Calculation of ωγ for ^{21}Ne(p, γ) reaction

Step 1: Calculate k, the EM0 response

$$k = \frac{beamions}{EM0count} = 3.52 \times 10^{7} \pm 0.04 \times 10^{7}$$

Step 2: calculate partial yields

$$Y_{x+} = \frac{N_{x+}^{DSSSD}}{kN_{x+}^{EM0}}$$

where N^{DSSSD} = total coincidence counts/BGO efficiency
and BGO efficiency = 0.435 +/- 0.02

Step 3: calculate total yield

$$Y = \sum Y_x = 4.8 \times 10^{-10} \pm 0.4 \times 10^{-10}$$

Step 4: calculate the stopping cross section, ε

$$\varepsilon = \frac{\Delta E}{\mathrm{N}^{+} g^{+}} = 8.86 \times 10^{-14} \pm 0.09 \times 10^{-14}$$

Step 5: calculate ωγ

$$\omega\gamma = \frac{2Y\varepsilon}{\lambda^2}\frac{M}{m+M} = 118 \pm 11$$

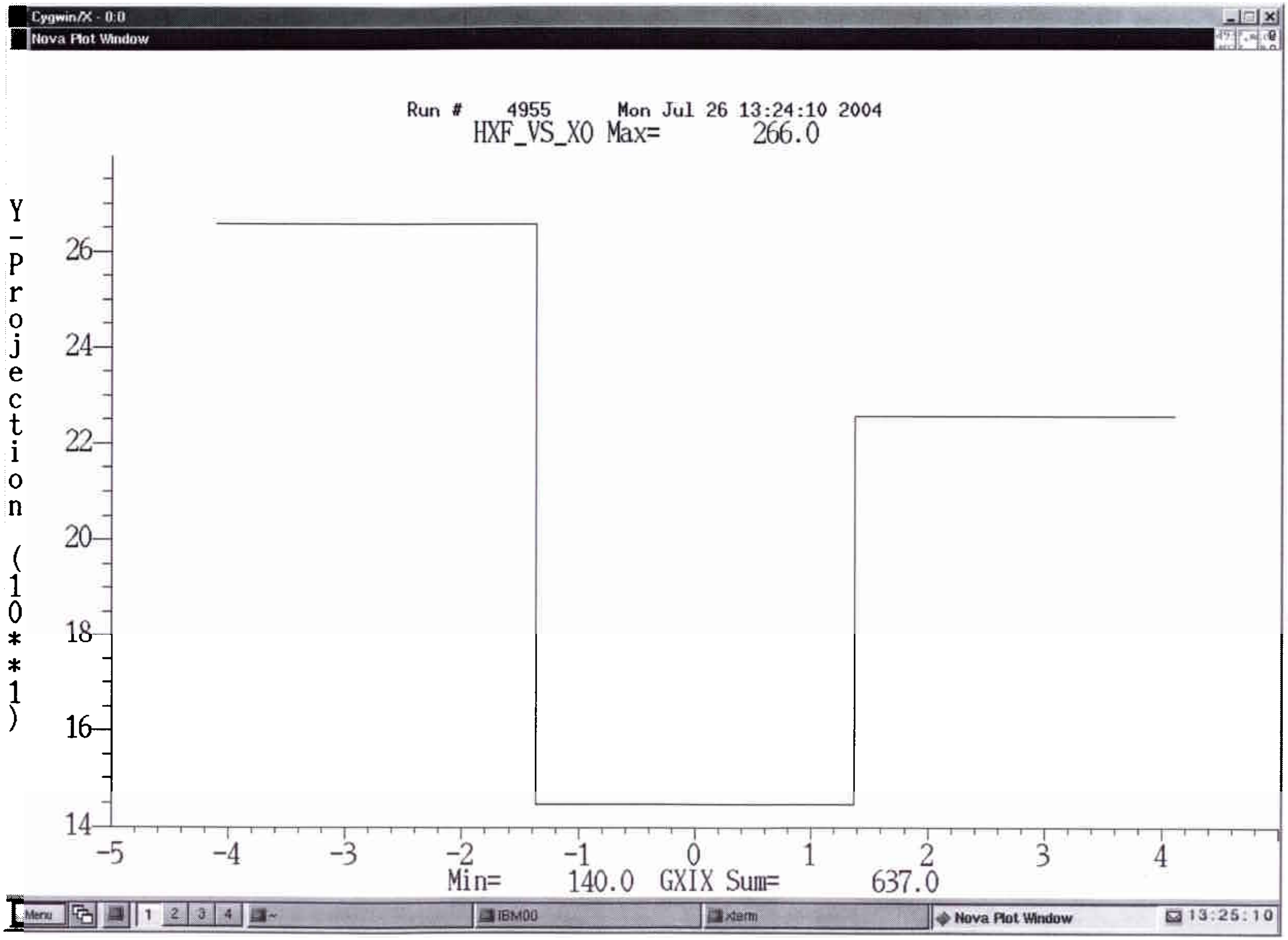
Taking BGO left and right asymmetry into account

$$\underline{\omega\gamma = 118\ {}^{+35}_{-11}\ \text{meV}}$$

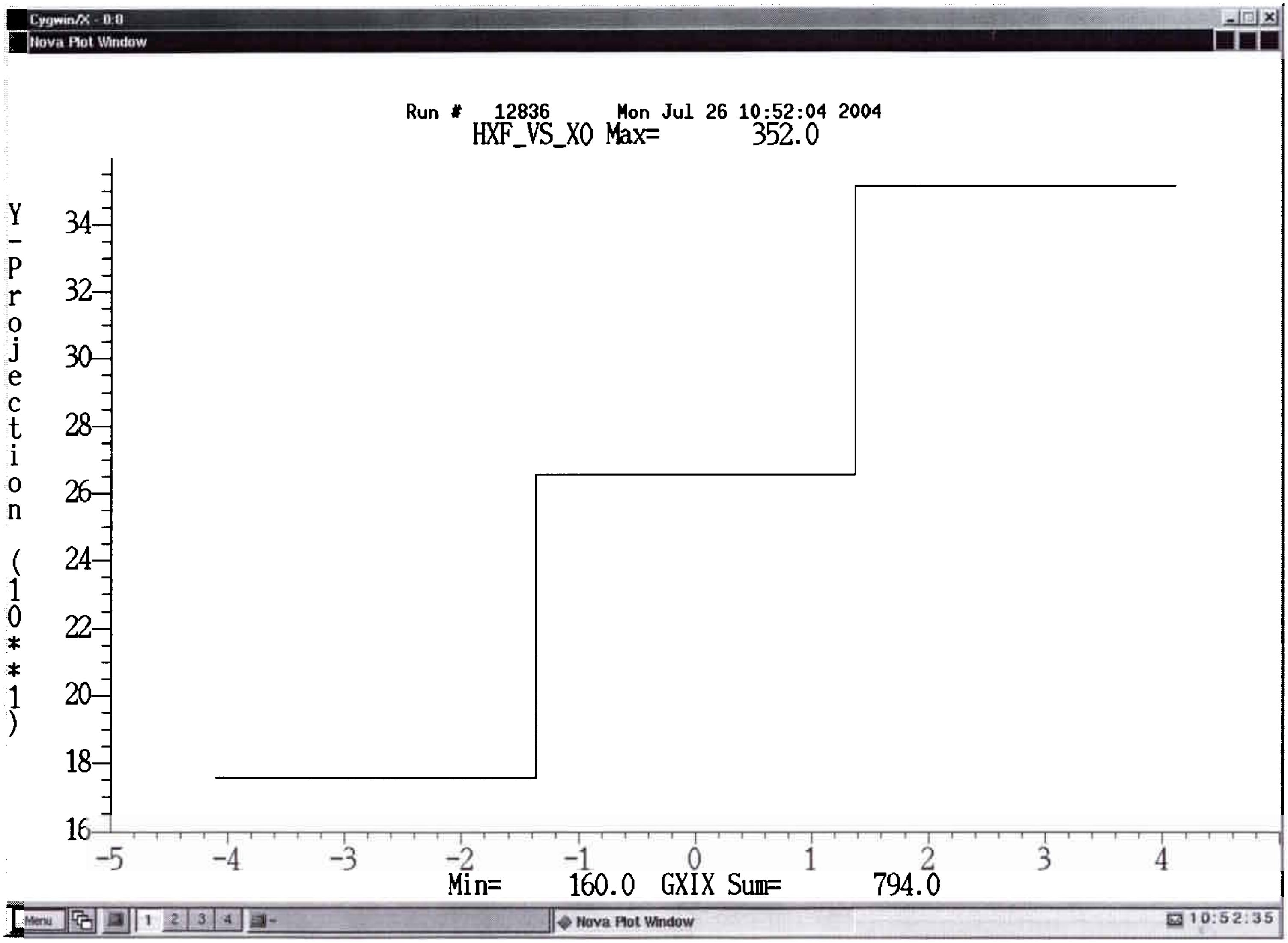
Comparing with previous results

Run #	BGO efficiency	Yield	strength meV
4955	0.49	5.76E-10	131.2
5232	0.48	4.94E-10	112.6
12199	0.501	6.59E-10	150.2
12836-12841	0.435 +/- 0.02	4.84E-10 +/- 0.43E-10	118 +35/-11

Previously published strength: 82 +/- 12.5 meV



Cygwin/X - 0:0
Nova Plot Window
Run # 4955 Mon Jul 26 13:24:10 2004
HXF_VS_X0 Max= 266.0
Y-Projection (10**1)
26
24
22
20
18
16
14
-5
-4
-3
-2
-1
0
1
2
3
4
Min= 140.0 GXIX Sum= 637.0
Menu
IBM00
xterm
Nova Plot Window
13:25:10


Cygwin/X - 0:0
Nova Plot Window
Run # 12836 Mon Jul 26 10:52:04 2004
HXF_VS_X0 Max= 352.0
Y-Projection (10**1)
34
32
30
28
26
24
22
20
18
16
-5
-4
-3
-2
-1
0
1
2
3
4
Min= 160.0 GXIX Sum= 794.0
Menu
Nova Plot Window
10:52:35