1. Introduction of the experiment

This year, we ran the experiment in the University of Notre Dame with Tandem accelerator, searching for the ^{11}B resonance (E_x = 11.4MeV, J^π = ½$^+$ and Γ_α=11.5keV) via the α(^{7}Li, ^{7}Li)α reaction. We settled four Si detectors respectively at the scattering angle 30 degrees, 60 degrees, 90 degrees and -135 degrees.

Besides the elastic and inelastic α(^{7}Li, ^{7}Li)α reactions we are interested in, there are also contaminations in the source involving Carbon Oxygen and Florine.

2. The job I did with the knowledge I learned

By using the powerful ROOT, I'm able to generate 4 spectra histograms with respect to four detectors. The horizontal axis is the channel number, and the vertical axis is the counts. I suppose those peaks should be in the form of Gaussian distribution. Therefore, I gave each of them a gaussian fit and calculated the mean value as well as the deviation. After energy calibration, with the mean value of these peaks, I'm able to recognize most of peaks in the histograms. Then, I do an integration for each of gaussian fits so that I can use the scattering counts to calculate the cross section.

The problem I am facing is that there are kind of strong backgrounds that needed to be eliminated in order to increase the accuracy. Rather than just give a gaussian fit, I think I can try to give the histogram a "gaus+linear" fit which I imagine might can give a more realistic result.

Besides, the other problem I am facing is that some of these peaks are overlapped which will also make a bad influence on the result. I think it is not easy to distinguish overlapped peak. At this point, it could be a good opportunity for me to calculate the confidence level and limits. While, because of the upcoming deadline, I have to stop here.

3. Conclusion

In conclusion, the knowledge I learnt this semester is very helpful for me to do analysis. I really appreciate this great learning opportunity and experience provided by professor Wade!