

**BETA RAY SPECTROMETER**

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Student's name \_\_\_\_\_

Partner's Name \_\_\_\_\_

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

**Ring #** \_\_\_\_\_ **Issued** \_\_\_\_\_ **Returned** \_\_\_\_\_  
 (Date and Signed) (Date and Signed)

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

**Pre-lab Discussion Questions and Staff Sign Off**

It is your responsibility to discuss this lab with a professor or GSI. on the first day of your scheduled laboratory period. This signed sheet must be included as the first page of your report. Without it you will lose 1/3 of a letter grade. You should think about and be prepared to discuss at least the following before you come to lab:

**Watch the Beta Ray & Error Analysis video with these questions at hand.**

1. What are Beta Rays? How are they produced?
2. How is radioactive decay related to nuclear binding energy?
3. What is the half-life of  $\text{Cs}^{137}$  and what are the decay modes of this nucleus? Sketch the two beta-decay distributions of  $\text{Cs}^{137}$ . Qualitatively explain their general shapes and relative sizes. Indicate the maximum energy of each distribution.
4. What is the "internal conversion process" and how does atomic electronic binding play a role in the electron's final kinetic energy?
5. What is a Fermi-Kurie plot, and why do you need to use it ?
6. What does the Beta-ray spectrometer measure, and how does it measure it?
7. Identify and describe the operation of each of the pieces of experimental apparatus: source, coils, preamp, amp, SCA, etc.

Staff Signature \_\_\_\_\_ Date \_\_\_\_\_

Completed on the *first* day of lab? (circle) Yes / No

**Mid-lab Questions**

On day 2 of this lab, you should have taken several quick spectra and determined an appropriate setting of the discriminator's baseline parameter. Demonstrate and show the spectra to an instructor and ask for a signature.

Staff Signature \_\_\_\_\_ Date \_\_\_\_\_

Completed on the *second* day of lab? (circle) Yes / No

**INCLUDE ALL SHEETS AT THE BEGINNING OF YOUR REPORT**

***Physics 111 Advanced Lab      Student Evaluation of Experiment***

Now that you have completed this experiment, we would appreciate your comments. Please take a few moments to answer the questions below, and feel free to add any other comments. Since you have just finished the experiment it is *your* critique that will be the most helpful. Your thoughts and suggestions will help to change the lab and improve the experiments.

Please be as specific as possible, using both sides of the paper as needed, and turn this in with your report. Thank you!

Experiment name: \_\_\_\_\_ Date: \_\_\_\_\_

How was the write-up for this experiment? How could it be improved?

How easily did you get started with the experiment? What sources of information were most/least helpful in getting started? Were the reprints appropriate? Did the Pre-lab discussion help? Did you need to go outside the course materials for assistance? What additional materials could you have used?

What did you like and/or dislike about the experiment?

Would you recommend this lab to fellow student? Why or why not?

What advice would you give to a friend just starting this experiment?

If the course materials were available over the internet (WWW, FTP, etc), would you (a) have access to them and (b) would you prefer to use them this way?

Please circle the abbreviations of the other labs you have done. ATM BMC BRA COM CO <sub>2</sub> GMA HAL HOL JOS LIF LLS MNO MOT MUO NLD NMR OPT OTZ RUT SHE XRA	Overall quality of this experiment? 1      2      3      4      5 Poor                  Average                  Good
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**Thank you from the 111-Lab Staff**