# Problem 1

① The $\chi^2$ value with parameters $[60, 0.02, 0.1, 0.05, 2\times10^{-9}, 1]$ using Jon's script is ~15267.
This seems quite high, meaning that the parameters don't seem like an acceptable fit. Better parameters yield a lower $\chi^2$.

② When the parameters are $[69, 0.022, 0.12, 0.06, 2.1\times10^{-9}, 0.95]$, the $\chi^2$ value drops down to ~3272.
This is around a factor of 5 smaller than using the previous parameters, meaning these parameters are promising. However, if we can find best fit parameters than can optimize $\chi^2$, then those would be better (hence, the next questions on the assignment).

Mean of $\chi^2 = n$
Variance of $\chi^2 = 2n$

$n$ = # of degrees of freedom.

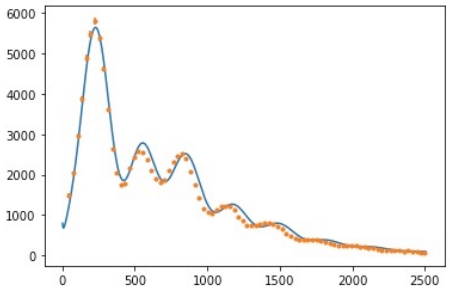
According to Jon's script, there are 2501 degrees of freedom, and the mean is also 2501.

$$15267 \gg 2501$$

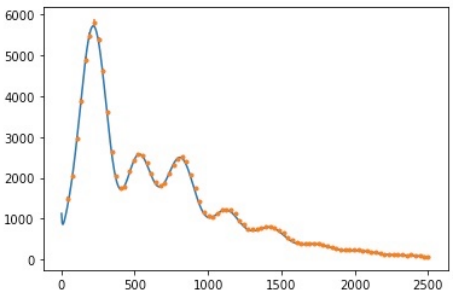
whereas 3272 is much closer to 2501, again confirming that the second set of parameters.

Graphically comparing both sets of parameters:

Graph 1: $\chi^2 = 15267$




Graph 2: $\chi^2 = 3272$




Visually, 2nd set of parameters yields a better model when plotting with data.