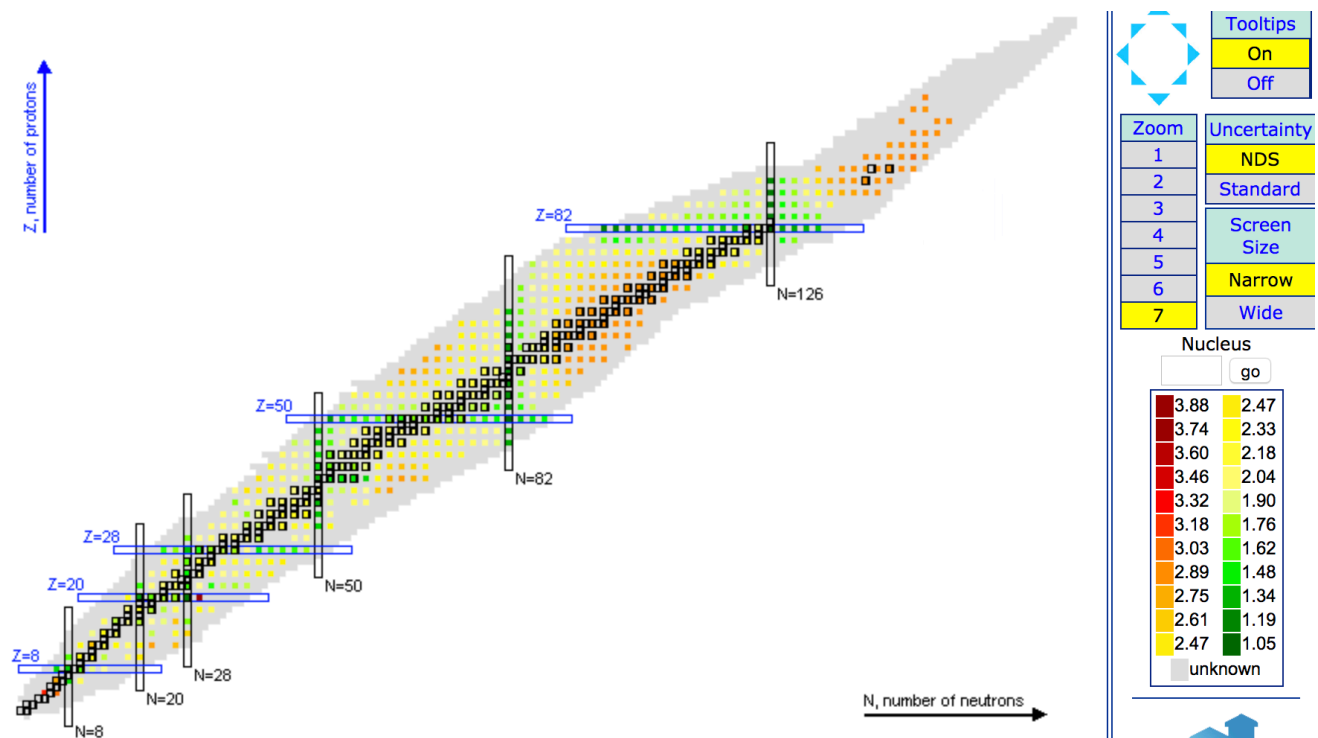


# Homework2 Zichao Yang

## p1

The ratio should be roughly around 10/3. So those orange nuclei would have a rotor spectrum.



## p2

80keV and 800keV would be two energy scales. There is a separation of scales.

## p3

```
gnuplot> f(x) = A*x*(x+1)
gnuplot> fit f(x) 'Dy162.txt' using 1:2 via A
iter      chisq      delta/lim  lambda    A
  0  3.1285627000e+07   0.00e+00  1.67e+02  1.000000e+00
  1  3.1062295097e+05  -9.97e+06  1.67e+01  1.062090e+01
  2  5.2498174836e+04  -4.92e+05  1.67e+00  1.158203e+01
  3  5.2497917227e+04  -4.91e-01  1.67e-01  1.158299e+01
iter      chisq      delta/lim  lambda    A
```

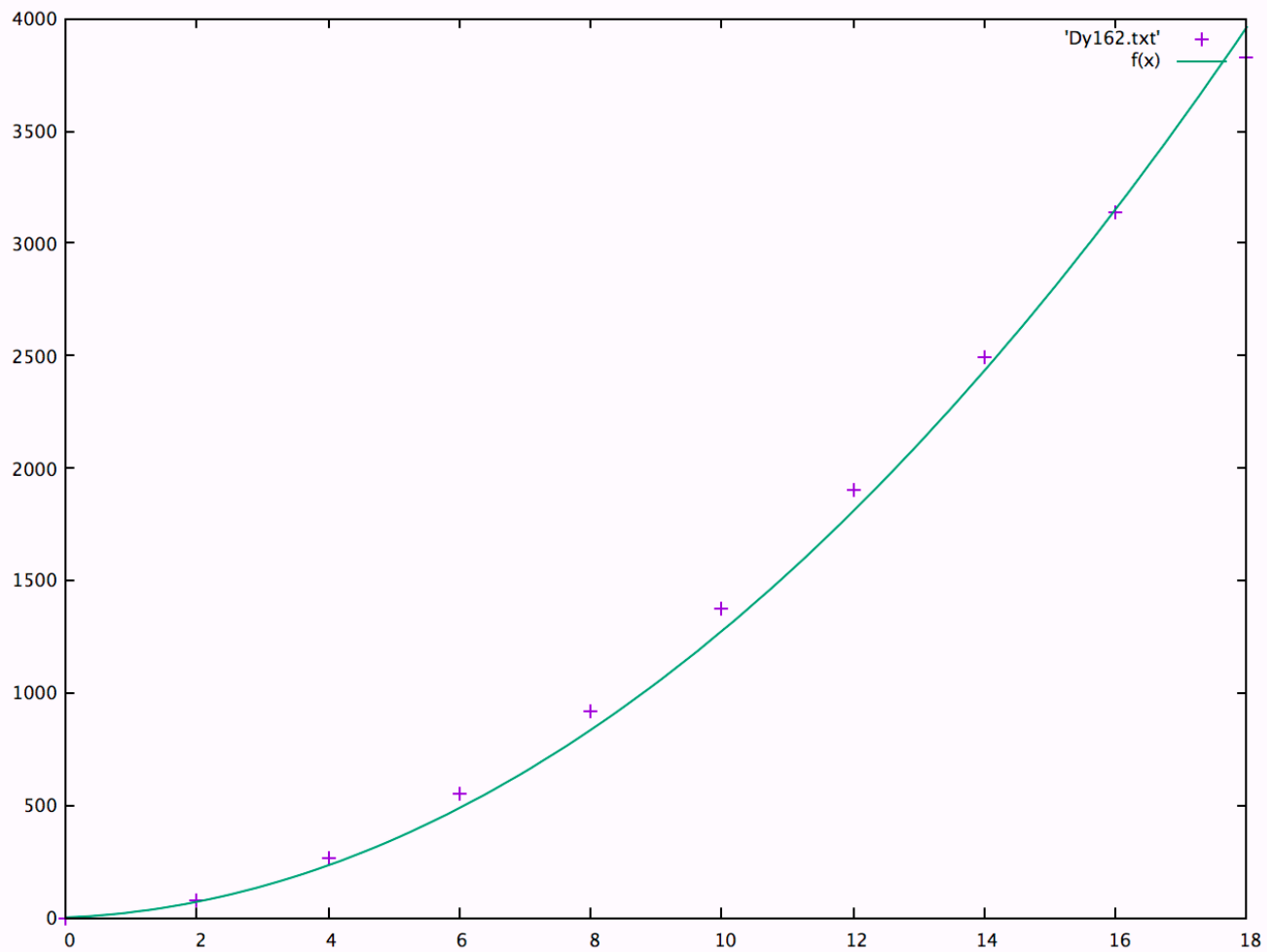
After 3 iterations the fit converged.

```
final sum of squares of residuals : 52497.9
rel. change during last iteration : -4.90704e-06
```

```
degrees of freedom      (FIT_NDF)                : 9
rms of residuals        (FIT_STDFIT) = sqrt(WSSR/ndf) : 76.3747
variance of residuals (reduced chisquare) = WSSR/ndf  : 5833.1
```

Final set of parameters	Asymptotic Standard Error
=====	=====
A = 11.583	+/- 0.1446 (1.249%)

Global fit would give a result of  $A = 11.583$ .



EFT would only use the two lowest state since it is low energy theory. The energy shall not beyond the energy scale.

```
octave:3> 80.7/6
ans = 13.450
```

In EFT, we should get  $A = 13.450$

