

AIDA Commissioning Test
GSI August 2011
- initial analysis

presented by
Tom Davinson
on behalf of the AIDA collaboration
(Edinburgh – Liverpool – STFC DL & RAL)

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School of Physics & Astronomy
The University of Edinburgh

Setup

1x MSL type W(DS)-1000

bias - 150V leakage current $\sim 0.8\mu A$

16x p+n junction strips (*horizontal*)

16x n+n ohmic strips (*vertical*)

strip size $\sim 50\text{mm} \times 3\text{mm}$

Edinburgh MSL type W – AIDA mezzanine adaptor PCB

ac coupling $\sim 10\text{nF}$ / strip

test capacitance $\sim 1\text{pF}$ / strip

bias resistor $\sim 10\text{M}$ / strip

Detector connected to ASICs #3 & #4

Events defined as all ADC data within 8 μs time window

decay events – events containing no HEC data (i.e. LEC data only)

implant events – any events containing HEC data (i.e. may contain LEC data)

Data

R81_0

Events 26.3M, time warps 92, invalid IDs 18090, events built 4.15M

250MeV/u 209Bi + 2mm Al degrader

ASIC shaping time 0x01 = 1 us

Aida Setup (User Level)

ASIC Controls

ASIC Number **1** **2** **3** **4**

Act on all ASICs

Offset	Title	Value/Setting	Offset	Title	Value/Setting
0	preamp reset	0x04	14	fast comparator threshold HEC	0x0f
1	shaper reset	0x05	15	fast comparator threshold LEC/MEC	0x1f
2	filter reset	0x06	16	vsasc_n for buffers	0xd2
3	fast filter reset	0x02	17	vsasc_p for buffers	0x80
4	peak hold reset	0x07	18	preAmp reference	0xb2
5	clamp reset	0x08	19	biasRC_preamp HEC	0x5c
6	comparator reset	0x09	20	vsasc_preamp HEC	0x68
7	hold timing	0x04	21	Ibias LF feedback	0x08
8	low_ref (pre-amp polarity)	0x00	22	biasRC_preamp	0x5c
9	shaping time	0x01	23	Ibias preamp SF	0x08
10	medium/low energy selection	0x00	24	vsasc_preamp LEC	0x68
11	clamp threshold	0x0d	25	Ibias preamp	0x08
12	slow comparator threshold	0x1f	26	diode link threshold	0xca
13	shaper reference	0x34			

(Re)load default settings

Save Settings

Restore Settings

Load ASIC Control

Check ASIC Control

Show temperatures

```
Initialised XAIDA Web Service at nnaida1
Initialised XAIDA Web Service at nnaida1
Initialised XAIDA Web Service at nnaida1
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Redisplay

Empty Log Window

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Mbz Aida Setup (User Level)

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4	peak hold reset	0x07	18	pre-Amp reference	0xb2
5	clamp reset	0x08	19	biasRC preamp HEC	0x5c
6	comparator reset	0x09	20	vcasc_preamp HEC	0x68
7	hold timing	0x04	21	Ibias L.F feedback	0x08
8	low_ref (pre-amp polarity)	0x00	22	biasRC preamp	0x5c
9	shaping time	0x01	23	Ibias preamp SF	0x08
10	medium/low energy selection	0x00	24	vcasc_preamp LEC	0x68
11	clamp threshold	0x0d	25	Ibias preamp	0x08
12	slow comparator threshold	0x28	26	diode link threshold	0xca
13	shaper reference	0x34			

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4	peak hold reset	0x07	18	preAmp reference	0x30
5	clamp reset	0x08	19	biasRC preamp HEC	0x5c
6	comparator reset	0x09	20	vcasc_preamp HEC	0x68
7	hold timing	0x04	21	Ibias LF feedback	0x0b
8	low_ref (pre-amp polarity)	0x01	22	biasRC preamp	0x5c
9	shaping time	0x01	23	Ibias preamp SF	0x08
10	medium/low energy selection	0x00	24	vcasc_preamp LEC	0x68
11	clamp threshold	0x02	25	Ibias preamp	0x08
12	slow comparator threshold	0x28	26	diode link threshold	0x11
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Hit Pattern

Displaying Spectra (.sd.s0)

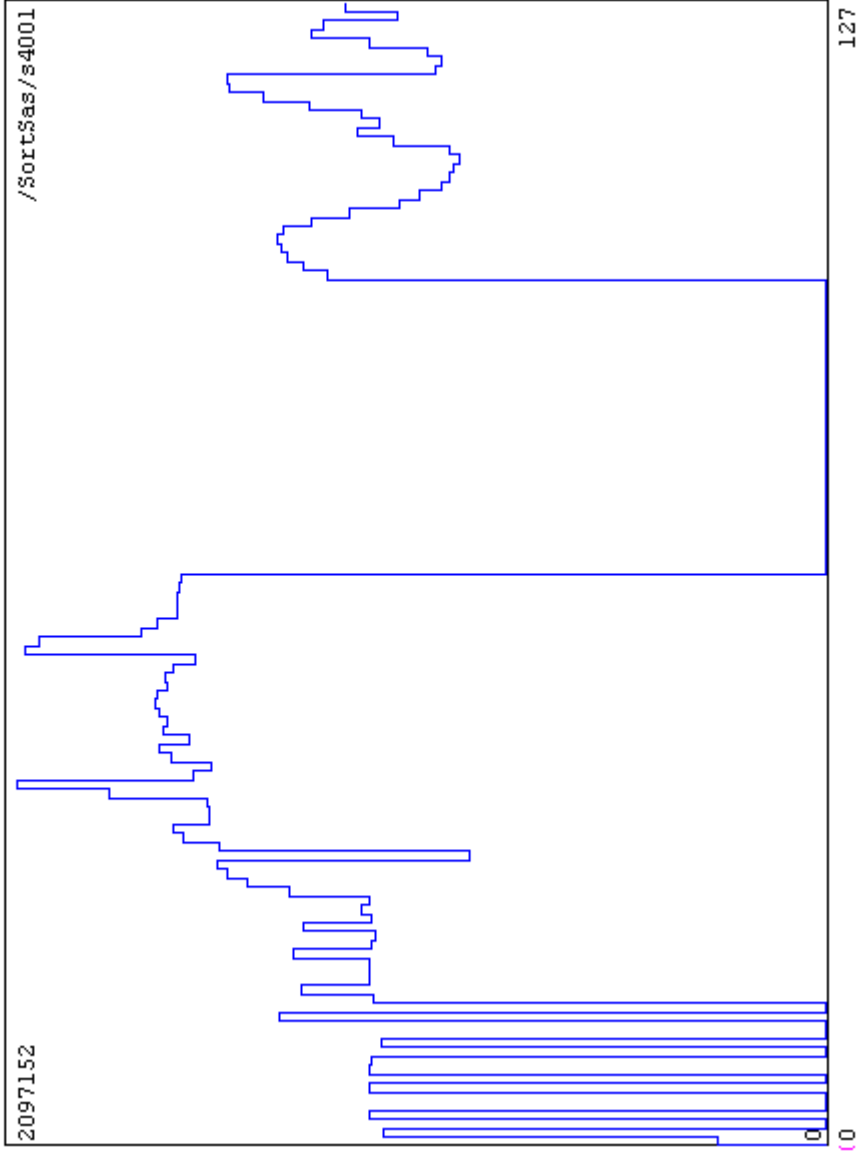
View → Arrange → Analysis → Tags & Fits → Channel: []

Reset Refresh

log new all slicing off

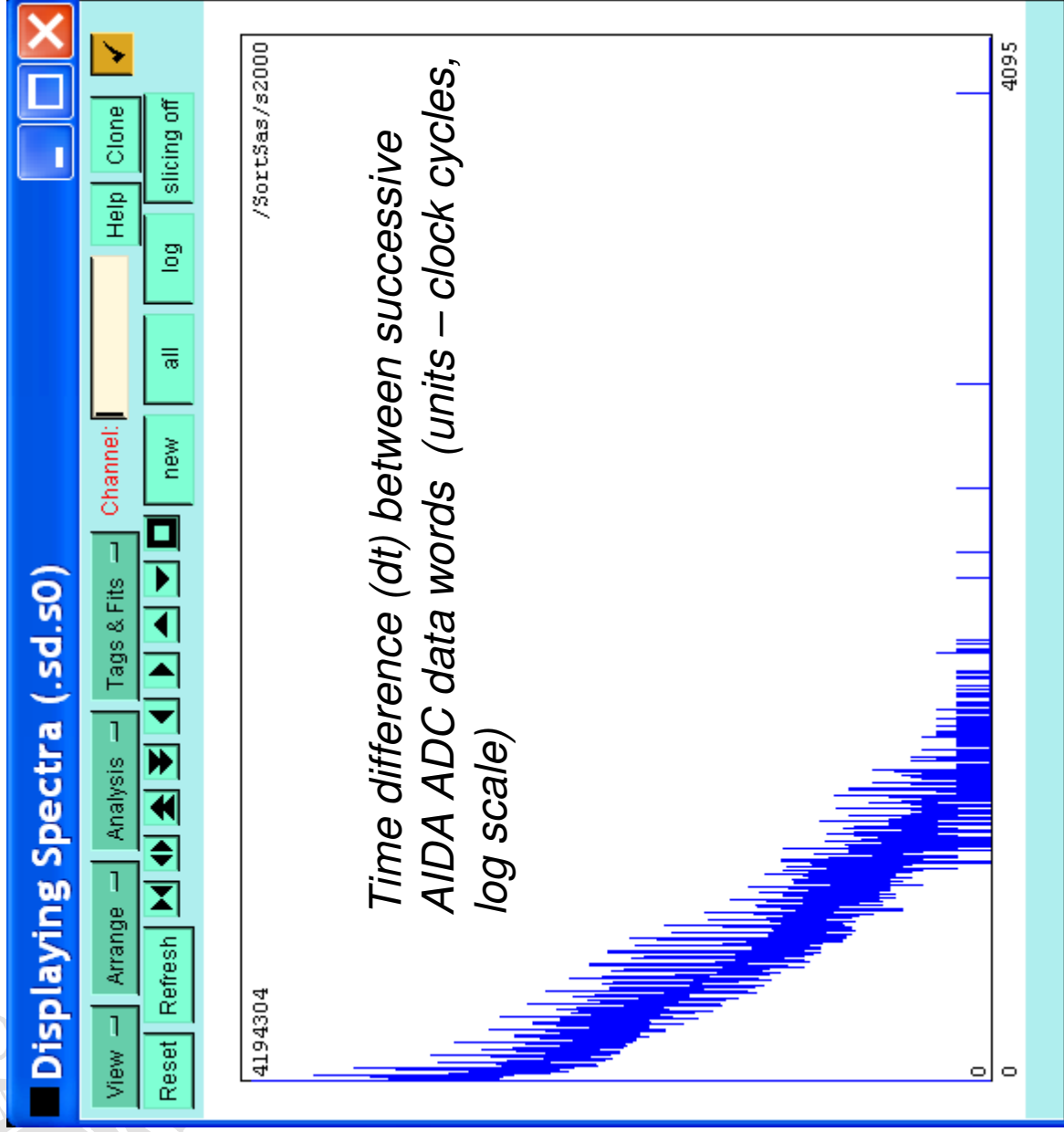
Help

Clone



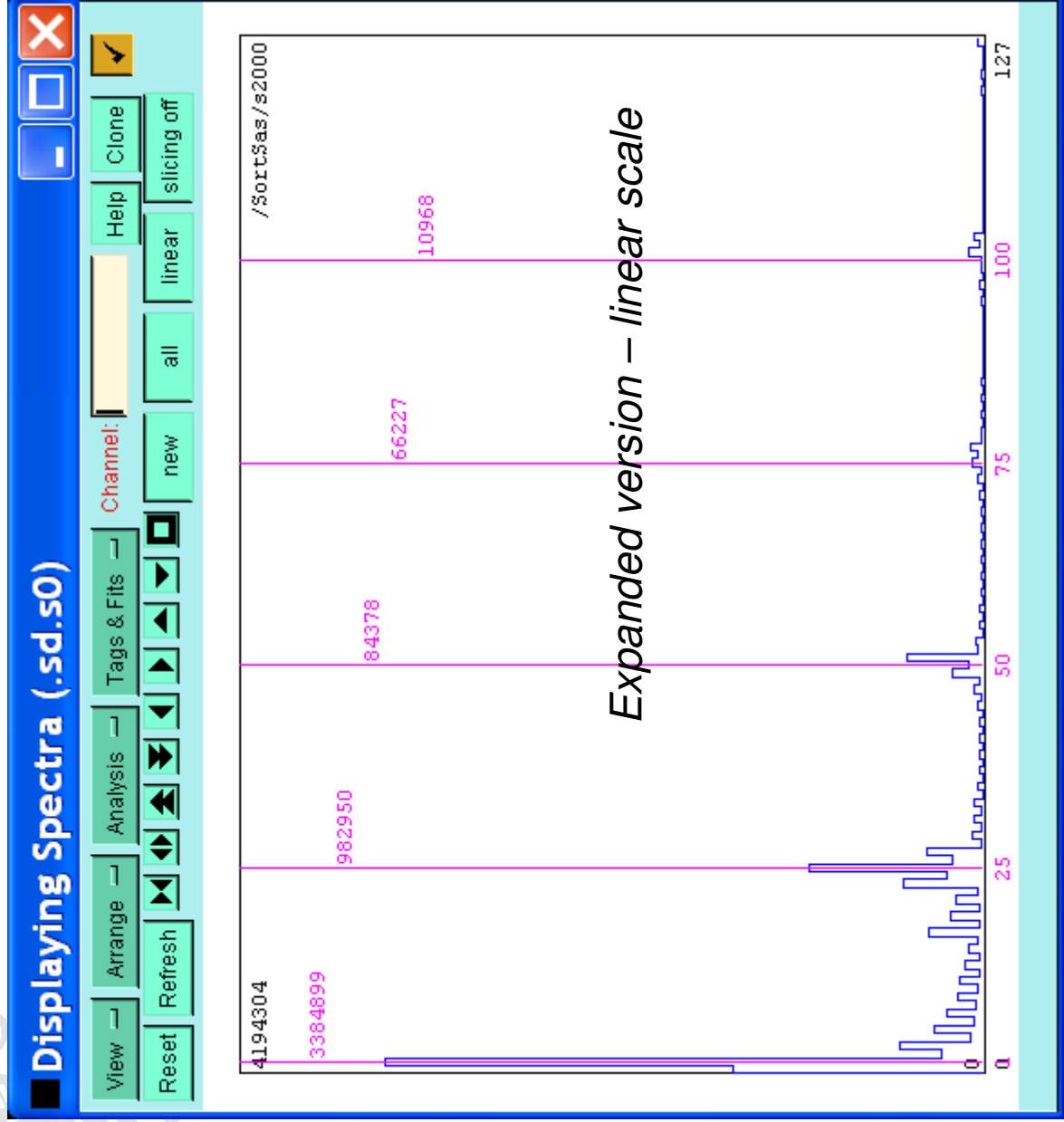
ch 0-63 decay
ch 64-127 implant

dt

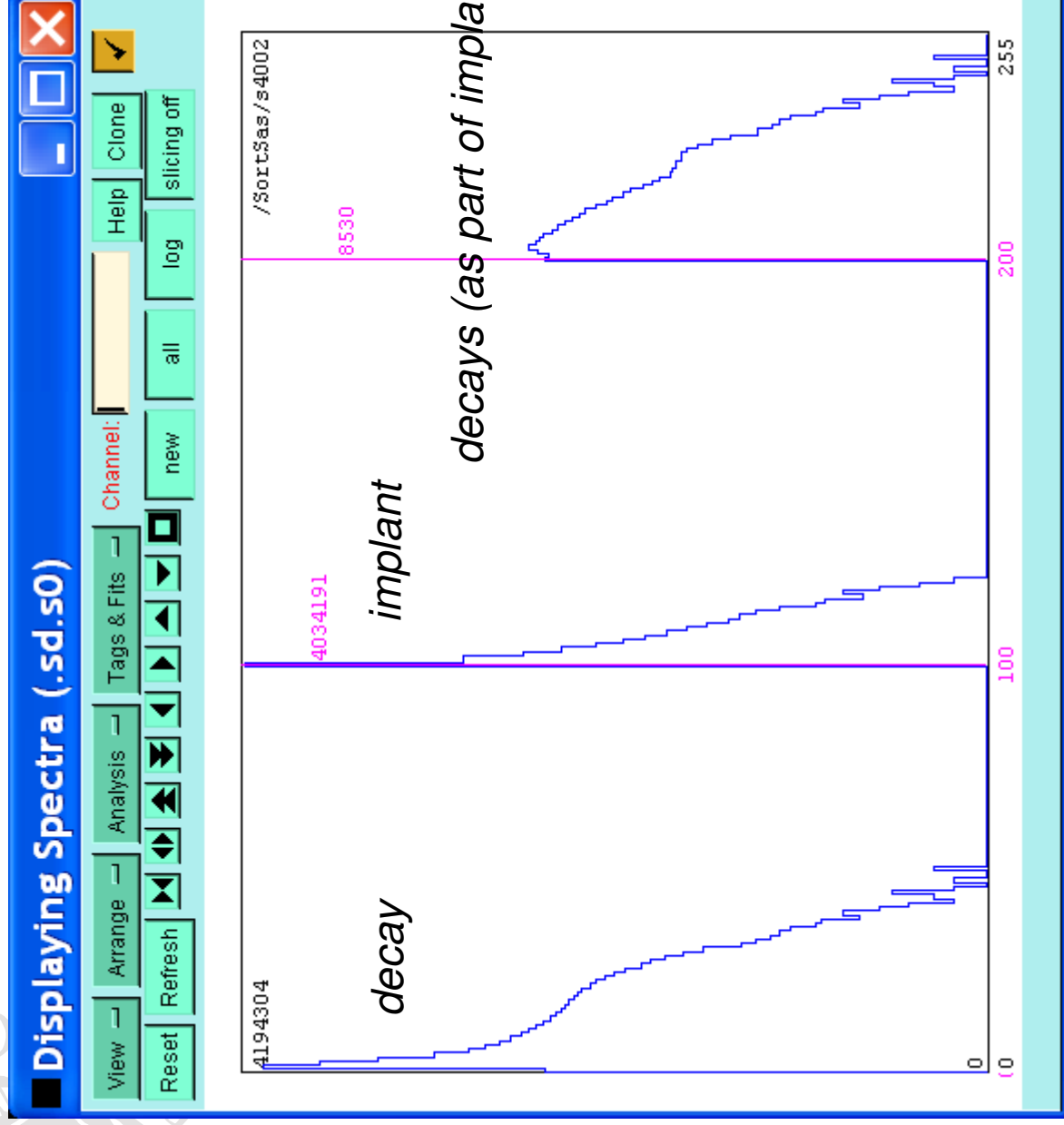


*Time difference (dt) between successive
AIDA ADC data words (units – clock cycles,
log scale)*

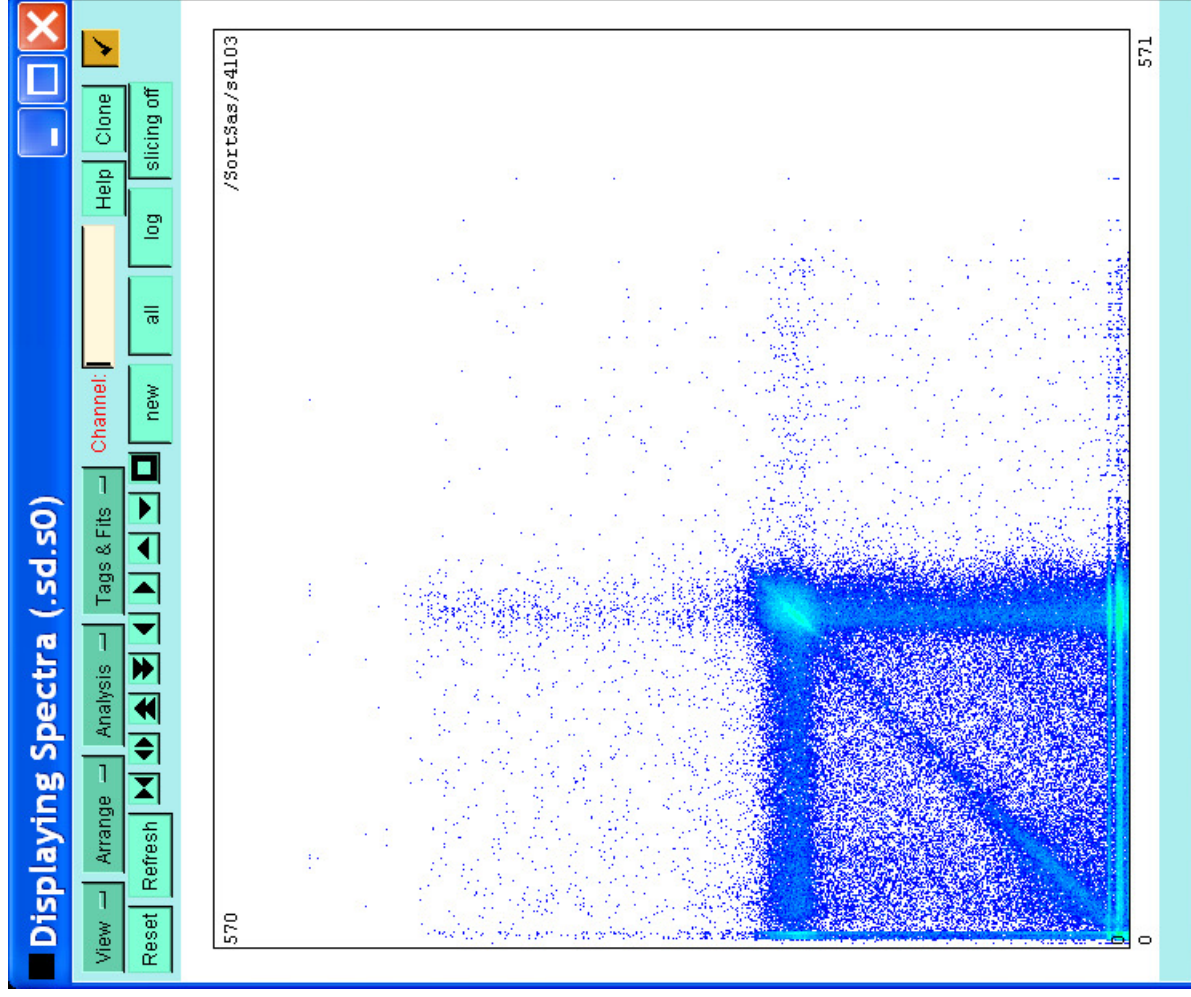
dt



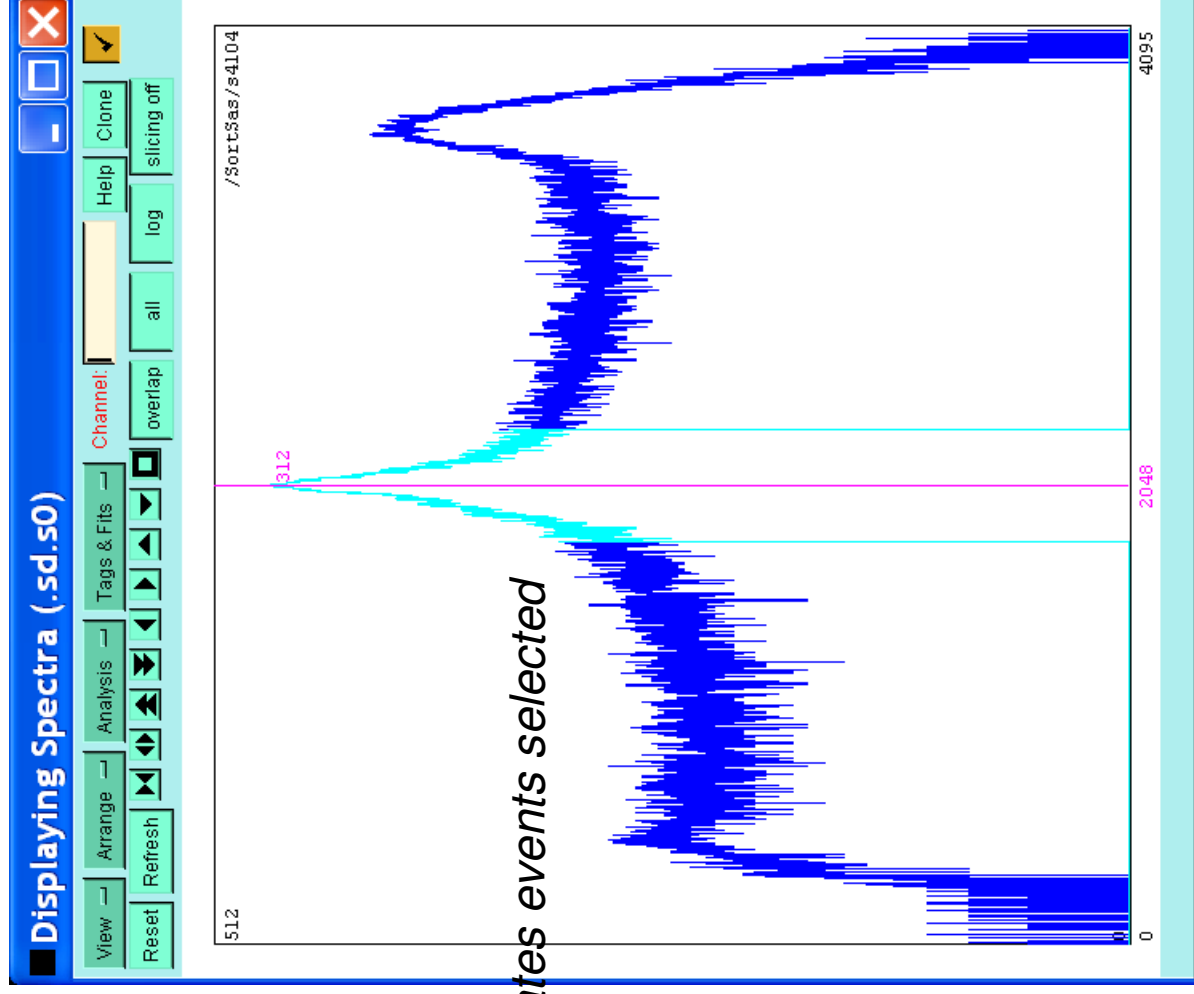
Multiplicity (log scale)



E(p+n strips) versus E(n+n strips) – implant events

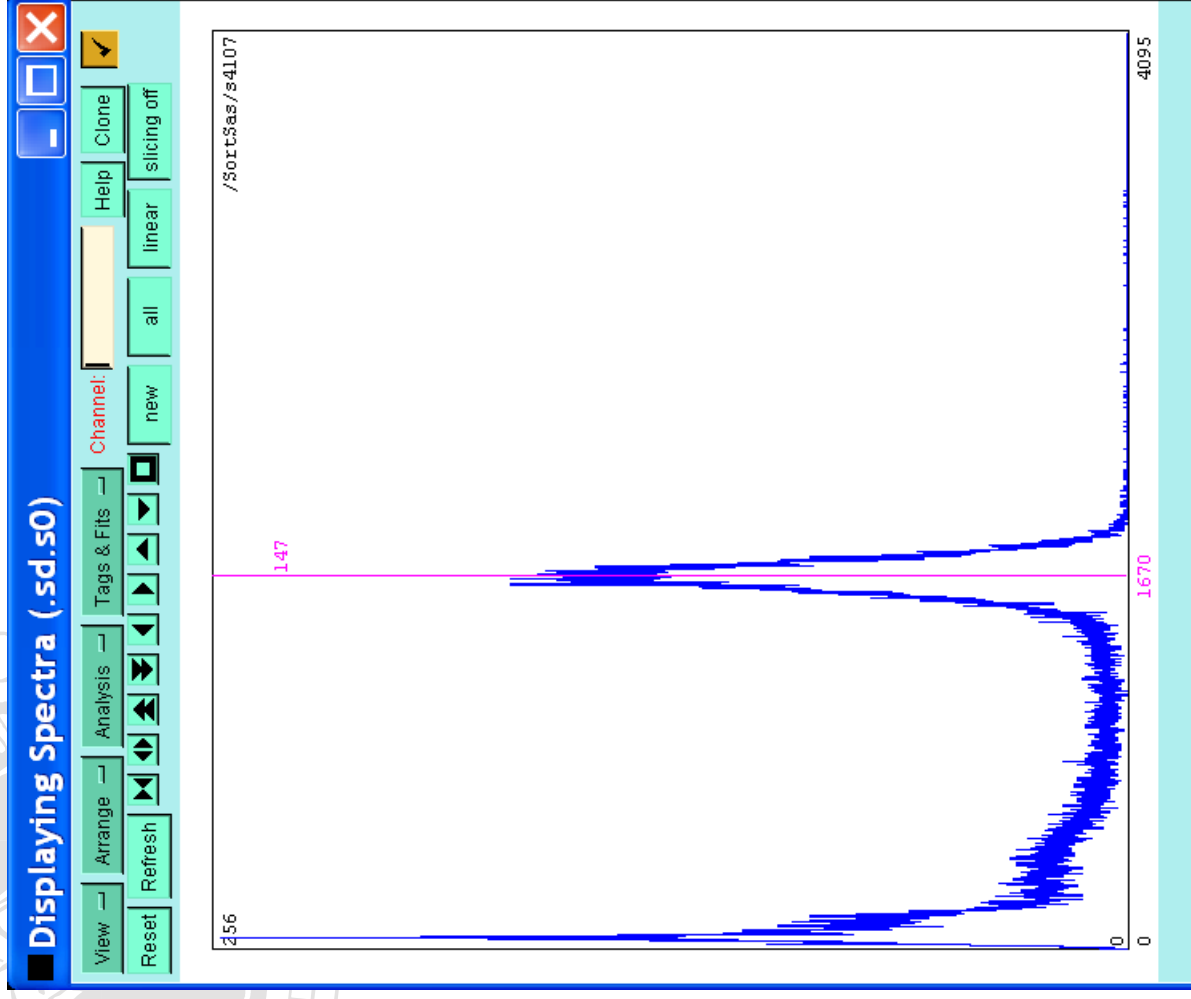


$E(p+n) - E(n+n) + \text{offset} - \text{implant events}$



cyan region indicates events selected

E(p+n) - selected implant events



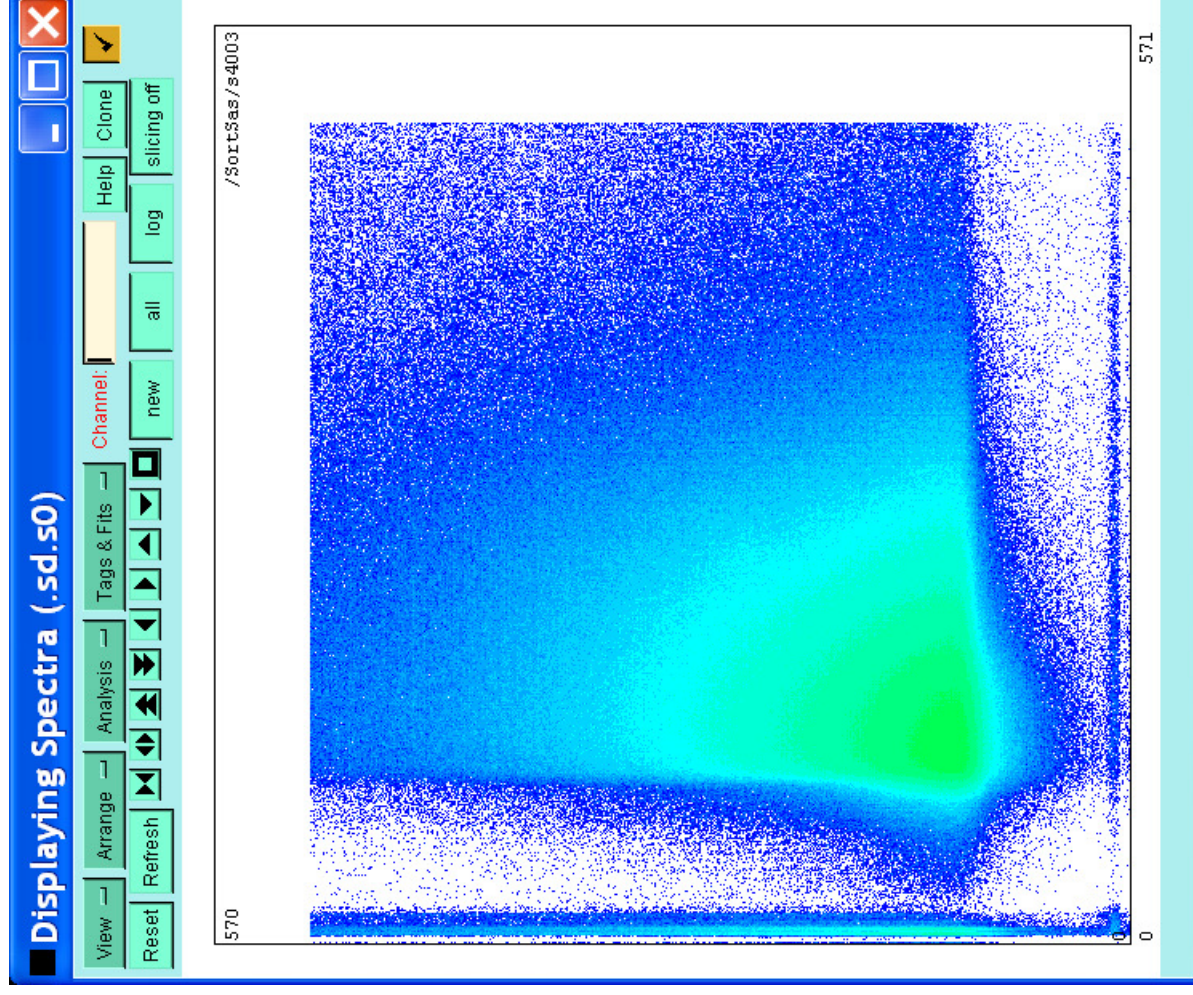
$1\text{ch} = 4.8\text{MeV}$ (nominal)

centroid = ch 1670 ~ 8.0GeV

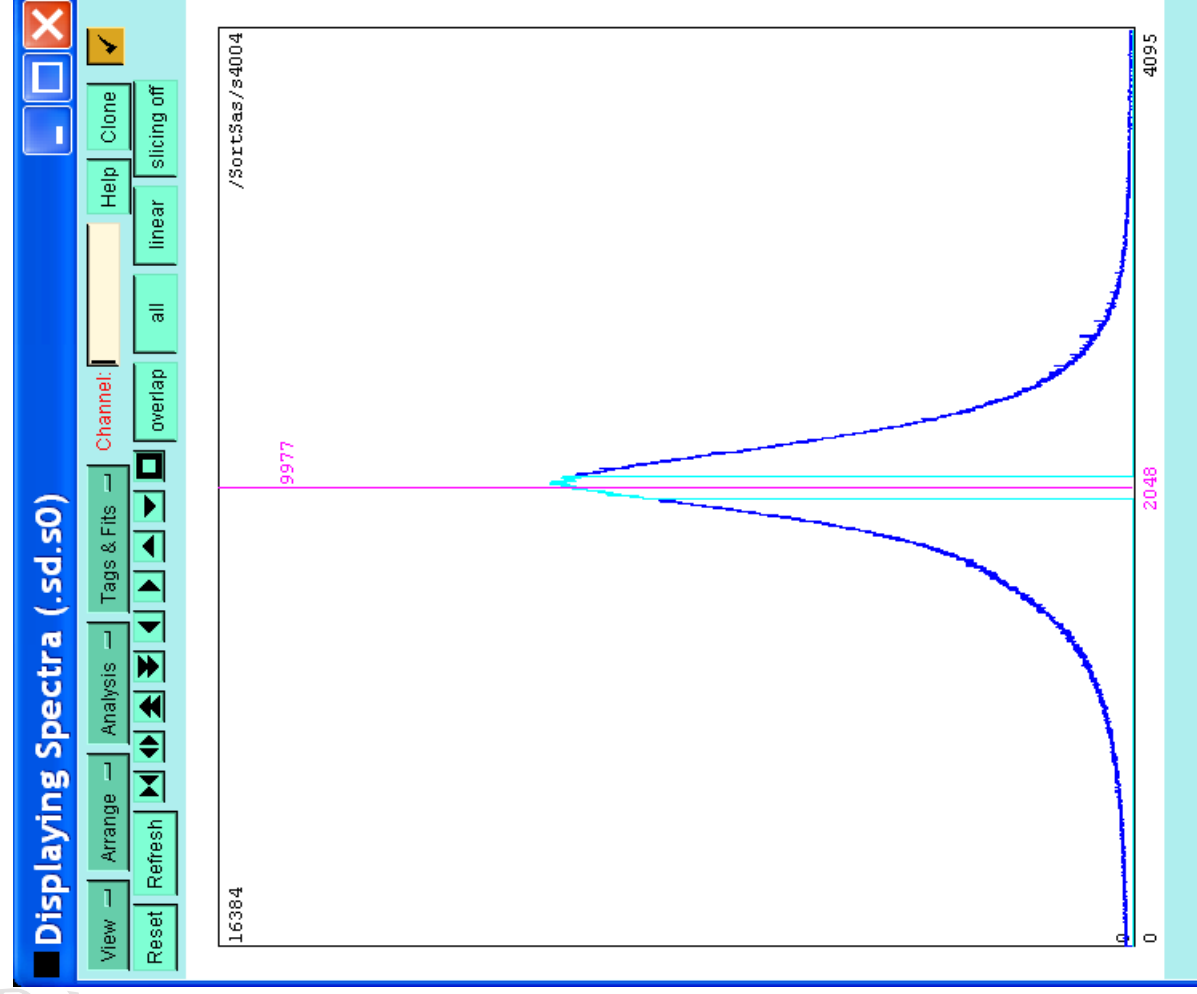
FWHM ~ 800MeV

linear scale

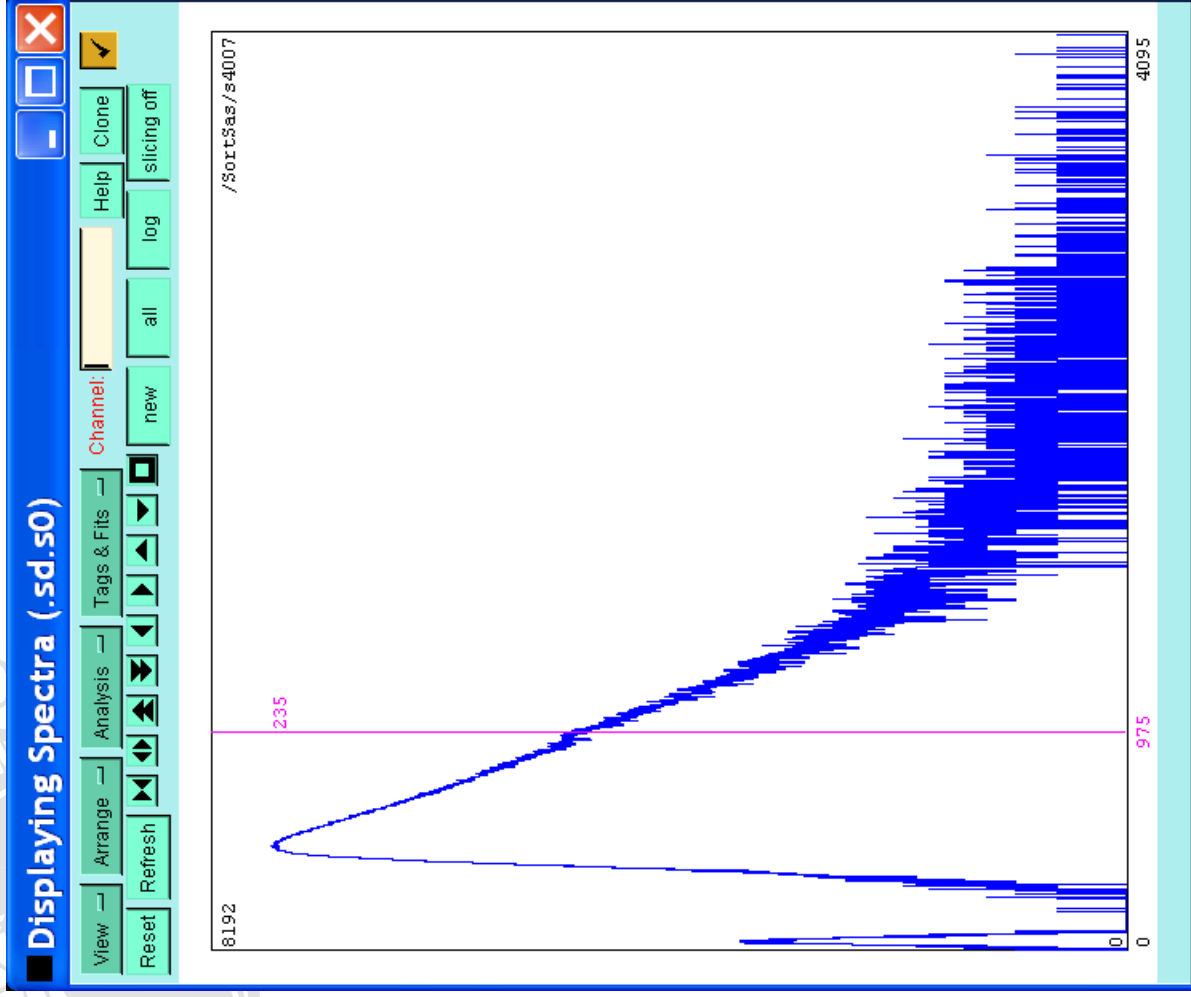
E(p+n strips) versus E(n+n strips) - decay events



$E(p+n) - E(n+n) + \text{offset} - \text{decay events}$



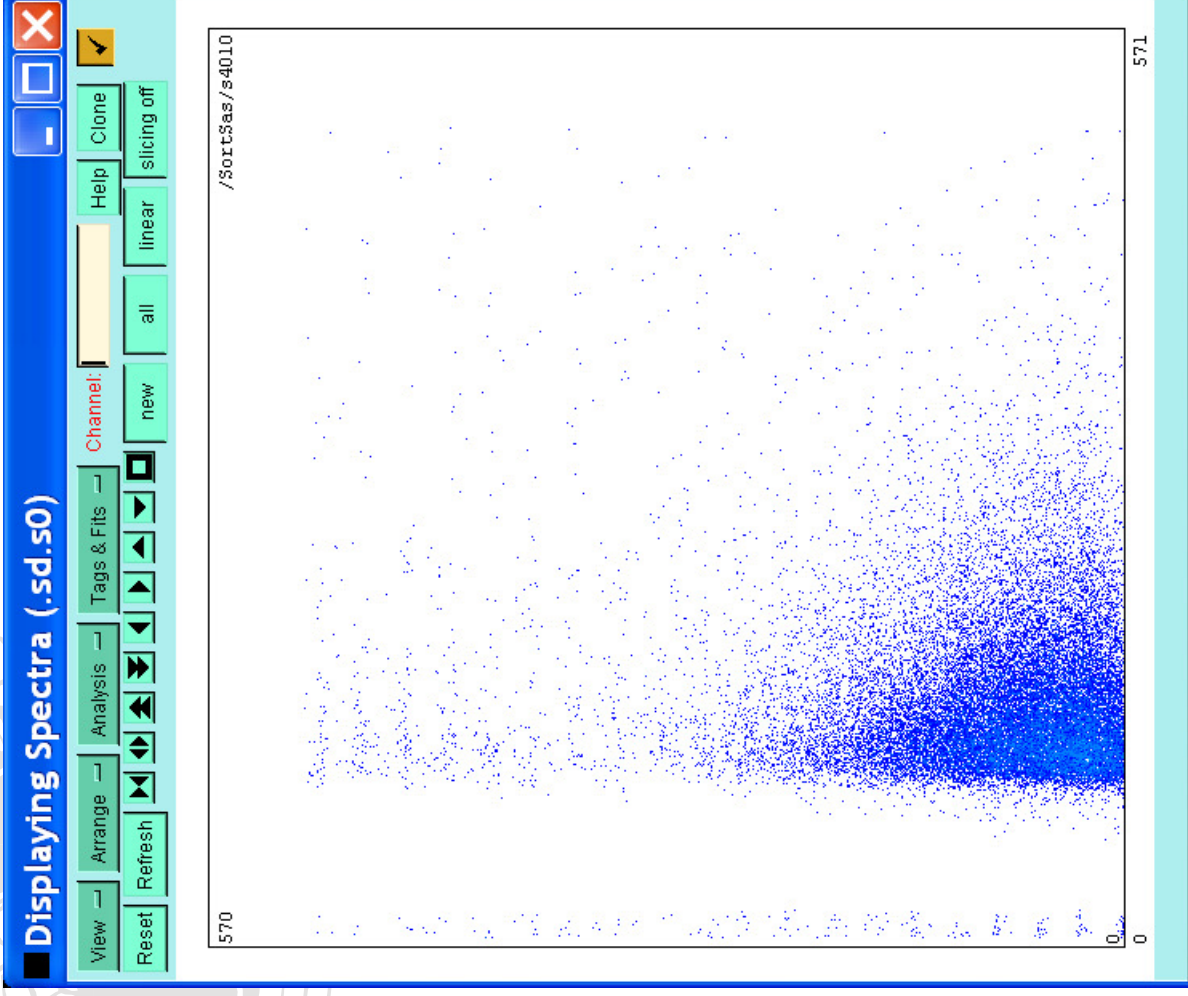
E(p+n) – selected decay events



1ch = 1keV (calibrated)

linear scale

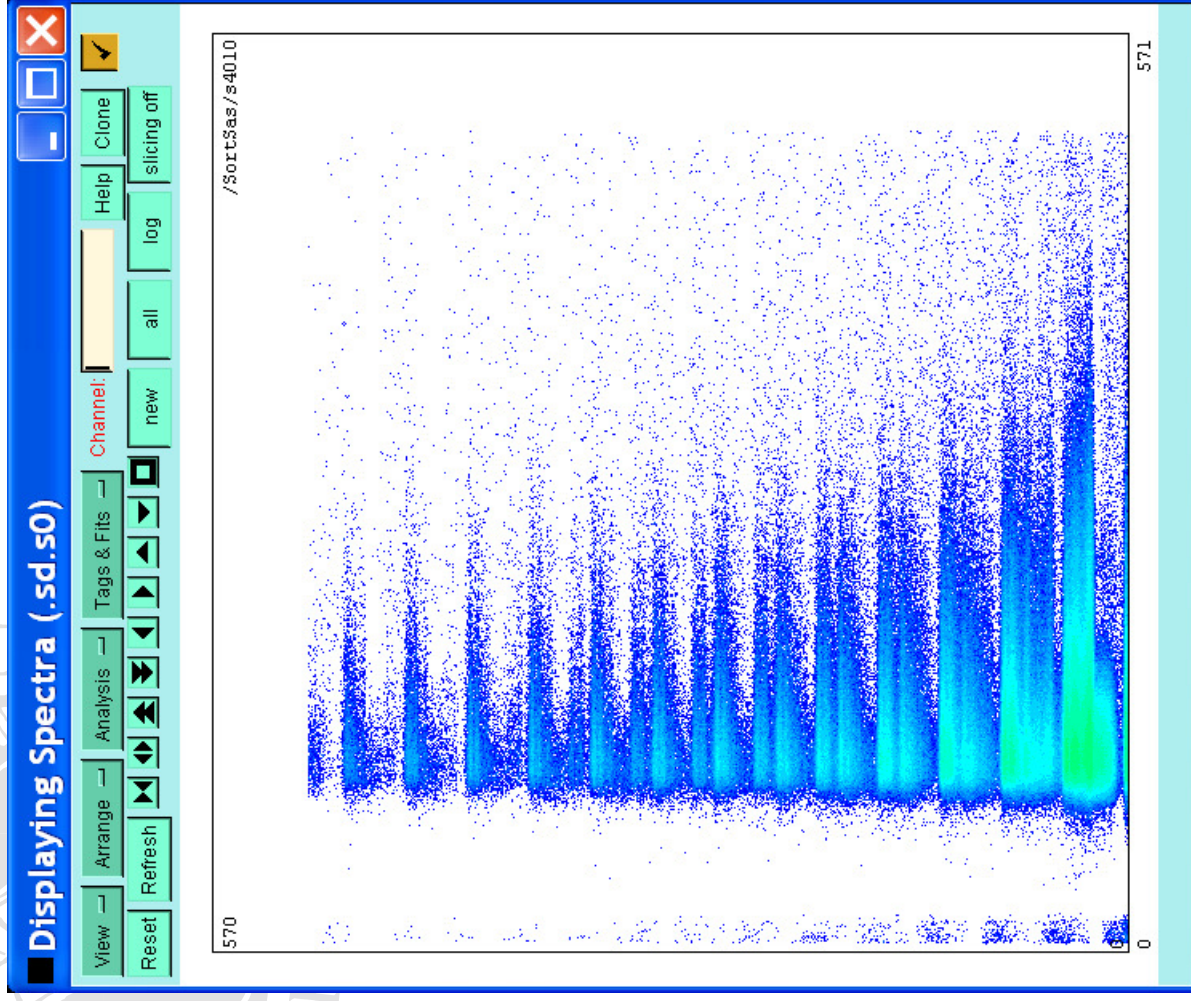
E(p+n) versus decay time



x-scale 1ms/channel
y-scale 4keV/channel

decay time = $t(\text{implant}) = t(\text{decay})$
per pixel basis

E(p+n) versus decay time



x-scale 100ms/channel
y-scale 4keV/channel

decay time = $t(\text{implant}) = t(\text{decay})$
per pixel basis

Data

R57_0

Events 19.6M, time warps 135, invalid IDs 1946, events built 5.17M

~37kBq ²⁰⁷Bi conversion electron source

ASIC shaping time 0x01 = 1 us

Alda Setup (User Level)

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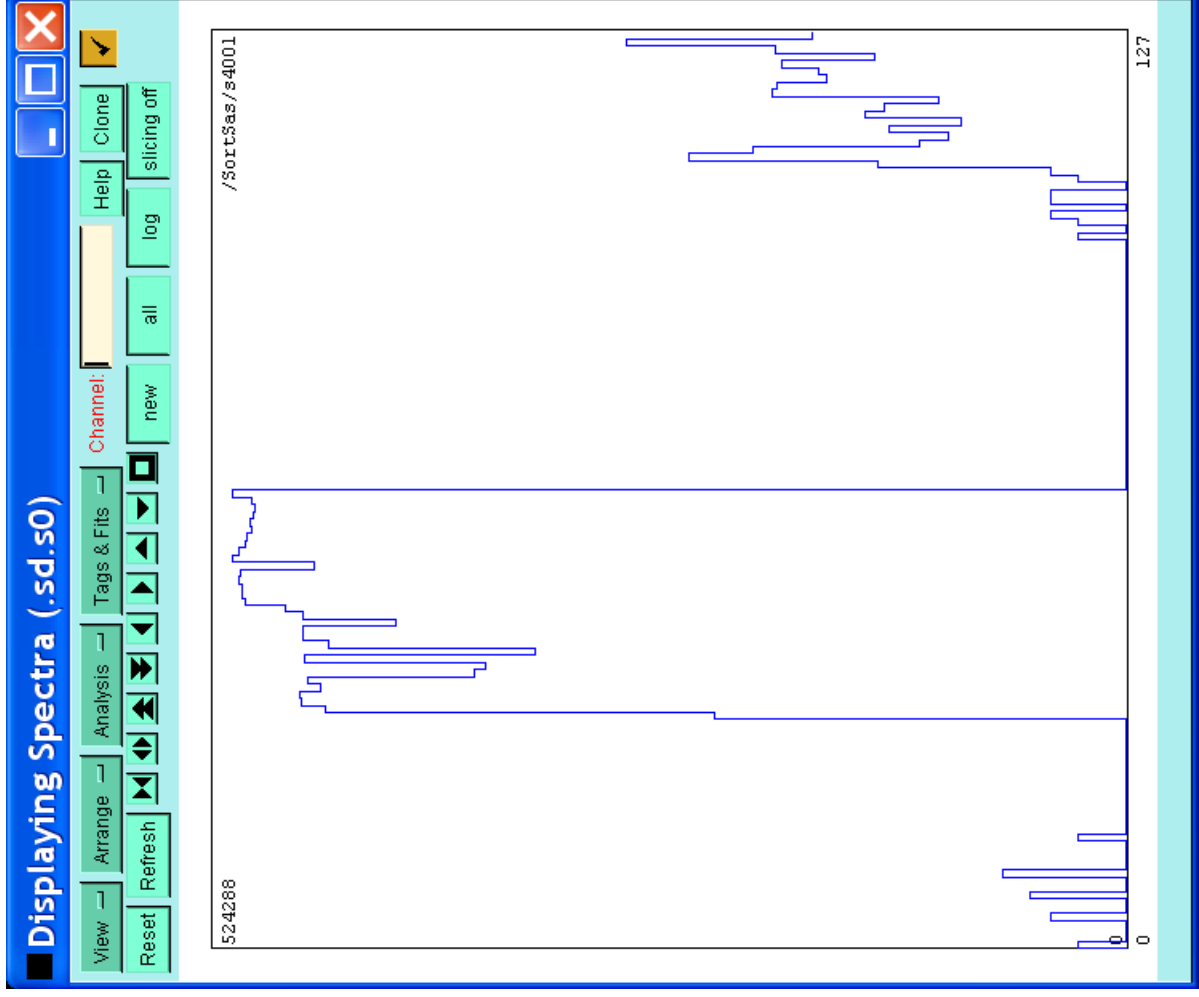
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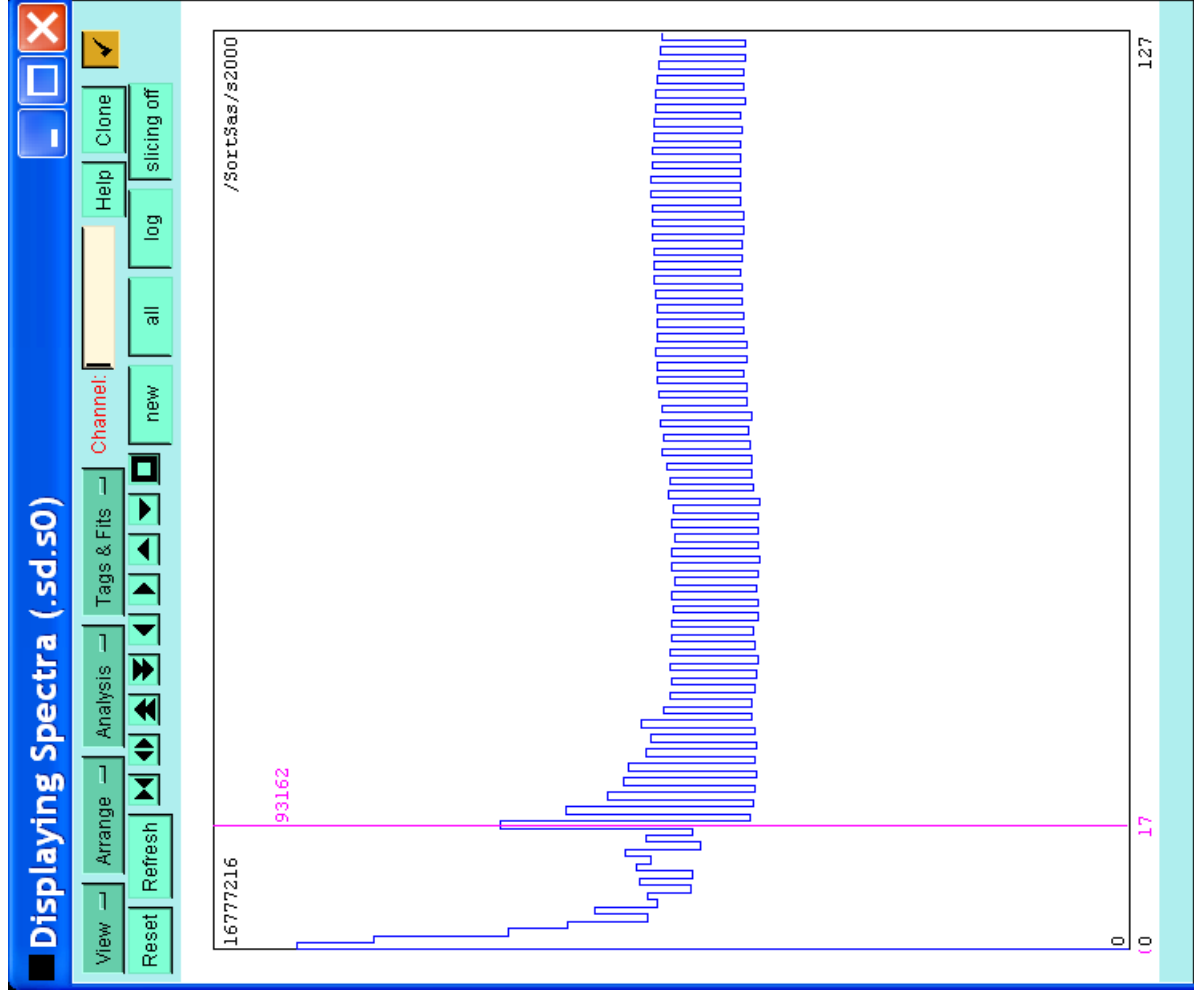
Redisplay

Empty Log Window

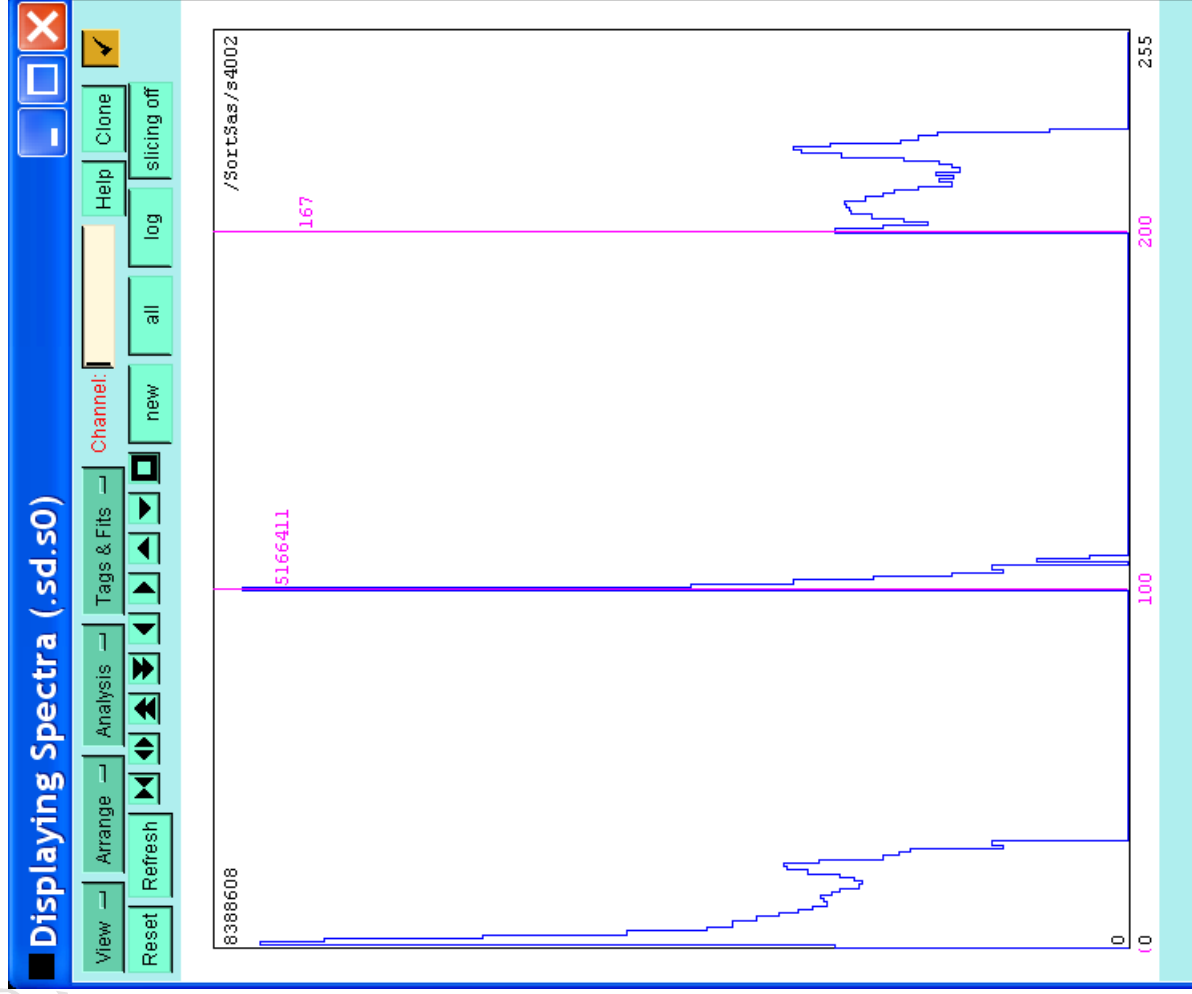
Hit Pattern



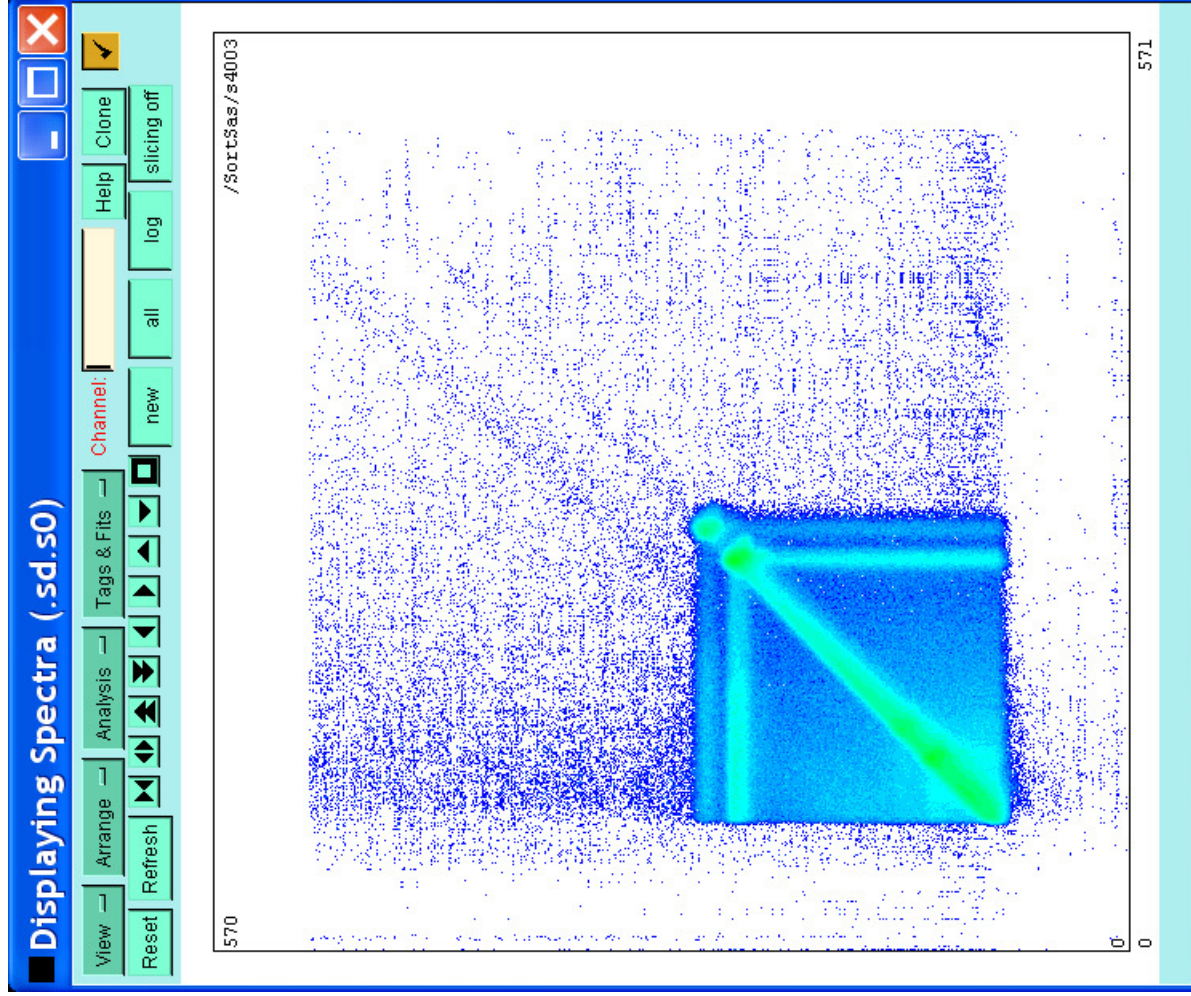
dt (log scale)



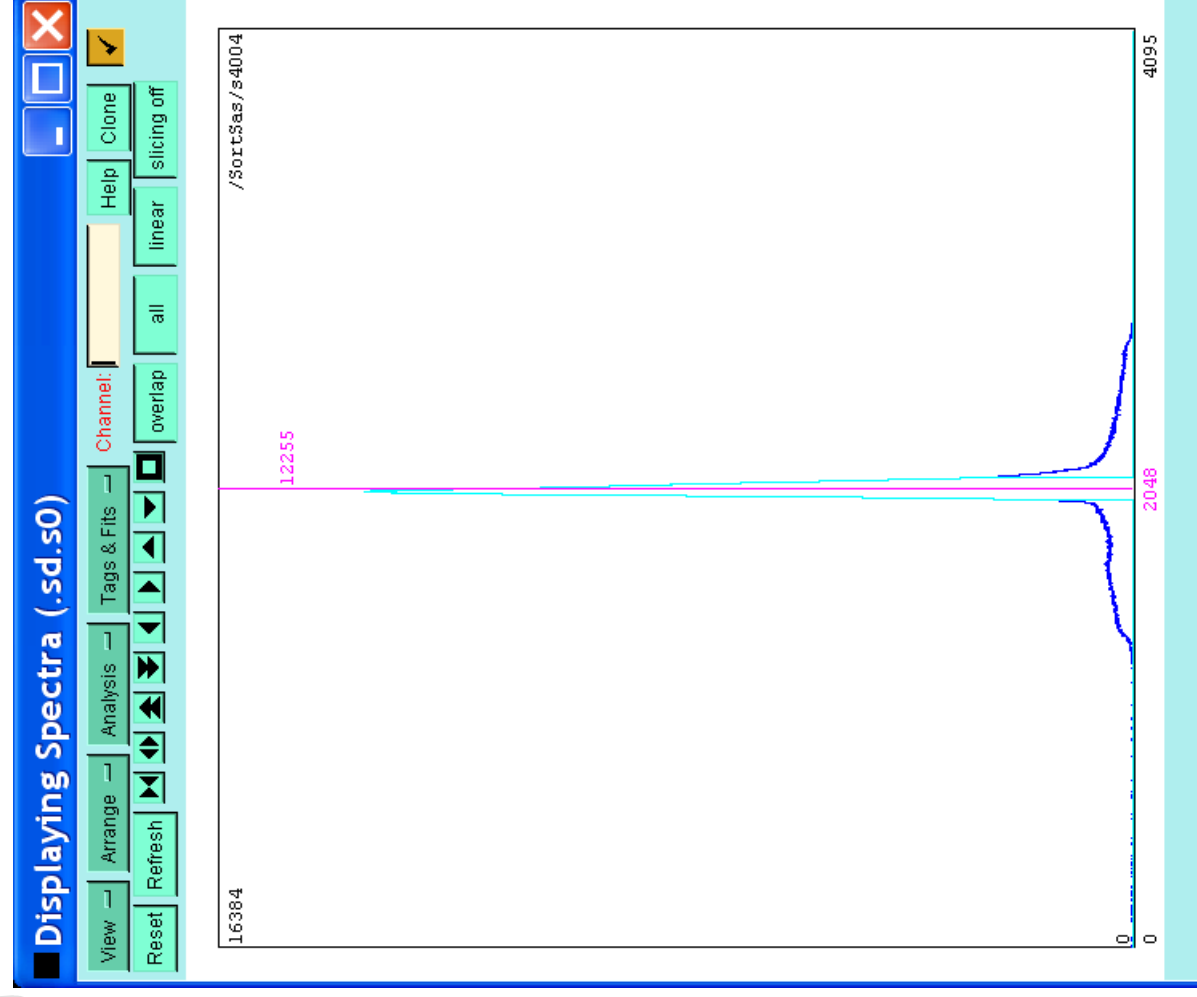
Multiplicity (log scale)



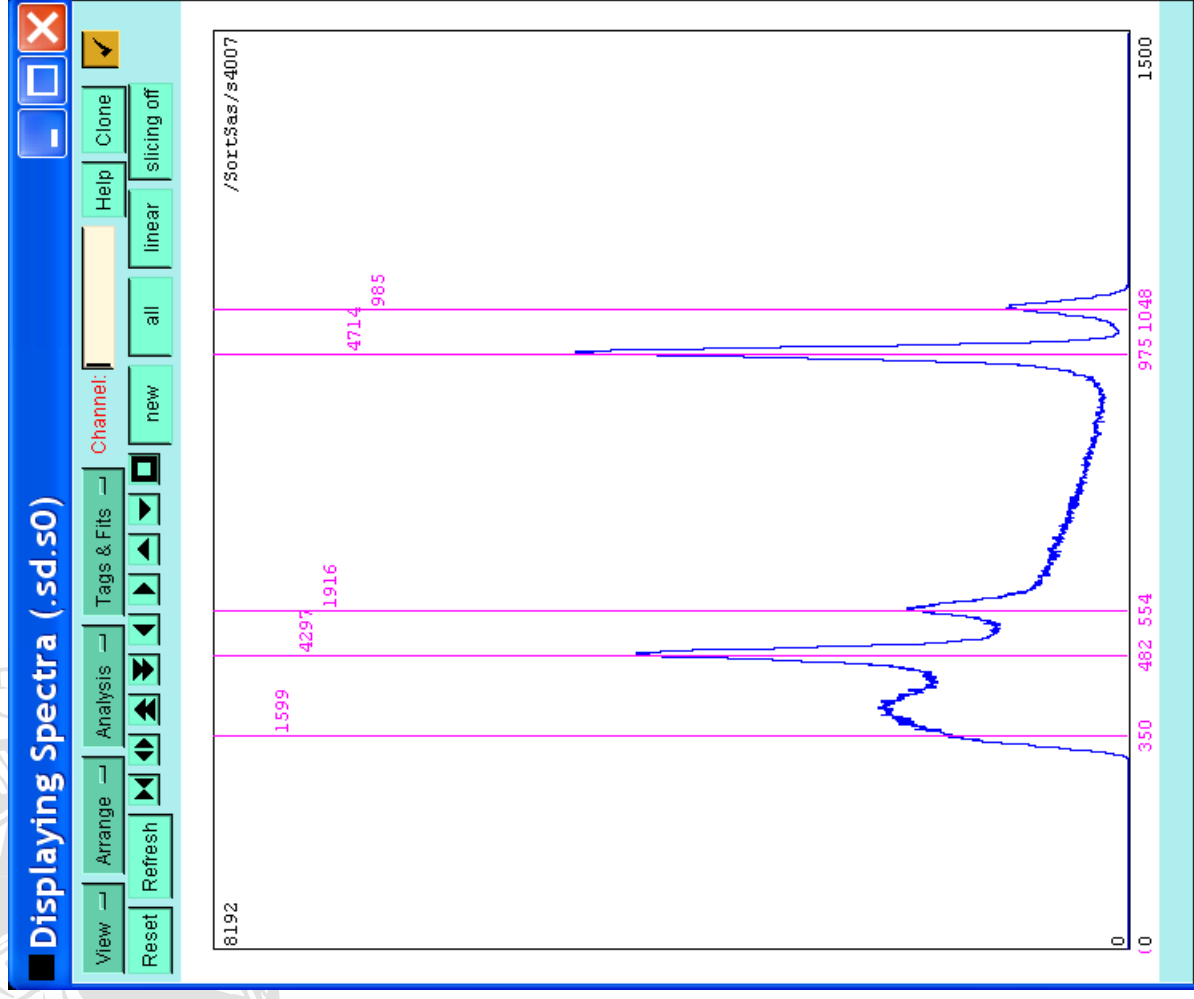
E(p+n strips) versus E(n+n strips) - decay events



$E(p+n) - E(n+n)$ + offset – decay events



E(p+n) - decay events



x-axis: 1ch = 1keV

linear scale

resolution ~ 22keV FWHM