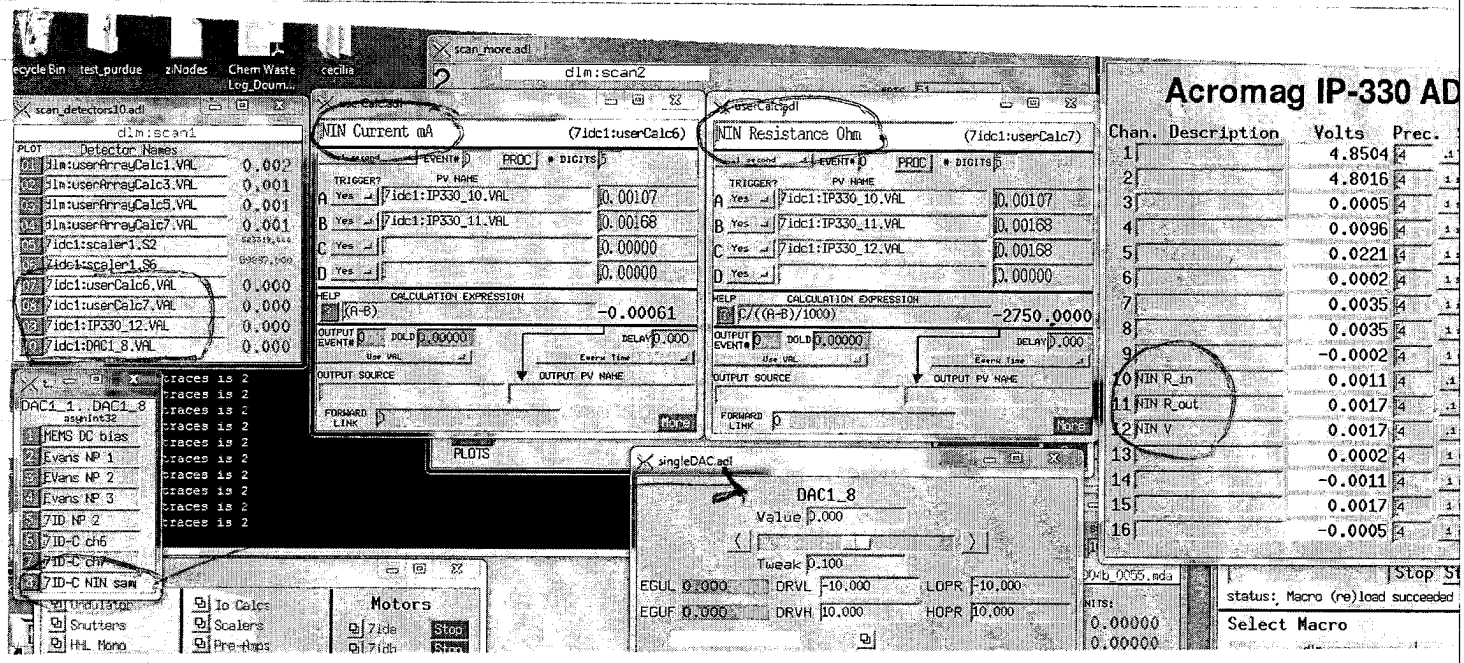
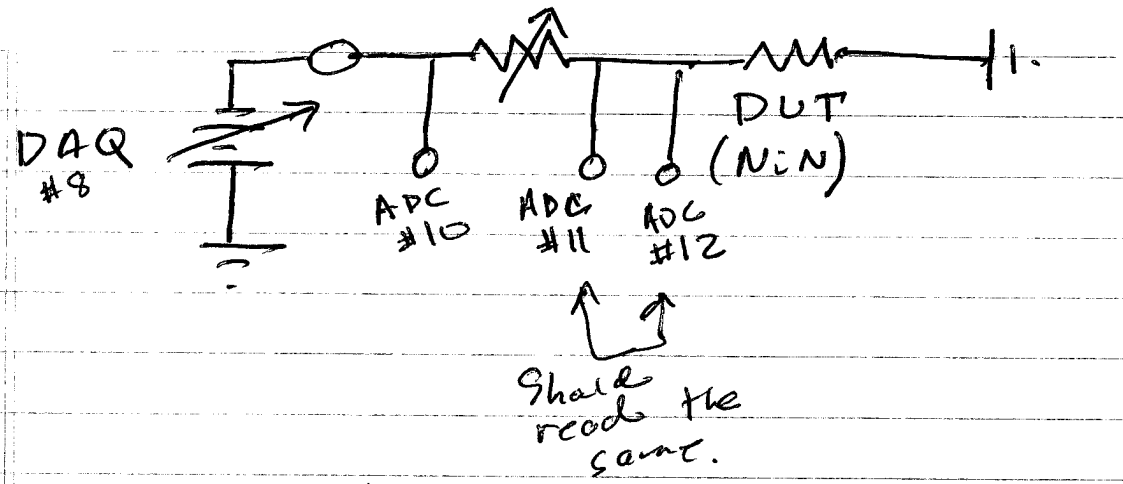
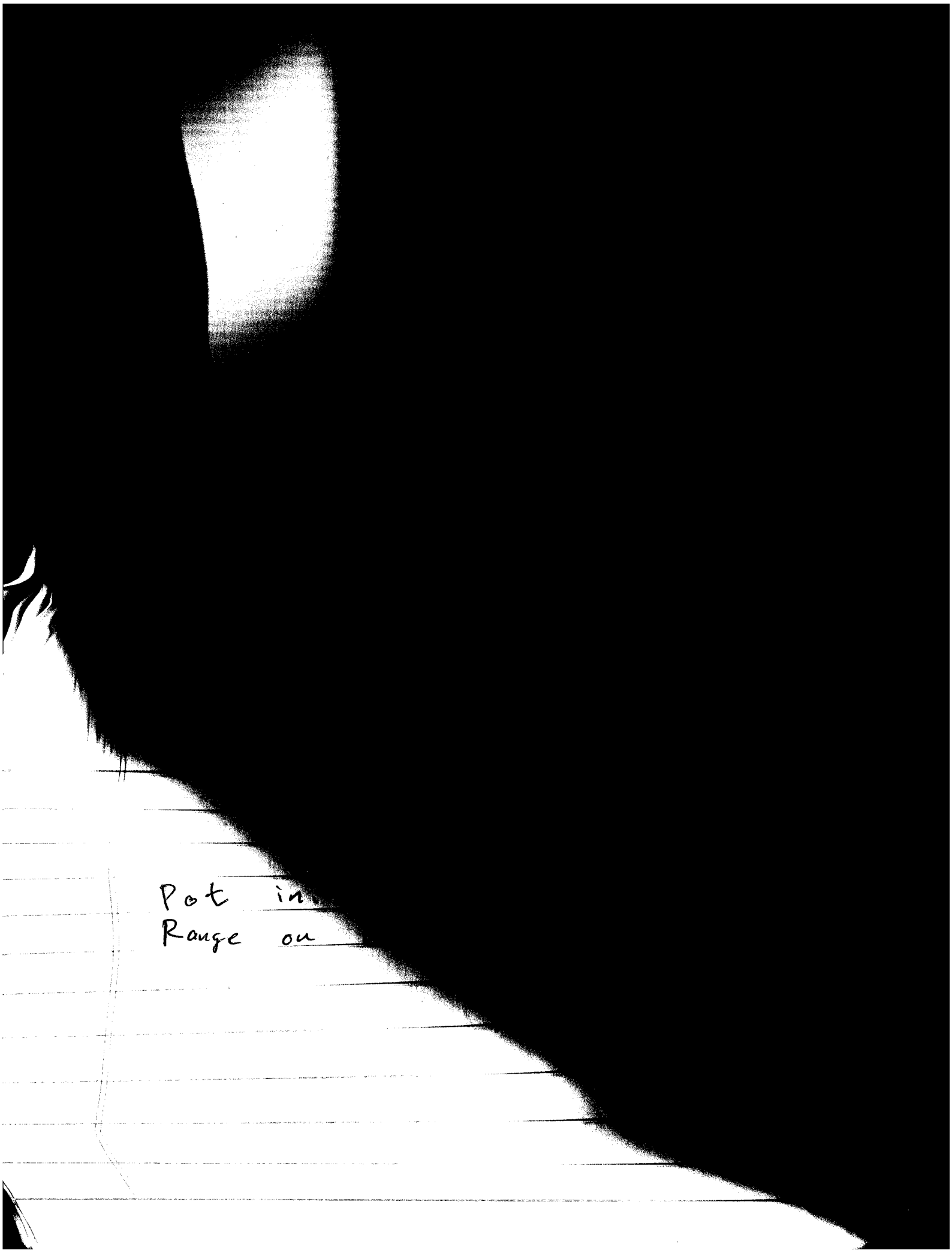
6/2
2PM

Det #7, current across NiN device in mA
Det #8 NiN resistance in Ω.
Det #9, voltage across NiN device in V
Det #10, Output voltage of DAQ (DAQ #8)

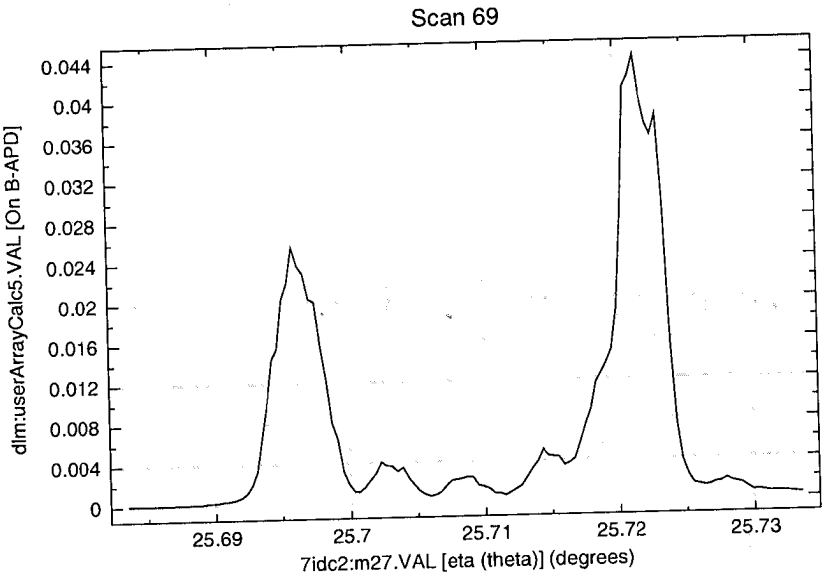




Pot initially set to 1000.0 Ω.
Range on DAQ is ±10V


Pot in
Range ou

Single photon mode
↳ amplifier 10.41 V. ⟷ 7.3 V.



~0.1 C

Scan started from 25.7085° = Θ

-.025 to +.025, 126 steps

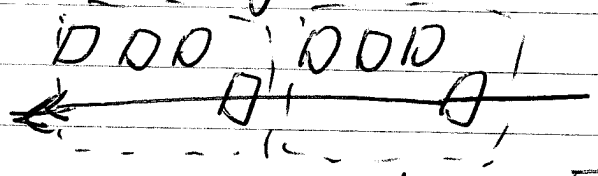
~~Saturates~~

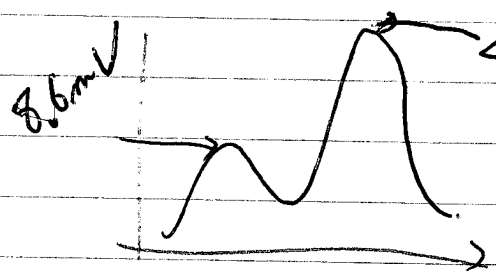
↳ Control Voltage = 7.2V 0.02A
Bias Voltage = +21V

↳ Now saturates at around ~0.12 V on Scope.

→ 4th pink-filter inserted for the Scan.

#80. filter change.





DAQ.
7ID-C
→ Analog
→ 7.7D-C NIM 6

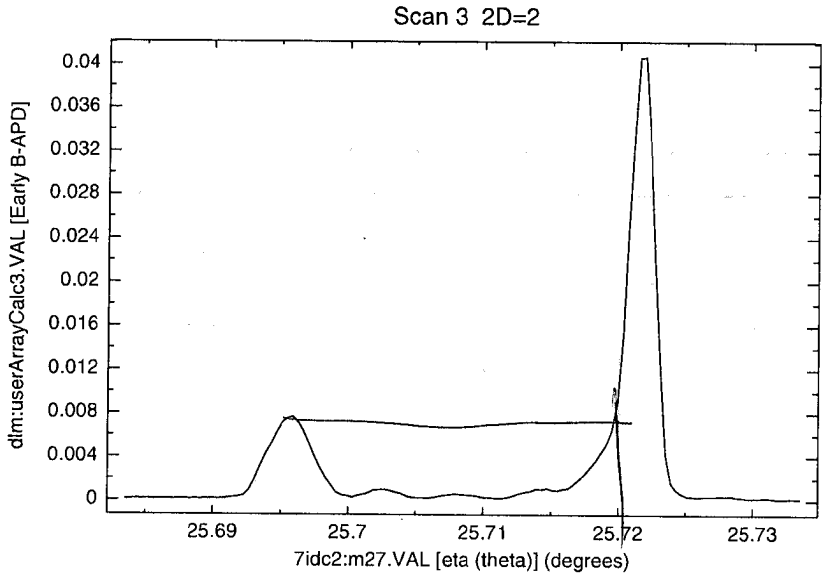
File name changed → NIN.

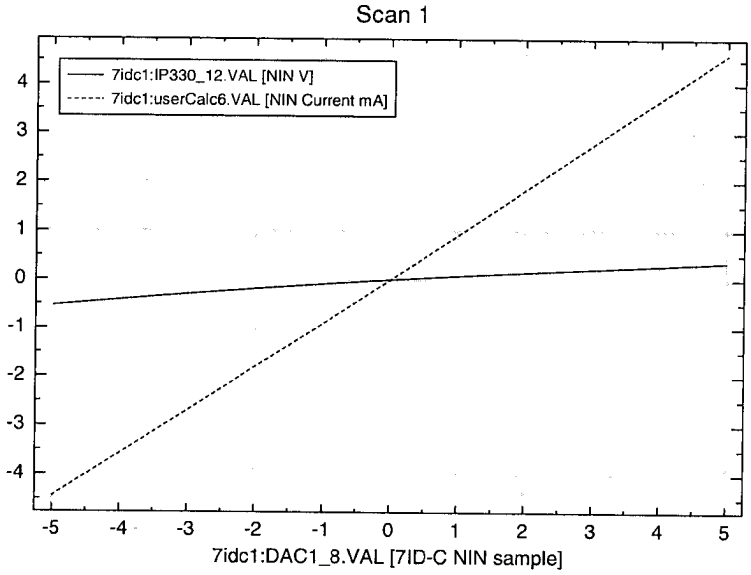
#1 I-V curve.

#2 th scan.

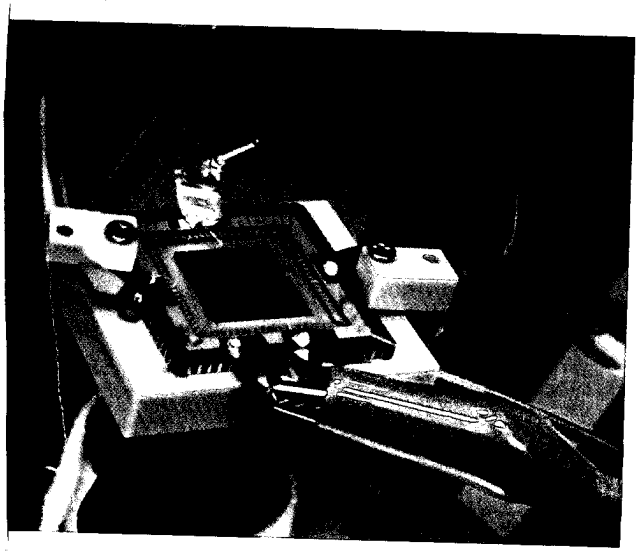
#3 2-D scan.

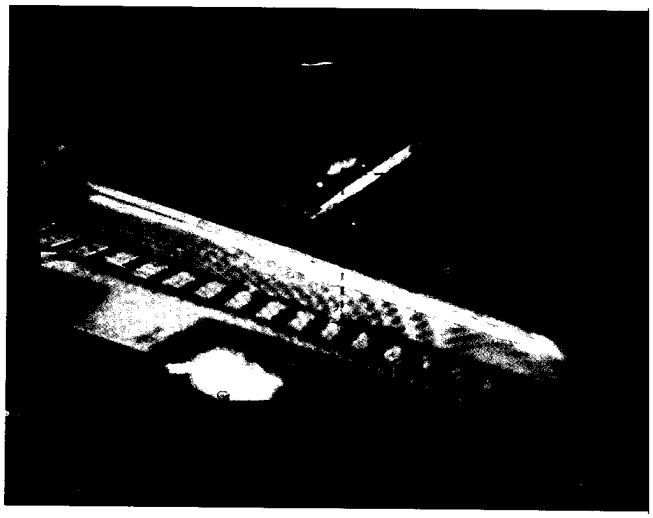
th: -0.025 ~ 0.025 126 steps, 0.4 mdegree
Vias: -10 ~ 10 11 points, 2 step size



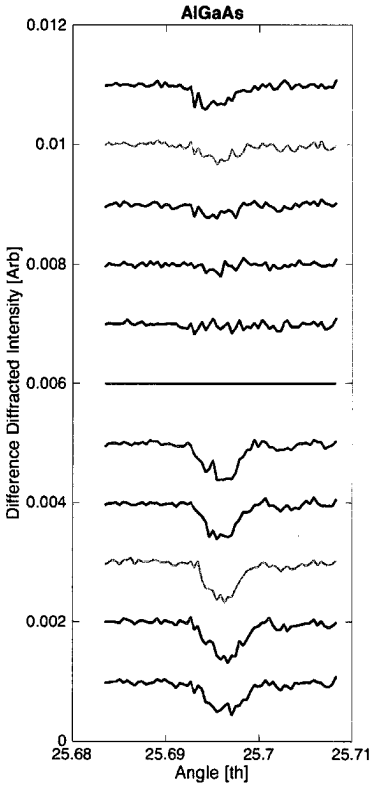


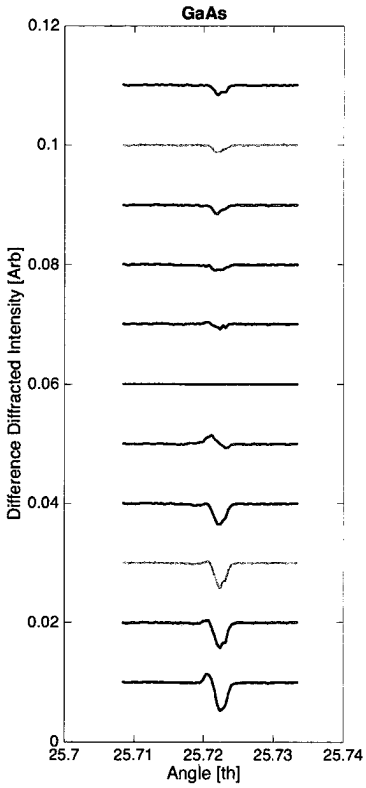
Scan #	AlGaAs Pos.	AlGaAs FWHM	GaAs Pos.	GaAs FWHM
1	$2.569573 \cdot 10^{1}$	$3.7208 \cdot 10^{-3}$	$2.572161 \cdot 10^{1}$	$2.1286 \cdot 10^{-3}$
2	$2.569571 \cdot 10^{1}$	$3.7254 \cdot 10^{-3}$	$2.572164 \cdot 10^{1}$	$2.1267 \cdot 10^{-3}$
3	$2.569574 \cdot 10^{1}$	$3.7451 \cdot 10^{-3}$	$2.572165 \cdot 10^{1}$	$2.1237 \cdot 10^{-3}$
4	$2.569575 \cdot 10^{1}$	$3.7376 \cdot 10^{-3}$	$2.572167 \cdot 10^{1}$	$2.1298 \cdot 10^{-3}$
5	$2.569574 \cdot 10^{1}$	$3.7107 \cdot 10^{-3}$	$2.572169 \cdot 10^{1}$	$2.1401 \cdot 10^{-3}$
6	$2.569577 \cdot 10^{1}$	$3.7361 \cdot 10^{-3}$	$2.572172 \cdot 10^{1}$	$2.1267 \cdot 10^{-3}$
7	$2.569578 \cdot 10^{1}$	$3.7493 \cdot 10^{-3}$	$2.572170 \cdot 10^{1}$	$2.1474 \cdot 10^{-3}$
8	$2.569577 \cdot 10^{1}$	$3.7455 \cdot 10^{-3}$	$2.572171 \cdot 10^{1}$	$2.1291 \cdot 10^{-3}$
9	$2.569579 \cdot 10^{1}$	$3.7823 \cdot 10^{-3}$	$2.572171 \cdot 10^{1}$	$2.1413 \cdot 10^{-3}$
10	$2.569577 \cdot 10^{1}$	$3.7319 \cdot 10^{-3}$	$2.572171 \cdot 10^{1}$	$2.1453 \cdot 10^{-3}$
11	$2.569579 \cdot 10^{1}$	$3.7134 \cdot 10^{-3}$	$2.572170 \cdot 10^{1}$	$2.1365 \cdot 10^{-3}$

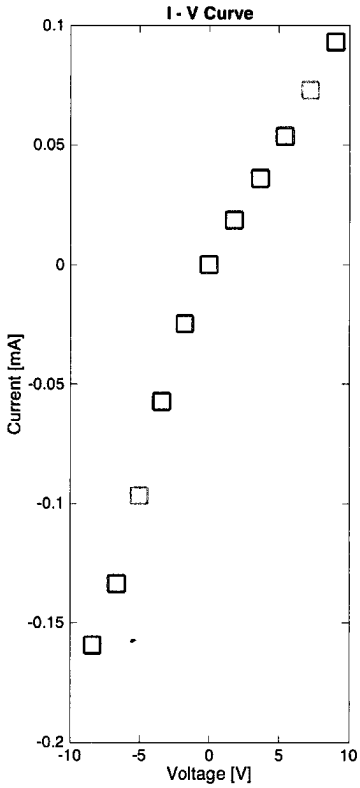




US atomic -







Time-Scan / with Bais ;

→ GaAs angle $\theta = 25.720°$

→ AlGaAs Angle $\theta = 25.694°$

N2N Scan #3 Laser OFF 1b $\theta = -0.025 \sim 0.025$
126 pts.

Scan #4 Pump

Scan #5 Laser ON, NP = 40
$\theta = -0.025 \sim 0.025$

Scan #6 Laser ON, NP = 28
same angle Scan

2D Scan Time

inner bias; -10 ~ +10 ; [1]

outer Time; (-4 +1) e^{-9} s

Time start
80.8416 x 10^{-6}

single DAC.adl → C-Hutch
↳ Analog I/O
↳ DAC out → 7D-C
NEN sample

Scan #017

GaAs - side angle (25.720°)

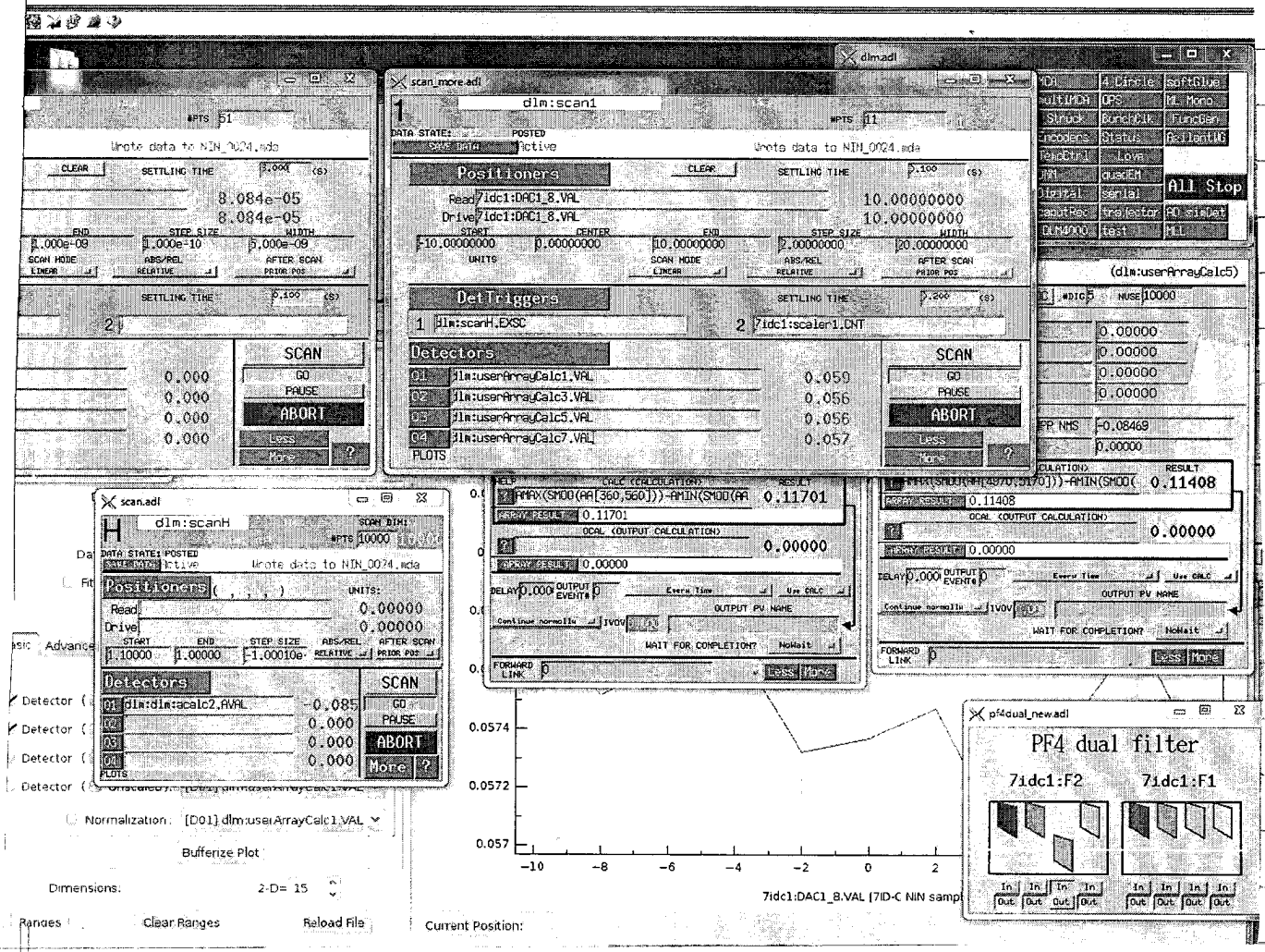
2D Scan (Bias + Time)

Scan #21 Same, but at AlGaAs-shift angle of θ = 25.694°.
2D Scan (Bias + time).

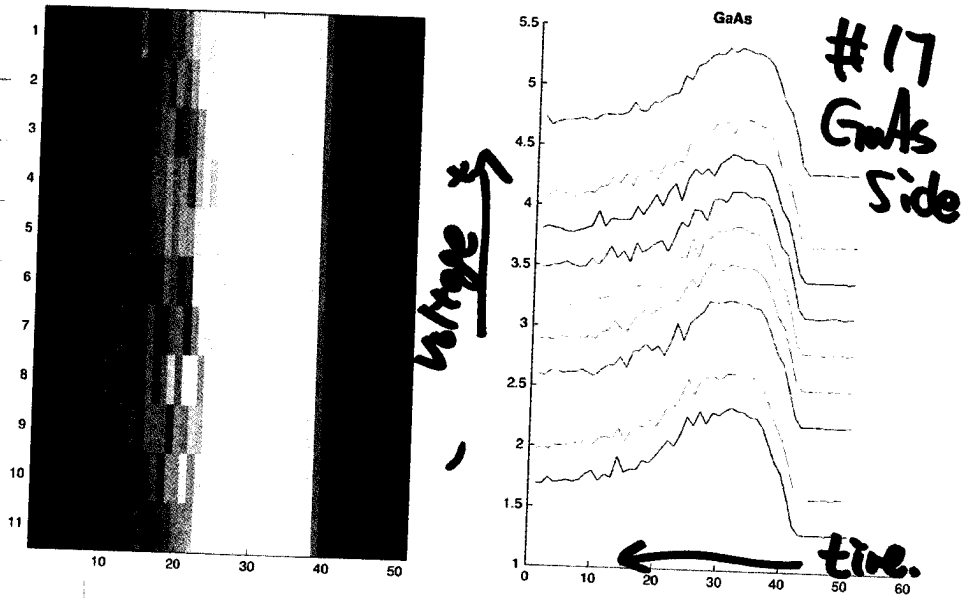
Scan 27 2D (Angle time)
Angle θ: -0.012 ~ 0.008, 61 pts
Time -4 x 10^{-9} ~ 1 x 10^{-9}, 51 pts
↳ Zero Bais

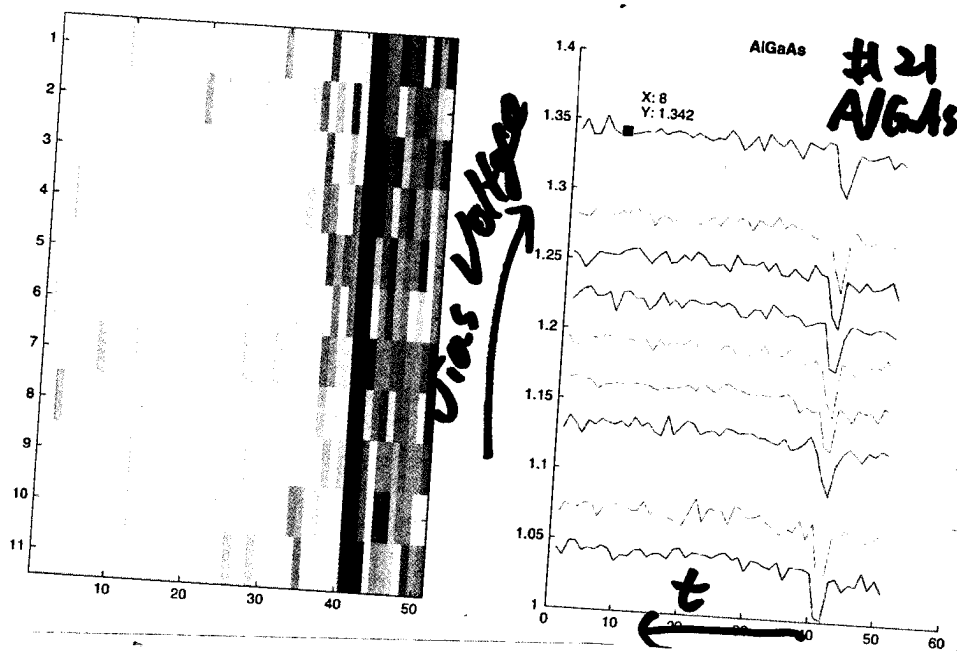
Scan #35.
AlGaAs measurement. → No attenuator!
Rocking curve th: 25.6957.
time scan, -0.012 ~ 0.08, 61 points
No Bias Delay: 80.8416 x 10^{-6}
-4ns ~ 1ns, 51 points

↳ user-calc → user array calc.



↳ Scan parameters for Bars vs Time





-10V, AlGaAs peak Time evolution.

(DAC1_8 : -10
thscan : -0.012 ~ 0.012, 61 step
Delay " : -4ns ~ 1ns, 51 steps
#036)

⇒ This Data is same with which is not apply Voltage (#35)
ABORT IT.

We Reduced Laser power,
Check peak positions again!

#37 th scan. "WP: 0"

#38. th 25.694 (AlGaAs Left side)
Tirescan -4ns ~ 1ns, 51. ~~V=+10~~ V=-1

#39 th 25.720 (GaAs Left side)
Tirescan. ~~V=+10~~ V=-1

→ #38, #39, at WP 0, GaAs moves but AlGaAs don't

Let's find minimum wp Energy which can make ~~AlGaA~~ move?
→ WP scan.. Do Later.

For. Rev Voltage.

~~#40.~~ ~~delay: 80.8415 x10^-6~~
~~th: 25.694~~

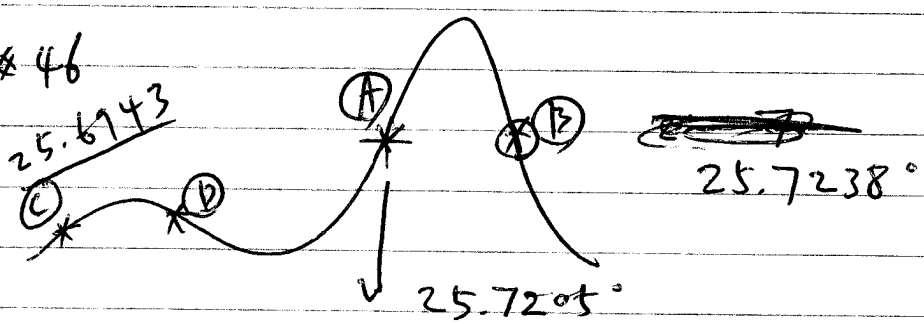
~~#40~~
#42 th: 25.72 (GaAs side)
V = +10 V.

#43 th: 25.72 (GaAs side)
V = 0 V.
: Laser down!!"

#44.

th : 25.7216 (GaAs) center.

th. -0.01 ~0.01, 101 x scan / -V = 0.



Bias Scan : -10 ~ 10, 51 steps.

At A,

#47 : Repeat

#48 : Repeat

#49 : Repeat

#50 : Repeat

When Bais is on

"Contraction"

At B

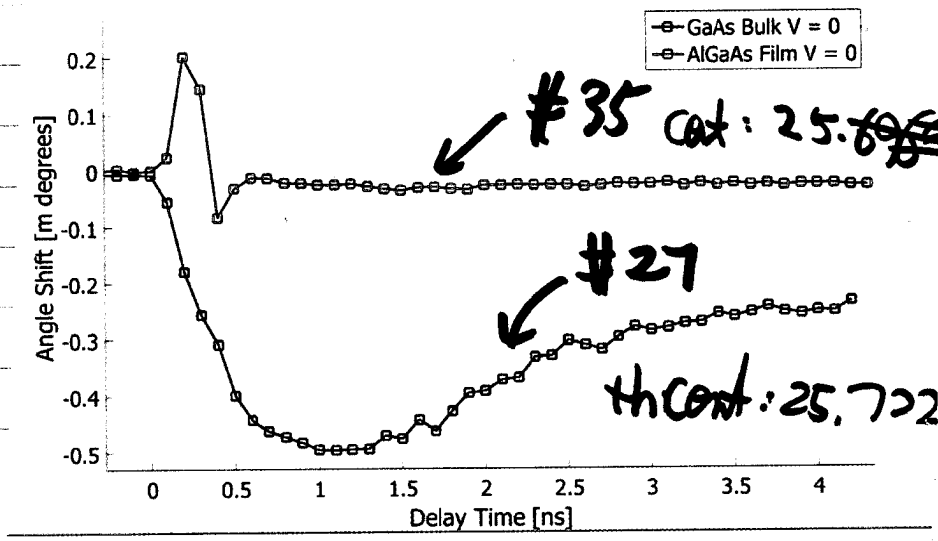
#51 ; Repeat

At C

#52, #53, #54, #55

At C

#56



#35 cat: 25.~~6955~~ 6957

#27

thCent: 25.7222

~~#26~~. GaAs center shift.

th: 25.7222, delay: 80.8416×10^{-6}, WP: 34, V = 0

th: −0.012 ~ 0.008, 61

del: −4ns ~ 1ns, 51 points

~~#60~~ 62. th: 25.72 (GaAs side)

V = −10, WP: 44.8

timescan −4ns ~ 1ns, 51st

~~#61~~ 63 " "

V = 0.

64

V = +10

2-D Scan.

Delay: −6ns ~ 1ns 50ps step, 141

Bias: −10 ~ 10 ~ 11 steps.

#65 th: 25.72.

Delay: 84.8416×10^{-6}

None changed.

↳ NZN_S002_# .mda

WP: 44.8.

#1 — V10 $-6e^{-9} \sim +1e^{-9}$

#2 — V0. $\Delta t = 5$ ops, 141 pts

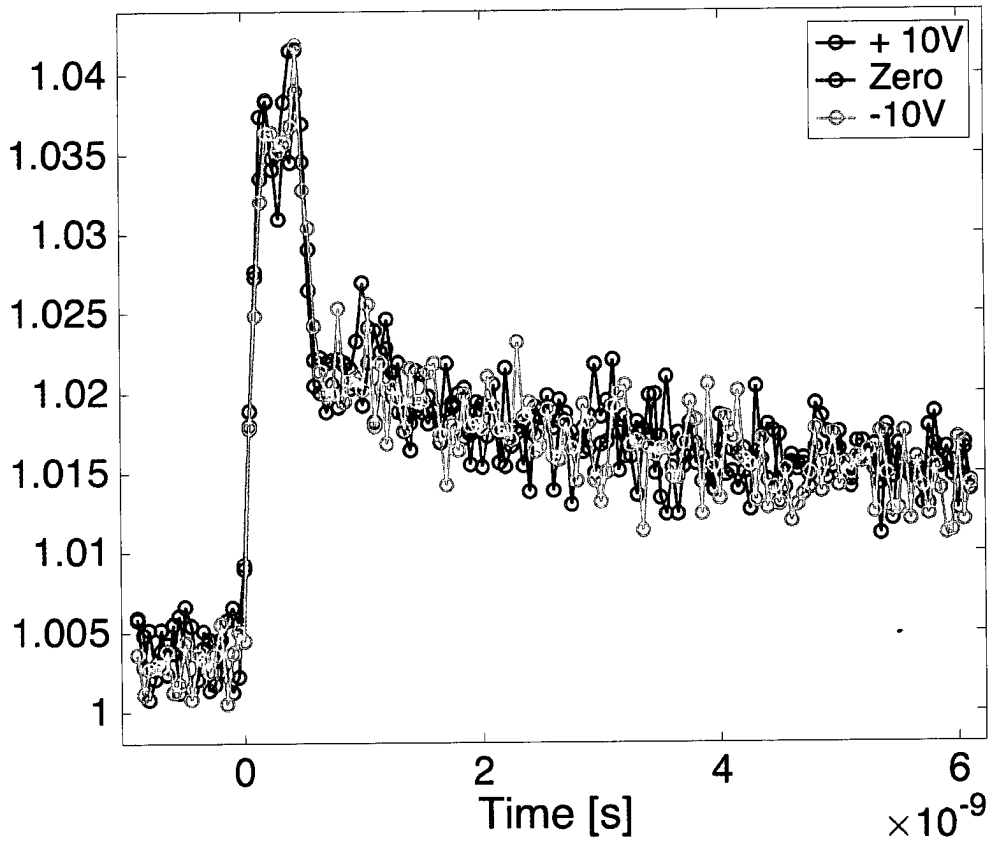
#3 — −10V

#4 → 10V. #8 → 0V. #13 → −10

#5 → 10V. #9 → 0V. #14 → −10

#6 → 10V. #10 → 0V #15 → −10

#7 → 10V. #12 → 0V. #16 → −10V



$\frac{\lambda}{2} = 37°$; increased the power

Scan 17 $\theta = 25.720$

$\theta = 25.6945$ AlGaAs

Same time Scan.

Bias = 0 Scan 18

#19; Repeat #18: time-range changed

$-6 \times 10^{-9} \sim 1 \times 10^{-9}$

Bias = -10

#20; Repeat 19 with Bias = +10

#21: X-rays off (shuttered)
I-V curves as a function of laser po
Scan 1: −10 to +10 V_{ADC} 101 steps.
Scan 2: WP = 45° to 28°, 18 steps.

#22 1D scan of I-V curve,
X-rays ~~on~~ off, laser nearly off (WP = 4

#23, X-rays on, IV curve again

Conclusion: Out of ~10mA total current at ~ −1V, less than 0.2 mA is generated by laser or x-rays.

#24. Alignment laser only on sample
See large change in R, I
(~factor of 2).

#26 Θ = ~~27.~~ ~~25.270°~~ 25.720°
(side of GaAs).
I-V scan with x-rays on
X-rays look same as before

#27 Θ = 25.694° (AlGaAs)
No pattern during I-V scan.

~~Next page~~
Changed Shunt Resistor to 100.0Ω
Changed user Calcs. Can now drive full ±20mA through sample.
See I-V curve following pages

Scan 40 2D Scan

Inner Loop: ⊖, 126 pts accross peak

Outer loop: V_{APD} -5 to +5 21 pts

At T = 80.8414 μs of delay (max effec

Can compare On vs Off for each peak as a function of bias.

No effect seen from peak shift

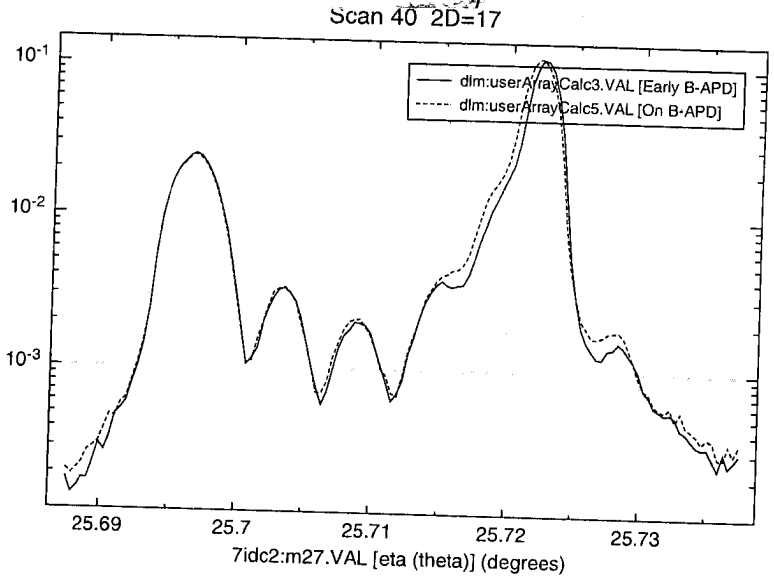
WP = 280°

I (mA)	V		GaAs ON	GaAs EARLY	GaAs SHIFT	AlGaAs ON	AlGaAs EARLY	AlGaAs SHIFT
-22.8	-1.87	25.72204	25.72235	-0.00031	25.69667	25.69669	-0.00002	
-22.78	-1.86	25.72193	25.72225	-0.00032	25.69658	25.6966	-0.00002	
-21.3	-1.81	25.72192	25.72223	-0.00031	25.69654	25.69656	-0.00002	
-17.8	-1.67	25.72195	25.72227	-0.00032	25.69656	25.69658	-0.00002	
-14.57	-1.5	25.72201	25.72233	-0.00032	25.69657	25.69661	-0.00004	
-11.56	-1.31	25.72211	25.72241	-0.0003	25.6966	25.69663	-0.00003	
-8.92	-1.08	25.7221	25.72241	-0.00031	25.69662	25.69664	-0.00002	
-6.62	-0.82	25.72216	25.72246	-0.0003	25.69665	25.69667	-0.00002	
-4.54	-0.54	25.72218	25.72249	-0.00031	25.69666	25.69669	-0.00003	
-2.41	-0.25	25.7222	25.72251	-0.00031	25.69667	25.6967	-0.00003	
0	0	25.72222	25.72253	-0.00031	25.69668	25.69671	-0.00003	
2.76	0.21	25.72223	25.72254	-0.00031	25.69667	25.69671	-0.00004	
5.65	0.42	25.72222	25.72253	-0.00031	25.69666	25.6967	-0.00004	
8.55	0.62	25.72221	25.72252	-0.00031	25.69667	25.69669	-0.00002	
11.46	0.83				25.69664	25.69666	-0.00002	
14.45	1.01				25.69663	25.69666	-0.00003	
17.65	1.18				25.69659	25.69661	-0.00002	

↑ 1

No pattern.

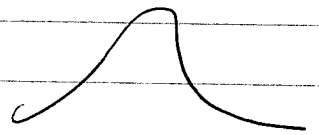
However this scan does have lots of beautiful rocking curves...



Lots of these for each bias, 80.8414 μs delay.

Scan 41. Same as ~~Scan~~ Scan 40, but different laser delay: 80.8404 μs, or ~1 ns after TΦ.
Started 3 pm. Ending ~5 pm.
WP = 28°.

Want to see time-response on Lower side of AlGaAs once more



Bias = 1
-1.5×10^{-9} ~ 1×10^{-9} ; 51 pts.
Scan #42

$\frac{\lambda}{2} = 28°$

Repeat with Bias = 10
Scan #43

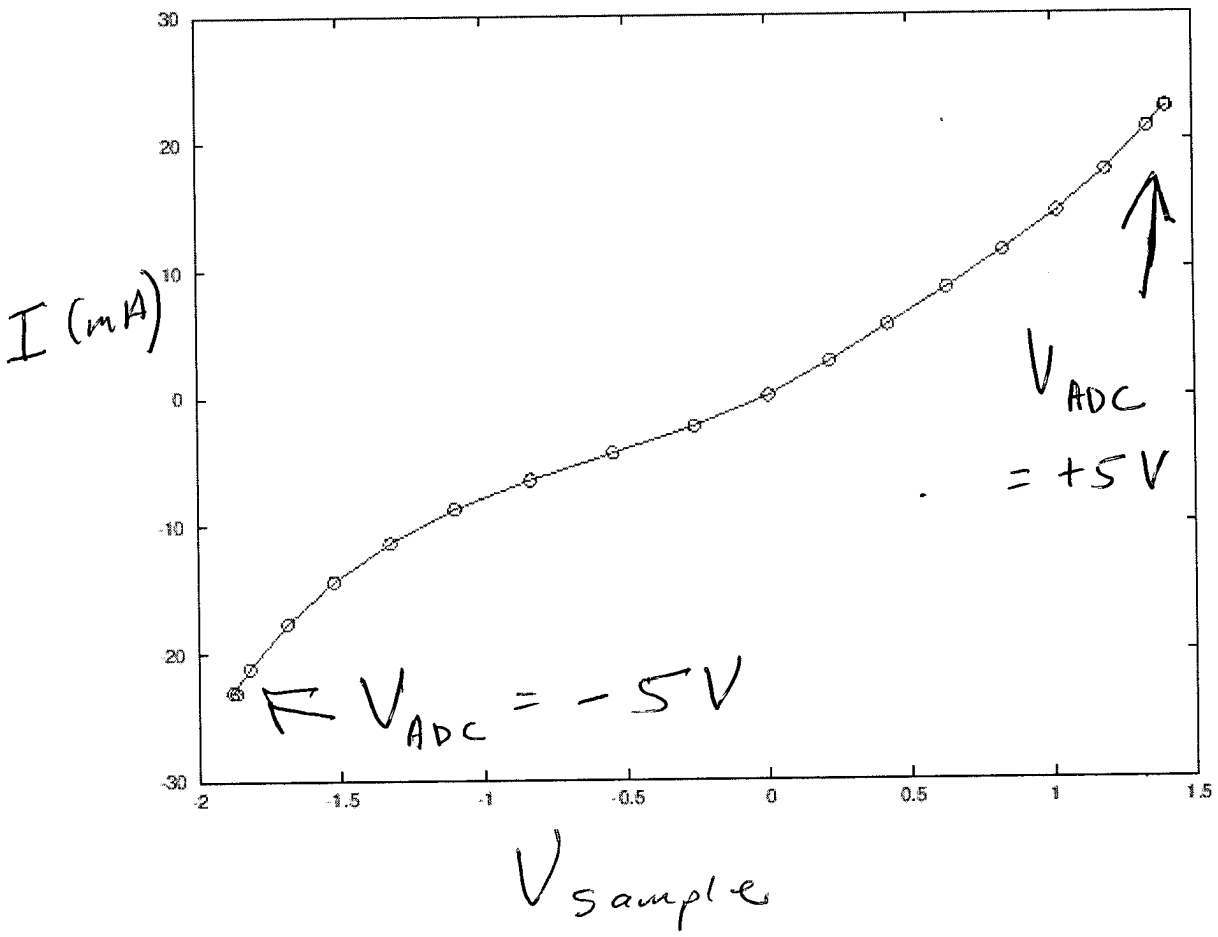
Repeat Bias = -10
Scan #44

Bias = -10, -10 ns ~ 1 ns
Scan #45

Bias = +10 -10 ns ~ 1 ns
Scan #46
Scan #47

Scan # 48 Bias = -10, 101 steps.
-10 ns ~ 1 ns

Note: Current I-V curve:
run V_{ADC} from -5 to $+5$ V.



1.97

~ 1 ns ; (10.10 us)

Well Nothing is really working out.

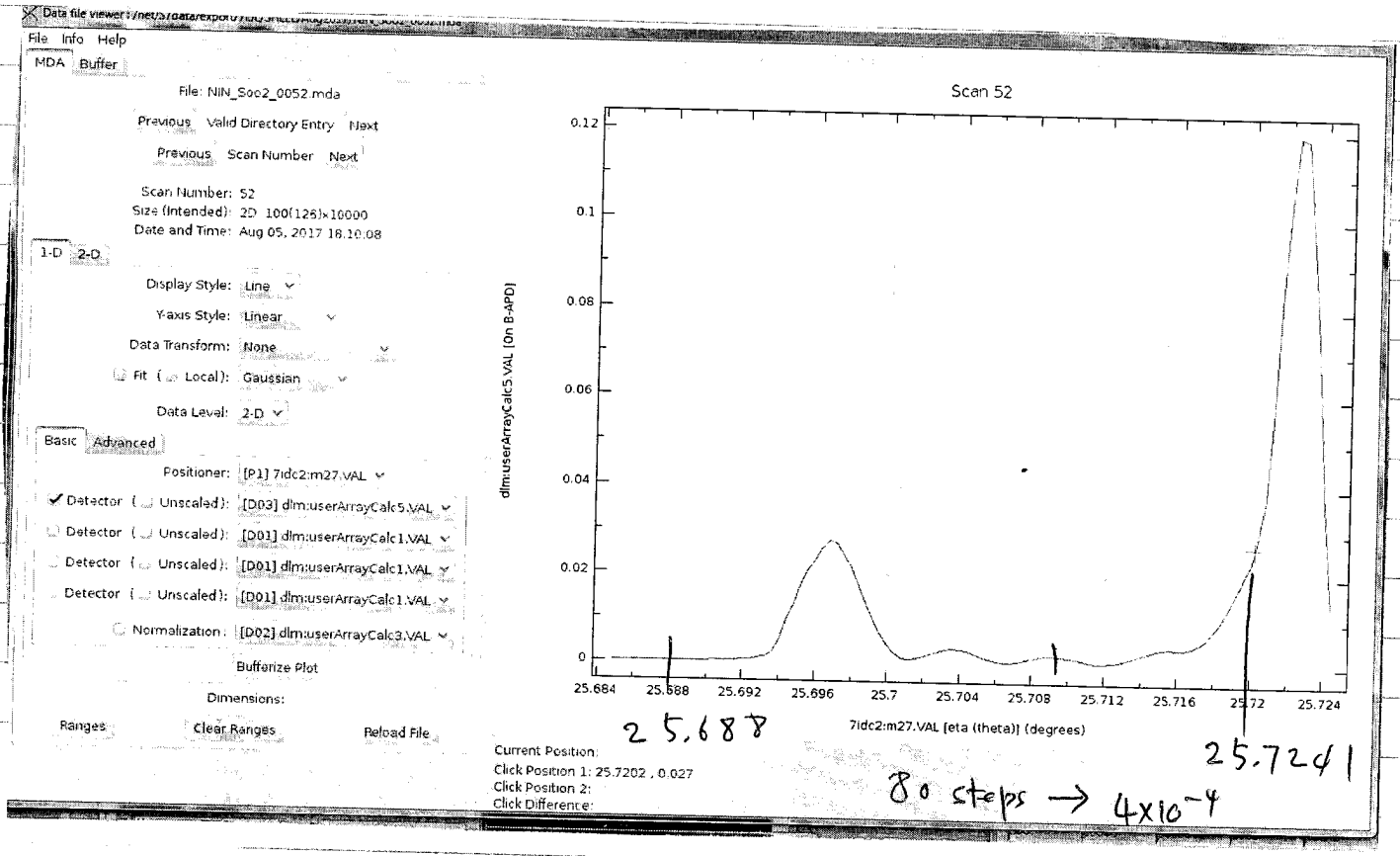
I am going to take a high resolution rocking curve
Scan with bias = 0
$\pm$ 0.025, 126 steps.
↳ put filter in-between
near GaAs peak.

Re-centering

#52 → Re-centering sample

$\pm 2.5 \times 10^{-2}$, 126 pts

↳ 4×10^{-4} step size



#53

Time-Scan at 25.7241

-4ns ~ 1ns ; 50 ps resolution

No PF4 filter on.

#54

Repeat @ 25.7182

#55

Repeat @ 25.6942 (AlGaAs)

#57. 2D scan. (th, delay)

Start at 7:18 PM
05-08-2017

absolute scan:

th center: 25.7040.
Delay : 80.8416×10^{-6}
No x-ray filter,
Laser waveplate : 37.
No Bias : 0.
th ~~[illegible]~~ $- 1.6 \times 10^{-2} \sim 1.6 \times 10^{-2}$, 81 steps (0.4mdg
Delay : -6ns ~ 1ns 51 steps, (100ps.)

Mistake!

#~~58~~ 2D scan again? WP=37.

#64. To check again

#66 2D scan again! ← @ AlGaAs

GaAs scan.

#69. filter.

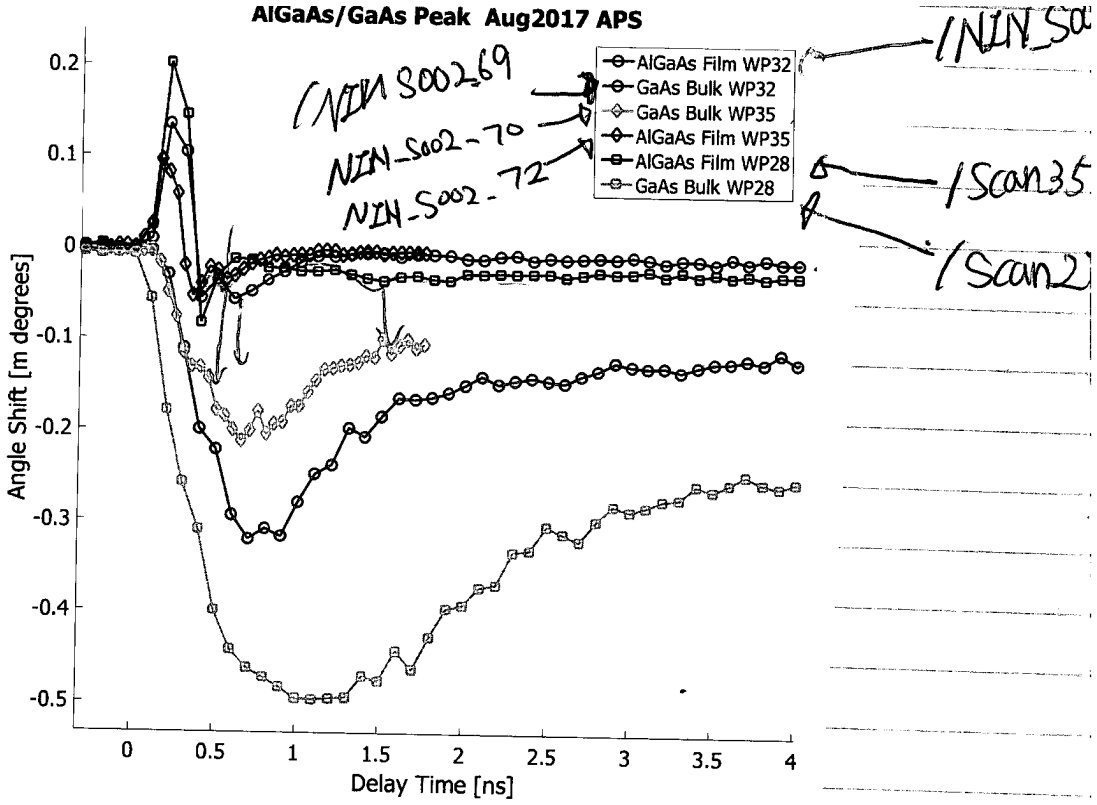
all off on off off off all off
□ □ ~~■~~ ~~■~~ ○ ○ ○ ○
~~▲~~ ○ ~~✕~~
pink.

thCenter., -0.008 ~ 0.008, 41 points.

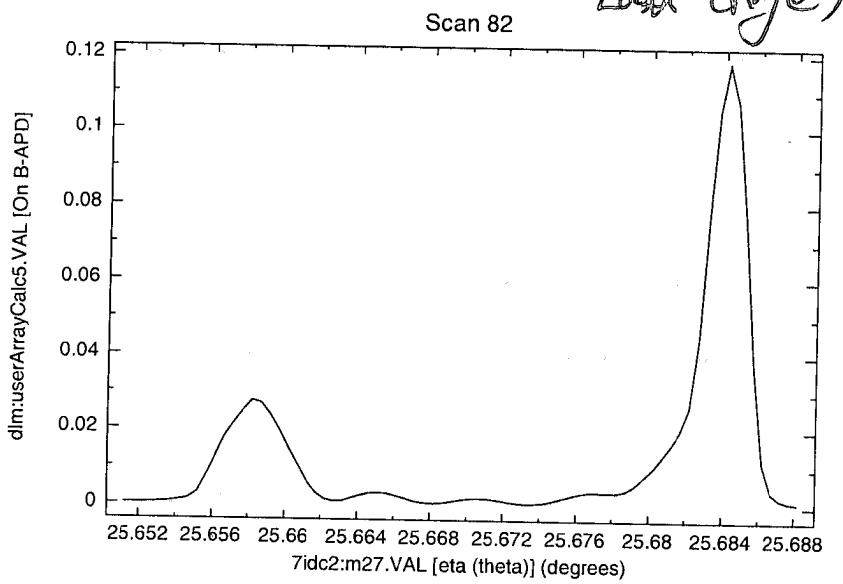
#70. th (GaAs scan)
2D scan. -1.5ns ~ 0.5ns, 50ps, ~~41~~ steps.
(WP 38)

#71 th (AlGaAs) 25.6969 ~~25.6964~~ ~~25.6969~~ ~~25.68~~

#72 th (AlGaAs) scan.
2D (WP 38)



After Sample re-locate. (Lower dhyte)



Change over to Second Harmonic
8-6-2017

→ Check timing (Scope)

→ AlGaAs side time-Scan
→ GaAs side time-Scan

→ Quick bias check for both ± 5.

→ 2p Angle - time Scan → Shape analysis will matter (19) 3

Current T_0 = 80.8416e-6

AlGaAs θ_c = 25.697
GaAs θ_c = 25.72256

NOT SURE ABOUT LASER CONVERSION EFFC.

AM 07:15.
Changed Laser photon Energy → 400nm
find X-ray diffraction again.
-chi : 89.7940, pi : 91.4955

GaAs : #77, Center : 25.6842
AlGaAs : #80, Center : 25.65840.

Find T_0 test shot
#88 (at) side of GaAs. th: 25.6830 V=0
#89 -4ns ~ 1ns. s=1ps?
#89 -20ns ~ 1ns s=1ns,
#90 (at) side of AlGaAs th: 25.6562. V=0

#91. AlGaAs. -20ns ~ 1ns, δt=1ns. th 24

Add Bias -5V

#92. Same with #91

Add Bias +5V

#93, Same with #91

#94. -180ns ~ 1ns, δt=1ns

Bias zero

#95 -150ns ~ 1ns, δt=1ns

Add Bias -5V

#96 -150ns ~ 1ns, δt=1ns

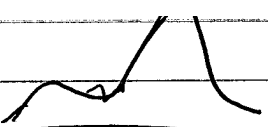
LEF

Add Bias -5V th=25.6830 : GaAs side

#97 -150ns ~ 1ns, δt=1ns

Add Bias 0. zero.

#98 -150ns ~ 1ns δt=1ns

#99 th 1-D scan 

← ± 0.025 degree →

Delay : .80.8416 X 10^-6

#100

Delay : 80.8418. X 10^-6 (-200 ps)

± 30 m degree th scan.

#101

Delay : -1 ns before 80.8416 X 10^-6

Rescan.

2D scan.

WP = 25.

#102 delay -3 ns ~ 1 ns, δt = 50 ps

@ th : 25.672. ± 30 m degree

Start 10 AM.

Scan 103 Same as 102 but

broad time range

~~± 1 ns~~ -1.59 ns to +1 ns 41 steps

(4 ns / step). Θ = 25.672° center, 126 avg. pts

(0.04 m deg). Started 4:30 pm

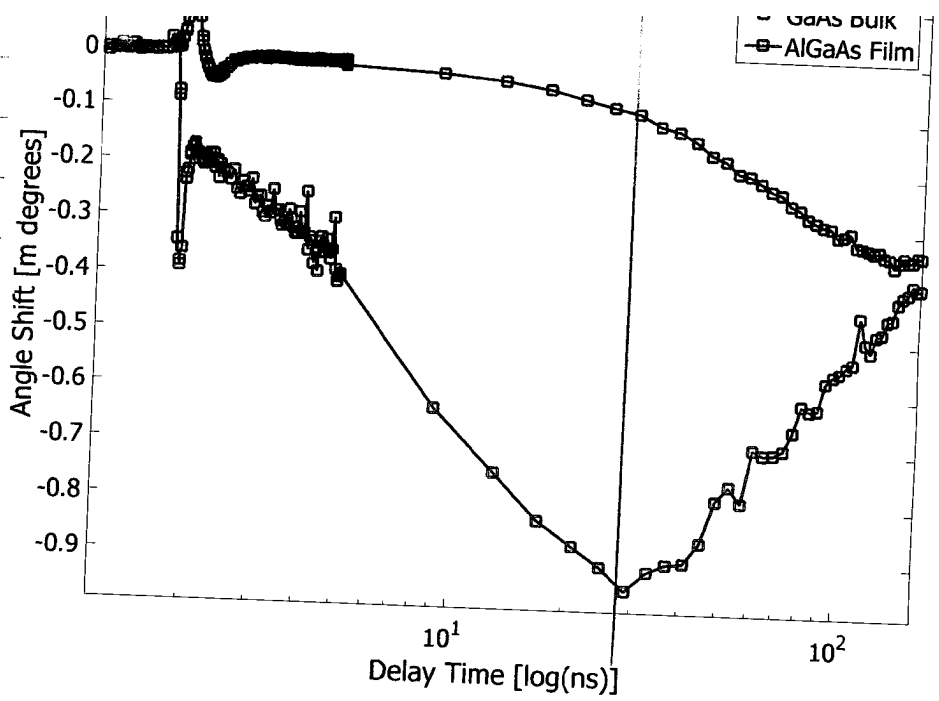
Scan 104

delay $-4 \times 10^{-10} \sim 2 \times 10^{-10}$, $\delta t = 25 \times 10^{-11}$, 25 steps

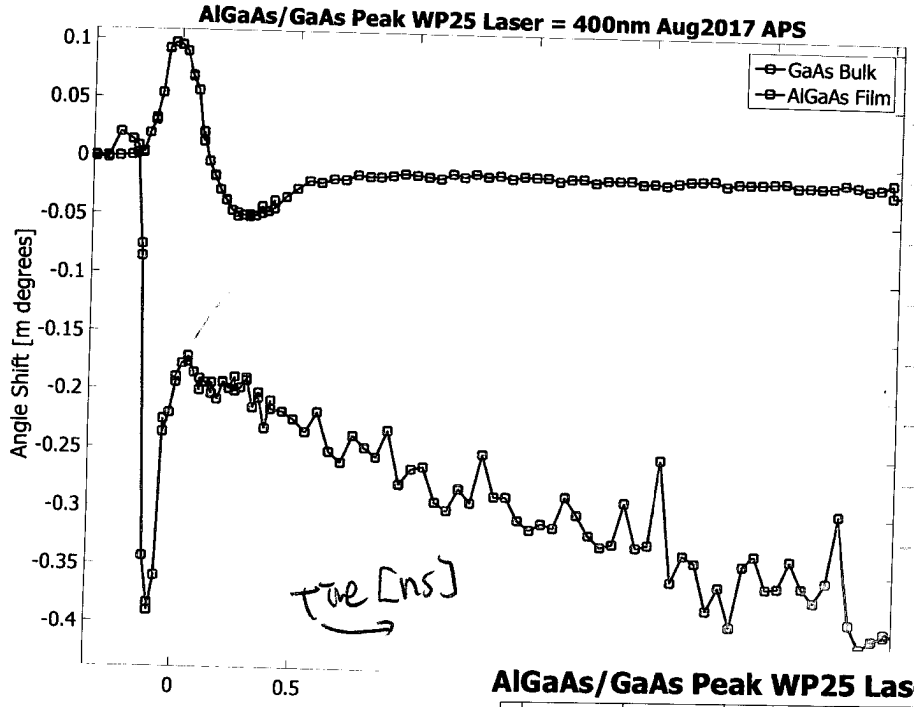
Scan 105 delay $+2.25 \times 10^{-10}$ to $+3.00 \times 10^{-10}$, 25 ps steps

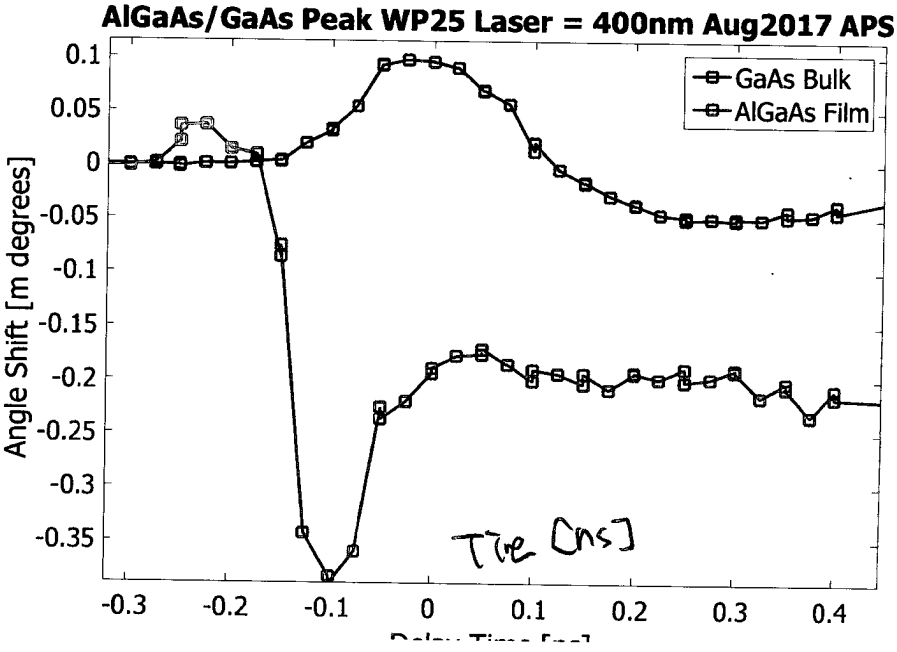
(4 pts only)

Overlay all of these



Result of MEN-S062-#6





Change file name

⇒ NIN_S003_#.

~~2D Scan~~

NIN_S003_1.mda

(th: −0.03 ~ 0.03, dth = 0.0004, 151 steps.
dely: −3ns ~ 1ns, dt = 100ps, 41 steps.
WP: 34.
th: 25.6720 start at 11:34 PM, 06-08-2017.
dely: 8 0.8416x10⁻⁶
⇒ stoped? at 12:02 AM. 07-08-2017.)

"X-ray problem"

th: ~~25~~ 25.684
only GaAs peak scan with time and Laser.

#26.
thc = 25.684, dely = 80.8416x10⁻⁶

th = −0.008 ~ 0.008, dth = 0.0004, 41 steps
dely = −3ns ~ 1ns, dt = 100ps, 41 steps
WP = 30.
start at Am3 : 19

for better statistic, Avenum 500 → 1500.
dely −3ns ~ 2ns, Scan.

Laser 400nm

WP (deg.)	reference (mW)	mW at sample	fluence mJ/cm^2			9.491709	sample incident fluence
0	253	0	0	0	0	9.379159	0
5	250	0	0	0	5	8.741376	0
10	233	0	0	0	10	7.503327	0
15	200	4	1.295522532	0.064776	15	6.077695	0.608210988
20	162	11	3.562686964	0.178134	20	4.35193	1.672580217
25	116	20	6.477612661	0.323881	25	2.813748	3.041054939
30	75	32	10.36418026	0.518209	30	1.425632	4.865687903
35	38	41	13.27910596	0.663955	35	0.487716	6.234162626
40	13	47	15.22238975	0.761119	40	0.075033	7.146479107
45	2	50	16.19403165	0.809702	45		7.602637348
	laser x (microns)	laser y (microns)	area (microns^2)	a			
	624	630	308755.726				
						25	Bragg angle in degrees
			area (mm^2)				
			0.308755726				
			area (cm^2)				
			0.003087557				

on on

#30 -4ns ~ 1ns 100ps step
WP: 30

GaAs

#31 " " WP: 40

#37 → static diffraction peak.

#38 → -4×10^{-9} ~ $+1\times10^{-9}$ WP = 30°
$-0.005 \sim 0.02$, $\Delta\theta = 0.0004$

4/7/17 11AM #39 Linearity scan for APD
Moved to $\theta = 25.6834$ (side of substrate)
laser still on at ~~80.816~~ 80.8416 μs
WP = 25°. Scan Horiz. JJ Slit size, 5 μm/step.
~~Repeat~~

#40 Repeat linearity, ~~[illegible]~~ = 80.8414 μs,
Now 20 μm/step)

#41 Repeat linearity, just for more data.

File Info Help

MDA Buffer

File: NIN_Soo3_0041.mda

Previous Valid Directory Entry Next

Previous Scan Number Next

Scan Number: 41
Size (Intended): 2D 53x10000
Date and Time: Aug 07, 2017 11:30:12

1-D 2-D

Display Style: Line
Y-axis Style: Linear
Data Transform: None
Fit (Local): Gaussian
Data Level: 2-D

Basic Advanced

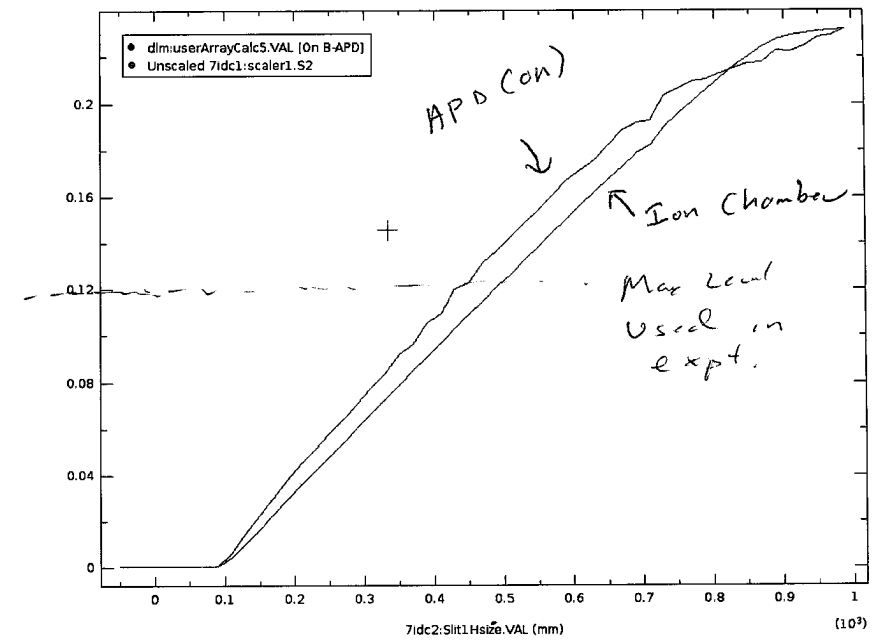
Positioner: [P1] 7idc2:Slit1Hsize.VAL
Detector (Unscaled): [D03] dlm:userArrayCalc5.VAL
Detector (Unscaled): [D02] dlm:userArrayCalc3.VAL
Detector (Unscaled): [D05] 7idc1:scaler1.S2
Detector (Unscaled): [D04] dlm:userArrayCalc7.VAL
Normalization: [D05] 7idc1:scaler1.S2

Bufferize Plot

Dimensions:

Ranges Clear Ranges Reload File

Scan 41



Current Position: 112 , 0.1586
Click Position 1: 334 , 0.1456
Click Position 2:
Click Difference:

Note: Strong laser effect