

## Rutherford Pre-Lab

WARNING: This Pre-Lab will take you two or more days. Allow adequate time.

1. For perspective, read and understand the paper *MIT-lab-Rutherford.pdf* (Earl, 1966) which is found in the 122 web page for this experiment under Related Material. You will encounter these same challenges, although with modern instrumentation! Allow a full day to understand the experiment and at least another day to complete the calculations in all parts of this pre-lab.
2. Read the Guide and plan how you will set up the experiment, tracing the pulse through the system, and optimizing the pulse timing and MCA.
3. Examine the relation between the scattering angle  $\theta$  and angles  $\theta_1$  and  $\theta_2$ . For the apparatus you have, with its fixed  $\theta_1$ , what is the range of scattering angles you can cover? Look at the drawing very carefully.
4. Complete the six exercises in section 6 of the Guide. Do the calculations, make high quality full-page plots, and answer the questions. This part of the pre-lab will take some time.
5. Correctly completing this pre-lab will allow you to plan your data runs. Planning is important. Each run (one point on your plot) will take many hours and you will not have time to repeat the series.