

GMA - Gamma-ray Spectroscopy

Signature Sheet

Student's Name _____ Partner's Name _____

WATCH THE GAMMA RAY AND THE RADIATION SAFETY VIDEOS

You must watch the Radiation Safety video, sign the Office of Radiation Safety form, and get a Radiation Ring before you use the apparatus in this experiment.

Ring _____ Issued (Date and Signed) _____ Returned (Date and Signed) _____

Your Report will not be accepted until you have turned in your ring.

Suggested reading to start with (see the end of the manual for more):

1. 111B GMA Manual
2. Knoll, G.F. *Radiation Detection and Measurement*. Wiley, 1979.
 - (a) **Ch.1 Radiation Sources**
 - (b) **Ch.2 Radiation Interactions**
 - (c) **Ch.3 General Properties of Radiation Detectors**
 - (d) **Ch.9 Photomultiplier Tubes**
 - (e) **Ch.10 Radiation Spectroscopy with Scintillators**
3. 111B GMA Experiment Video **Gamma Ray Video**. The equipment for this lab has changed over the years making the last part of the video inconsistent with the procedure on this lab but it is nonetheless useful for understanding how the set-up works. Note: In order to view the private Youtube videos hosted by the university, you must be signed into your berkeley.edu Google account.

Pre-Lab Discussion Questions

It is your responsibility to discuss this lab with an instructor before your first day of your scheduled lab period. This signed sheet must be included as the first page of your report. Without it you will lose grade points. You should be prepared to discuss at least the following before you come to lab:

1. What are gamma rays? How are the gamma rays produced that are used in this experiment?
2. What is a pulse height spectrum? What are the axes?
3. By what means does the sodium iodide detector detect photons?
4. What is a "photopeak"? What role do photopeaks play in this experiment?
5. What is Compton scattering? Do we observe Compton scattering in this experiment? What are other possible peaks that you might see?
6. What is a reference source? How do we use it to calibrate our pulse height spectrum?
7. What are possible sources of nonlinearity from our equipment?

Staff Signature _____ Date _____

Completed before the first day of lab? (Circle one) Yes / No

Mid-Lab Discussion Questions

1. On day 4 of this lab, you should have successfully produced a plot of the energy spectrum from each source, properly calibrated in keV or MeV. Show them to an instructor and ask for a signature.

Staff Signature _____ Date _____

Completed by day 4 of lab? (Circle one) Yes / No

Checkpoint Signatures

1. Variable High Voltage Supply

Staff Signature _____

2. Width of a peak

Staff Signature _____

3. Parameters

Staff Signature _____

4. Back-Scatter and Compton Edge Signals

Staff Signature _____

5. Intensity Formula

Staff Signature _____