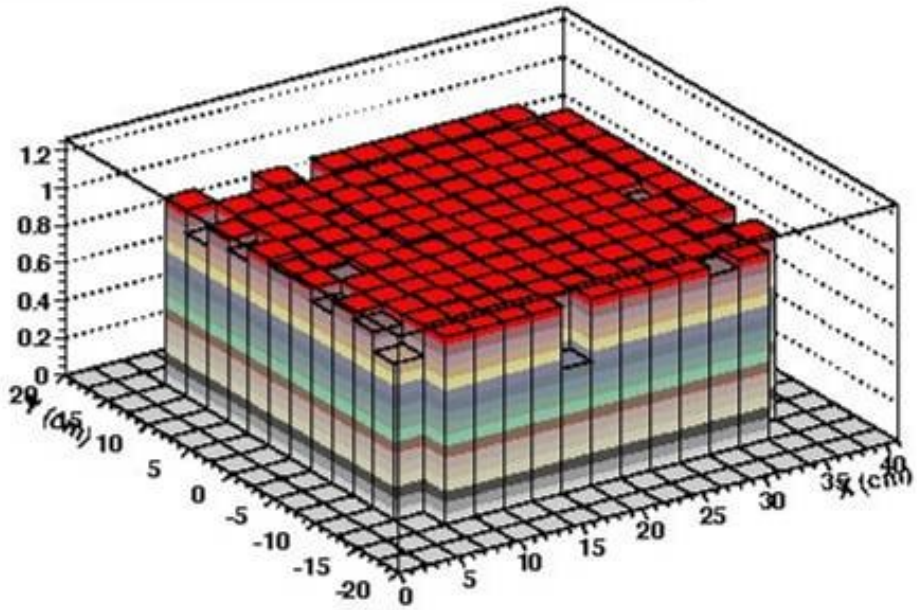
Efficiency distribution of PC1P1 Total = 99.00 +- 0.62

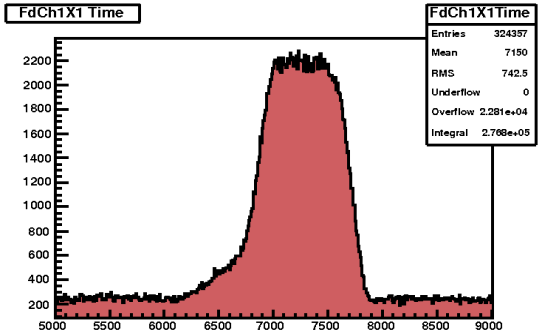


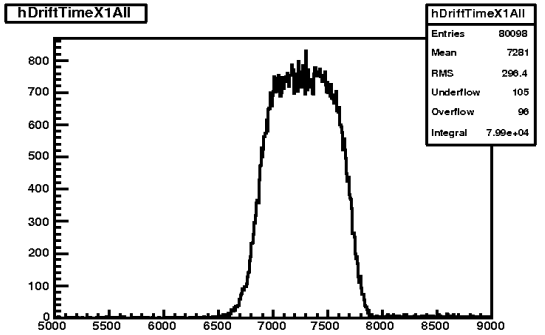
iency distribution of PC1P2 Total = 99.03 +- 0.62

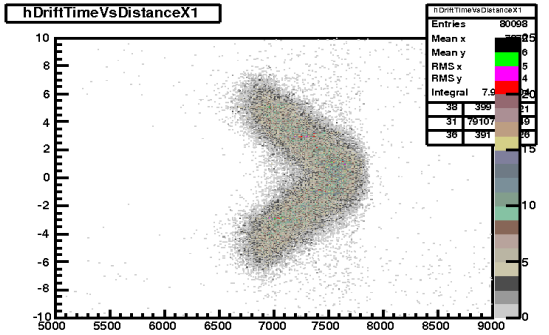


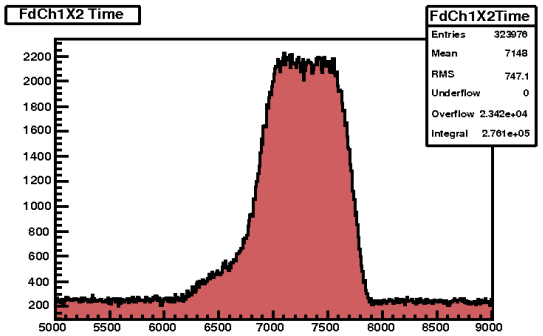
Efficiency distribution of PC1P3 Total = 98.22 +- 0.62

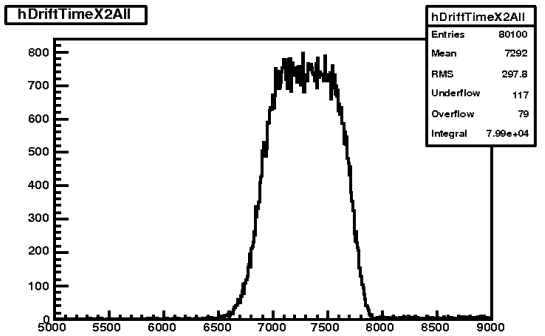


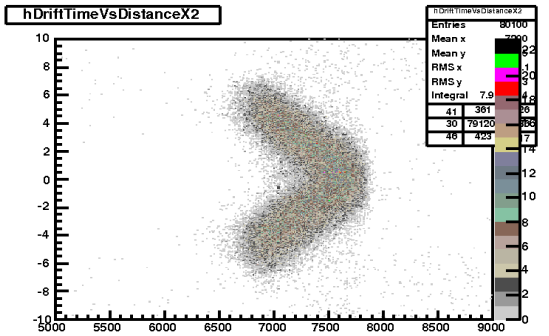

FdCh1X1 Time
FdCh1X1Time
Entries 324357
Mean 7150
RMS 742.5
Underflow 0
Overflow 2.281e+04
Integral 2.768e+05

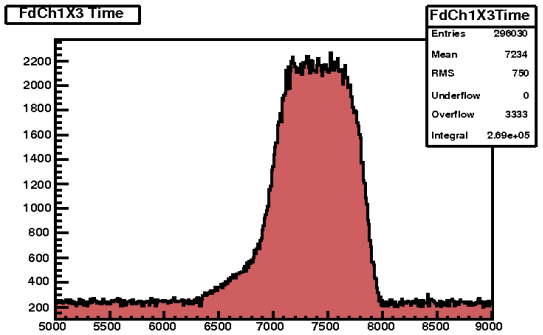

hDriftTimeX1All
hDriftTimeX1All
Entries 80098
Mean 7281
RMS 296.4
Underflow 105
Overflow 96
Integral 7.99e+04

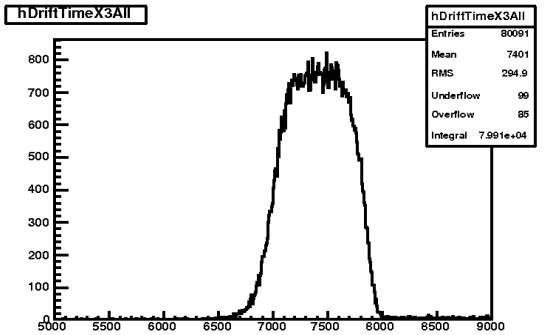

hDriftTimeVsDistanceX1

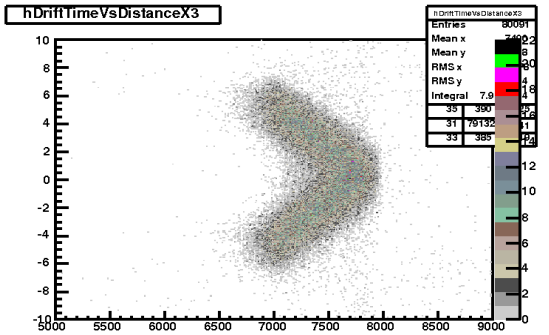

FdCh1X2 Time
FdCh1X2Time
Entries 323976
Mean 7148
RMS 747.1
Underflow 0
Overflow 2.342e+04
Integral 2.761e+05

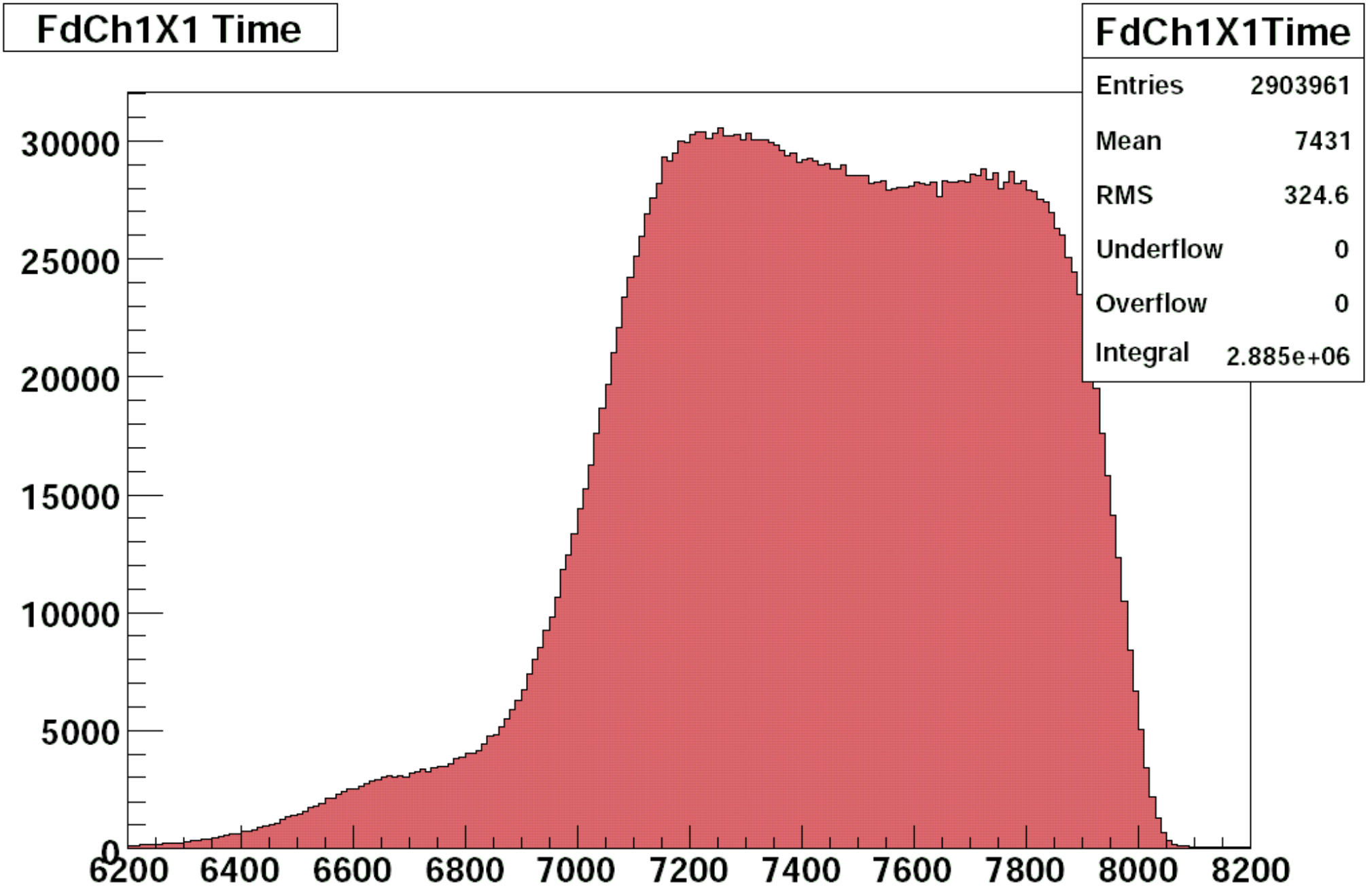

hDriftTimeX2All
hDriftTimeX2All
Entries 80100
Mean 7292
RMS 297.8
Underflow 117
Overflow 79
Integral 7.99e+04

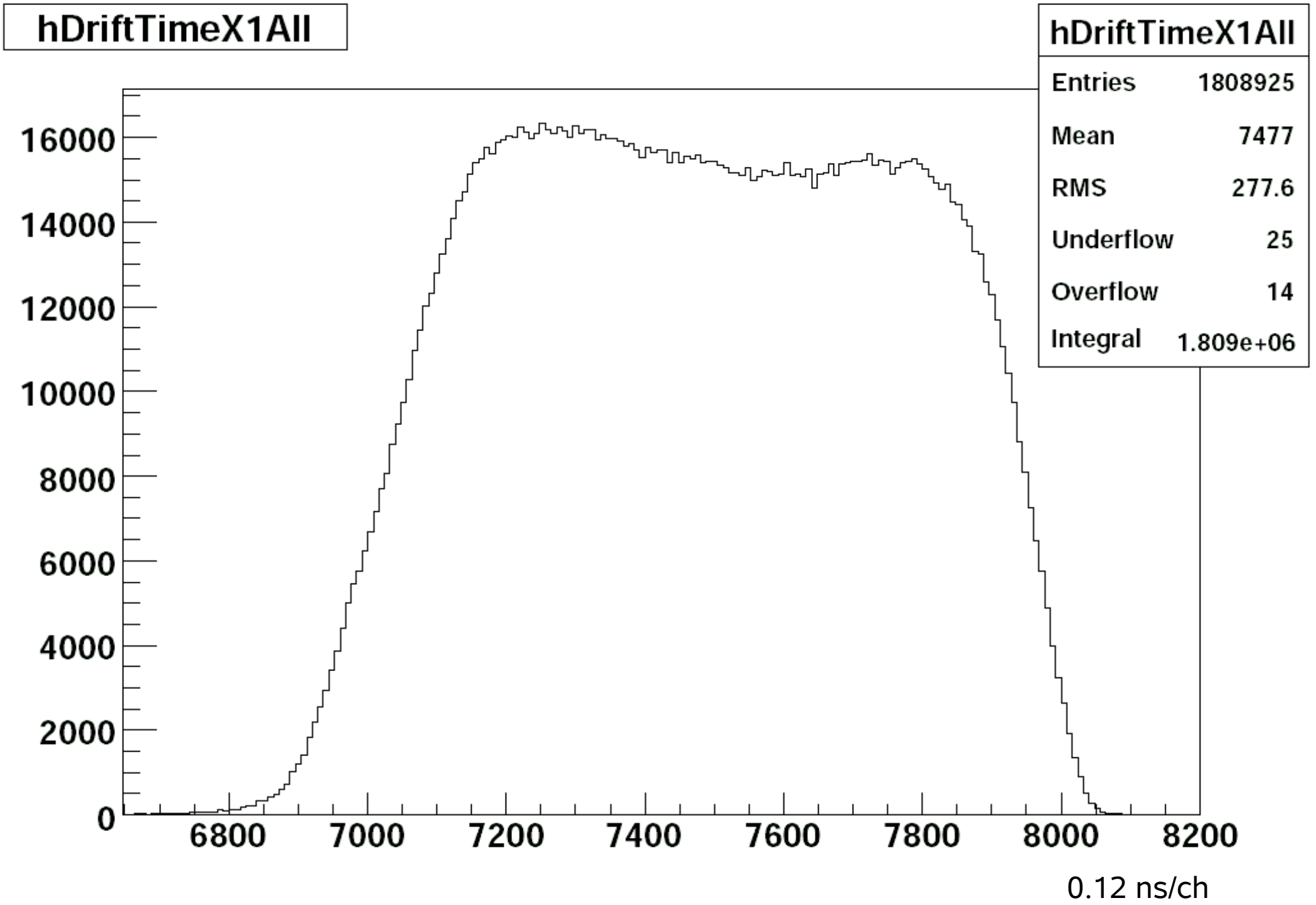

hDriftTimeVsDistanceX2

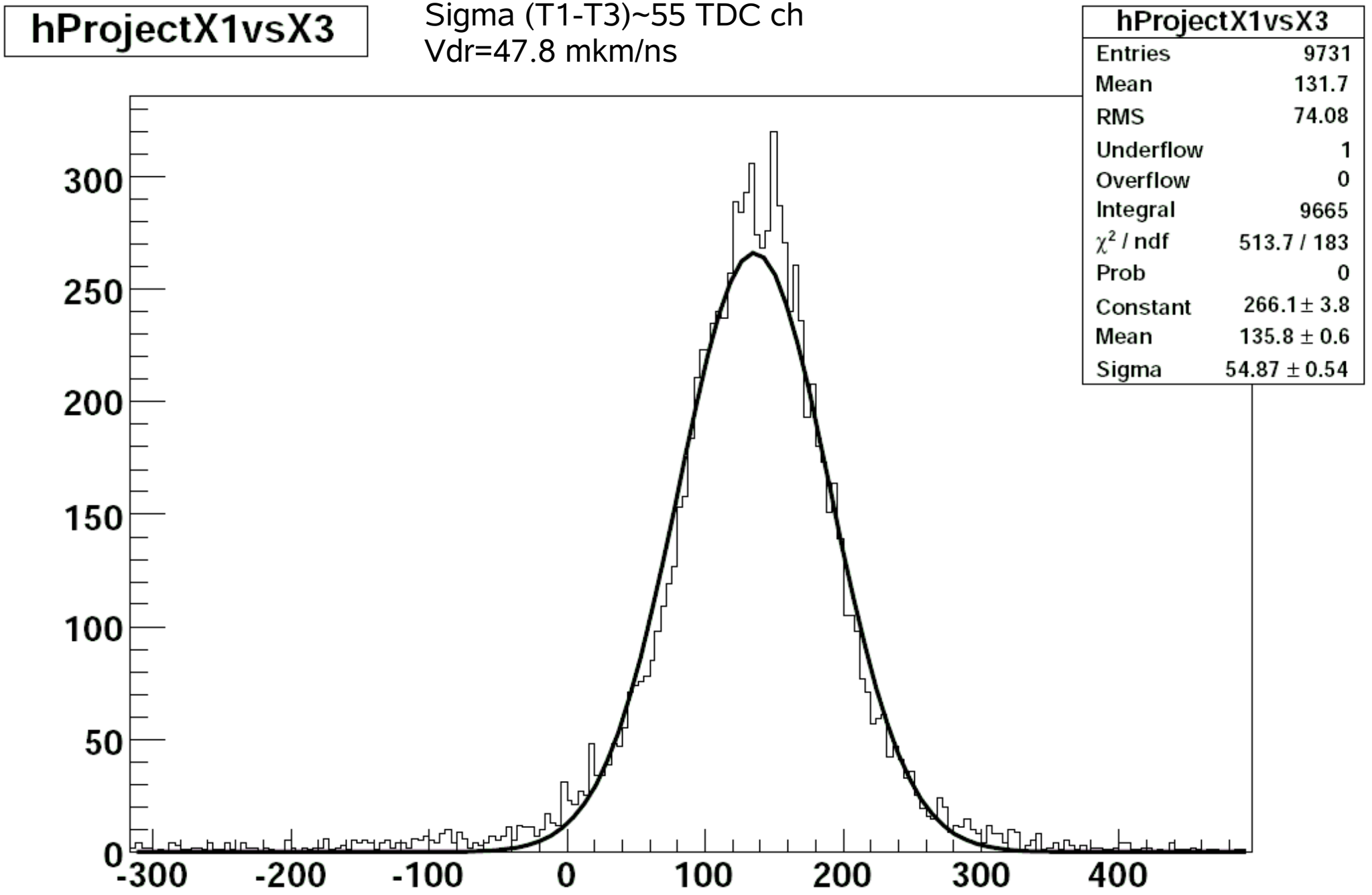

FdCh1X3 Time
FdCh1X3Time
Entries 296030
Mean 7234
RMS 750
Underflow 0
Overflow 3333
Integral 2.69e+05


hDriftTimeX3All
hDriftTimeX3All
Entries 80091
Mean 7401
RMS 294.9
Underflow 99
Overflow 85
Integral 7.991e+04


hDriftTimeVsDistanceX3

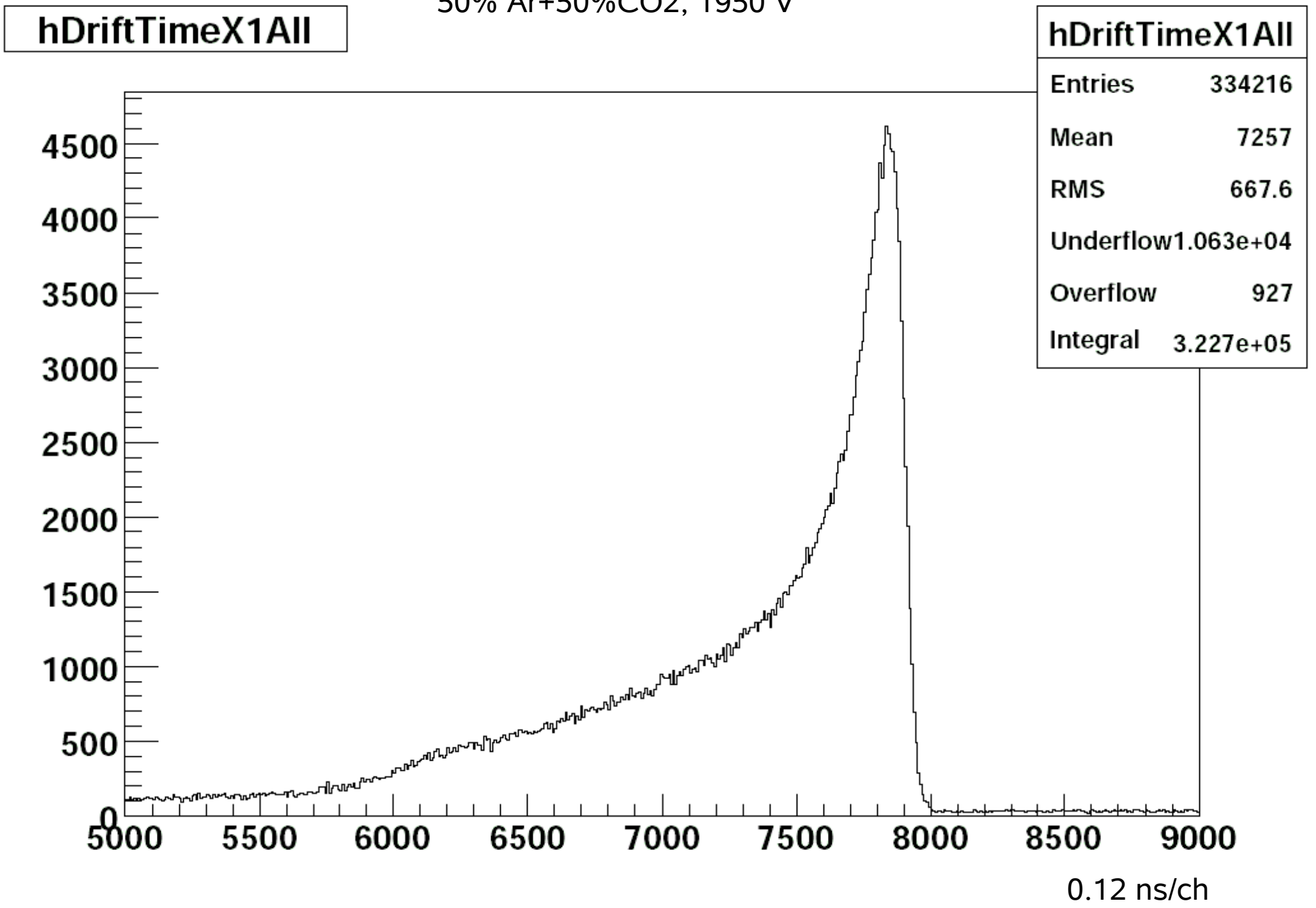

FdCh1X1 Time
FdCh1X1Time
Entries 2903961
Mean 7431
RMS 324.6
Underflow 0
Overflow 0
Integral 2.885e+06
30000
25000
20000
15000
10000
5000
0
6200
6400
6600
6800
7000
7200
7400
7600
7800
8000
8200

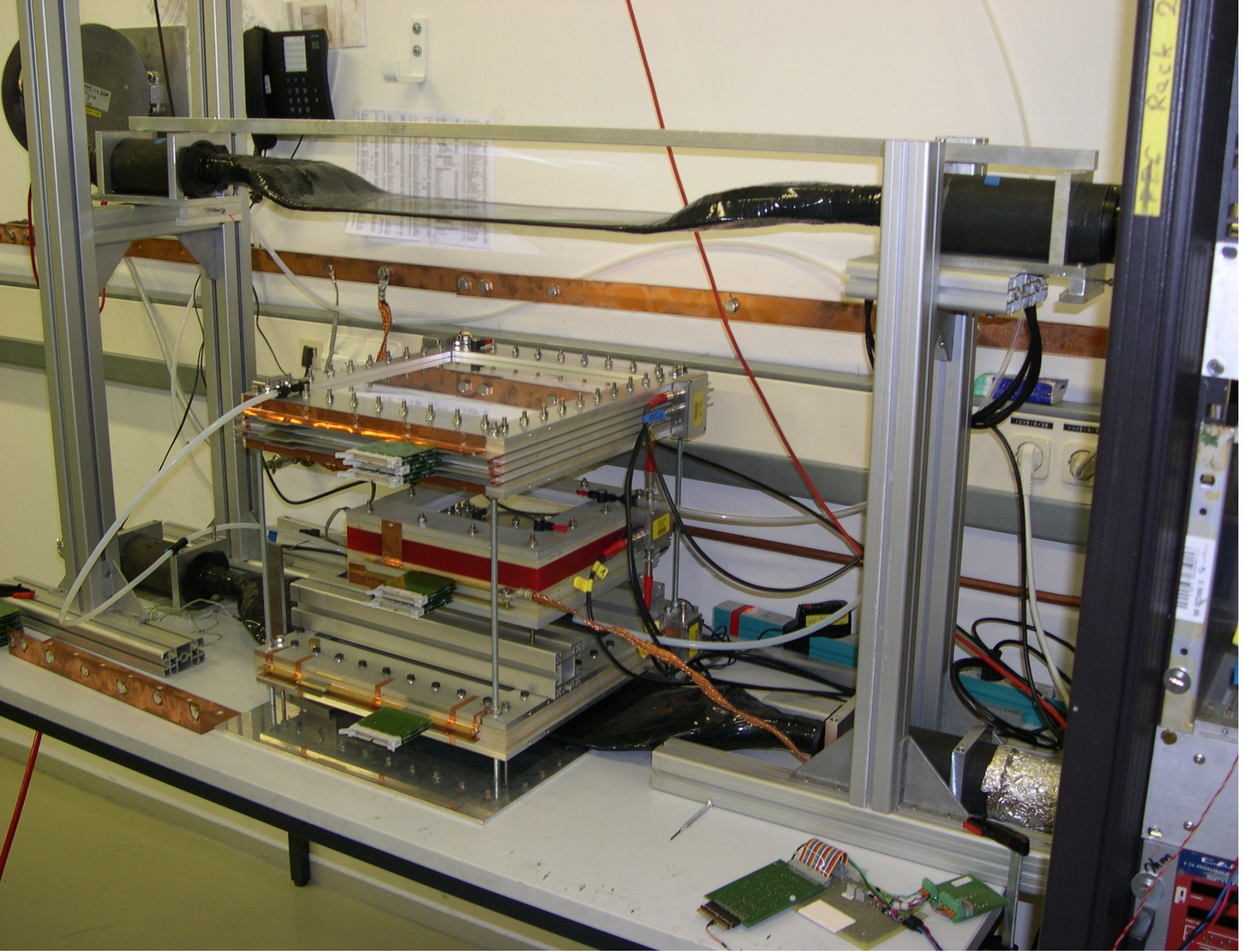

hDriftTimeX1All
hDriftTimeX1All
Entries 1808925
Mean 7477
RMS 277.6
Underflow 25
Overflow 14
Integral 1.809e+06
16000
14000
12000
10000
8000
6000
4000
2000
0
6800
7000
7200
7400
7600
7800
8000
8200
0.12 ns/ch



DC resolution (RMS)= 55x47.8x0.12/sqrt(2)~220 mkm

50% Ar+50%CO2, 1950 V





Straw tubes on the D2 exit window

4 mm straws, 25 mkm aluminized mylar, 2 vertical layers

S=4.4 mm, dZ=4 mm, 111 straws

Sensitive area 24x23 cm2, 20 mkm anode wires

All components available, construction in progress

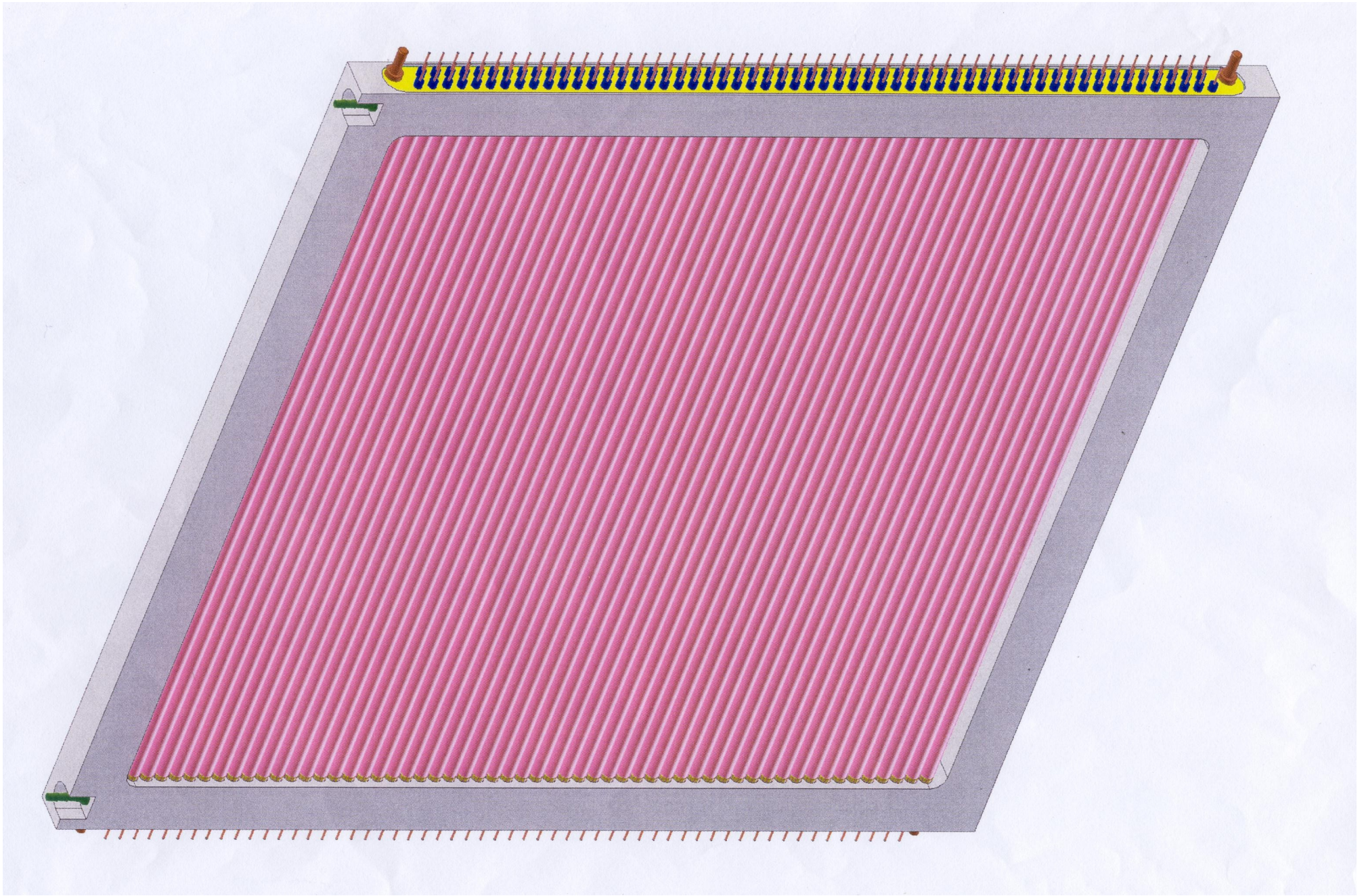
Electronics from WASA (spare) :

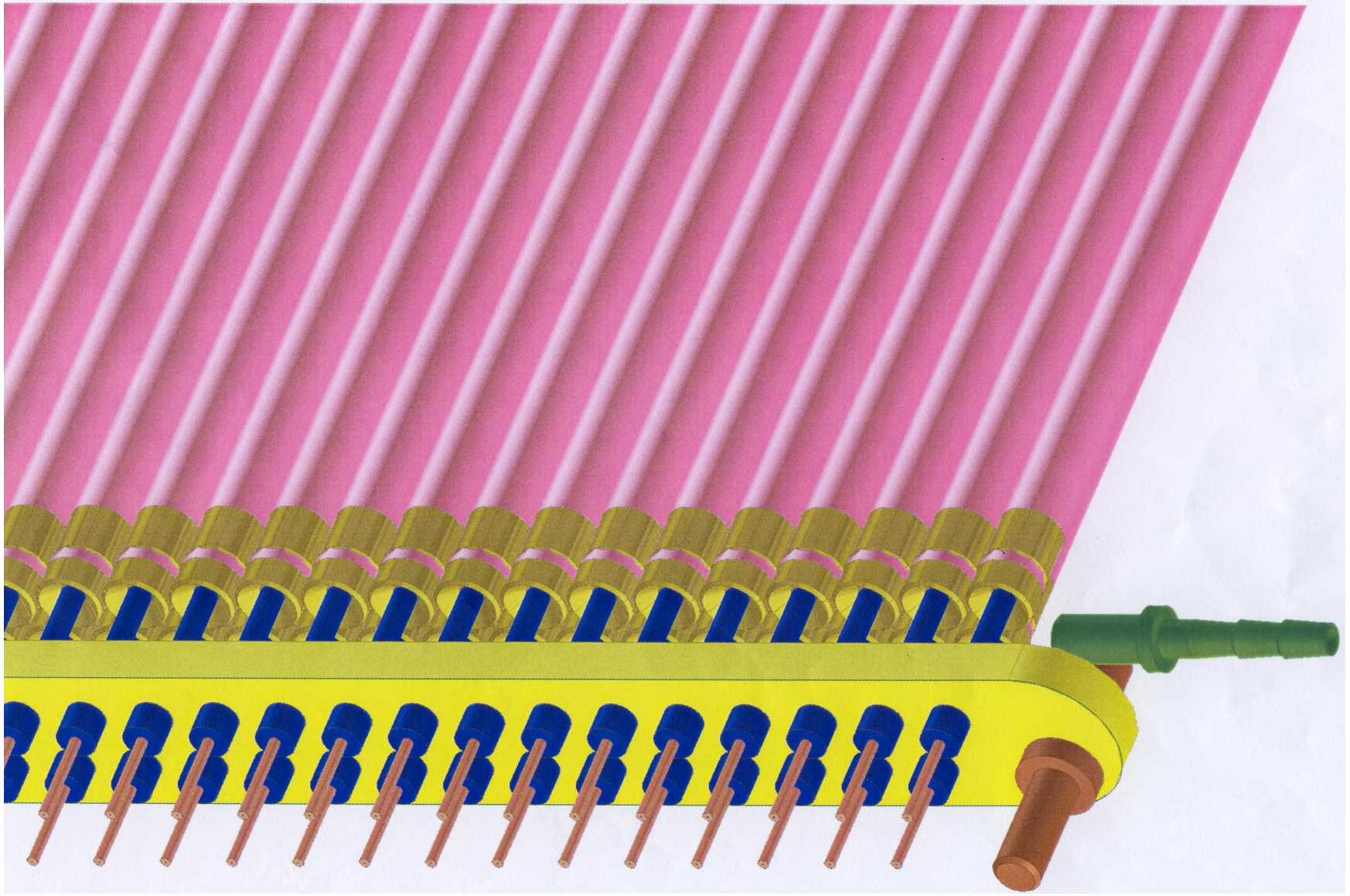
amplifier-discriminator CMP16,

TDC F1 (WASA type), integration into ANKE DAQ;

cables to be prepared;

Goal – installation during the summer shutdown, to be ready for September beam time





Summary

1. New drift chamber – design and problems understood;
basic tools and gadgets produced;
DC1 operational in ANKE ;
improvement needed in the calibration procedures:
alignment, t0, drift time space relation, resolution ;
new gas mixtures, optimizations;
to be studied on the cosmic ray setup in the Lab

DC3 – substitution of MWPC3, first half of 2008

2. Straw tubes on the D2 ANKE exit window:

all components available;
production in progress;
installation at COSY in summer shutdown