LUND UNIVERSITY

FYSC12 Pro Forma Lab Report

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Abstract

Elevator pitch for the whole report, just a few lines on what this whole document is.

Contents

1 Introduction [1/2 page]

Introduce the report, the aims of the lab and the learning outcomes. Remember this should be legible to someone who was not at the lab

2 Theory [2-3 pages MAX]

Included are a number of figures from text books relevant to the theory. Feel free to use these to guide what to include. Remember only the relevant theory.

- Detectors
- Gamma-ray interactions with matter

Don't just transpose sections from the textbook[1, 3]. Give specific references if it's a long text such as a book, e.g. Section 7.1 in Krane[4] or Section 5.3 in Lilley[2]. This shows you've actually read the work you reference.

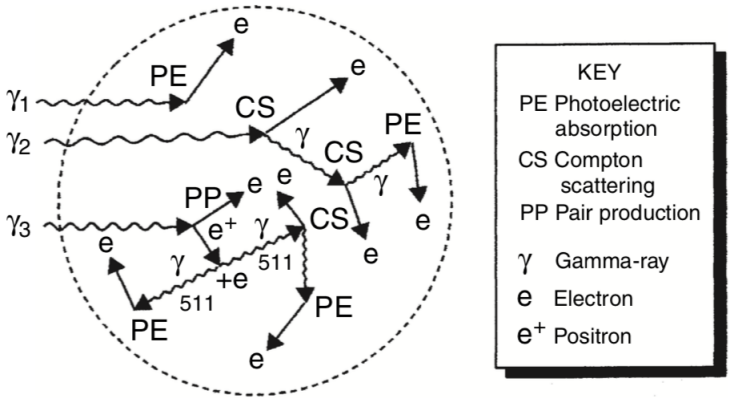

Figure 2.1: Schematic representation of possible interactions of a γ ray within material. Reproduced from Fig 2.8[1]

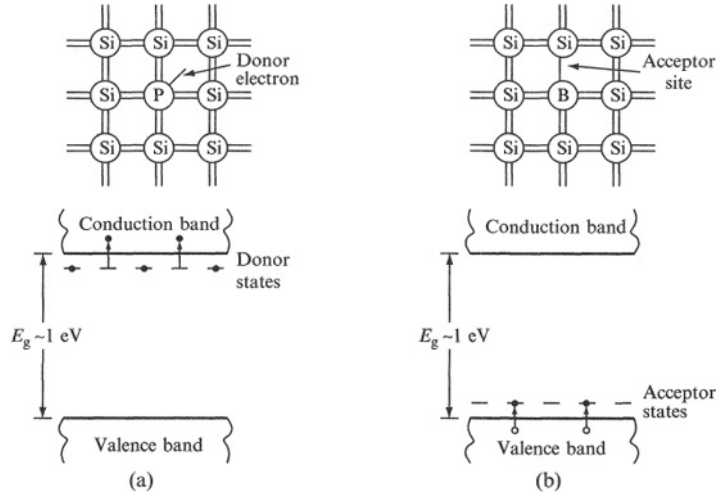

Figure 2.2: Electronic band structure of an n-type (a) and a p-type (b) semiconductor. Reproduced from Fig 6.6[2]

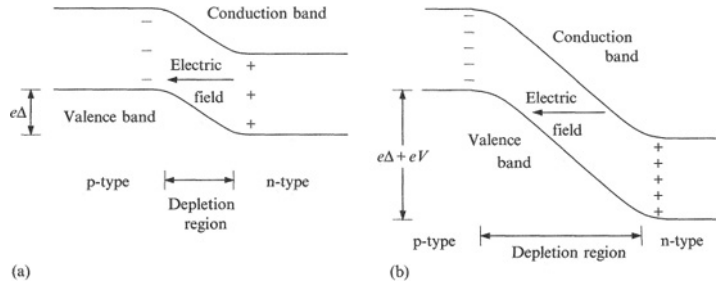

Figure 2.3: Depletion zone between a p-n junction without (a) and with (b) an external electric field applied. Reproduced from Fig 6.7[2]

3 EXPERIMENTAL SETUP [1-2 PAGES]

Describing the setup used, explaining the use of components. Use diagrams whenever relevant, not just here but throughout the report.

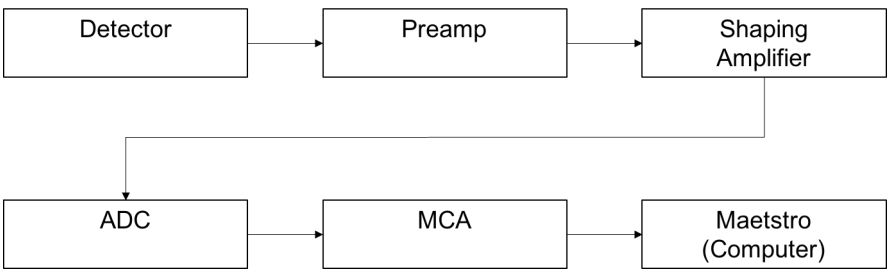

Figure 3.1: Schematic representation of electronics chain

4 Results [1/2 page each]

4.1 Task 1

Briefly describe the task, method used, result. Use diagrams.

4.2 Task 2

Briefly describe the task, method used, result. Use tables.

4.3 Task N-1

Briefly describe the task, method used, result. Don't forget errors.

4.4 Task N

Briefly describe the task, method used, result. Include the reference for tools used, such as BrIcc[5]

5 Discussion

Link everything together, theory to results. Detector comparison.

Table 5.1: Individual effects of the high voltage and aluminised Mylar absorber foil on the electron energy and full-width at half-maximum (FWHM) of the peaks from the ^{133}Ba decay [6].

	Energy [keV]	FWHM [keV]	Energy [keV]	FWHM [keV]
Literature	75.28(1)		320.03(1)	
This work				
Unsuppressed	75.4(1)	9.7(1)	320.2(1)	6.6(1)
+5 kV	70.0(1)	9.6(1)	315.2(1)	6.9(1)
Absorber foil	63.6(1)	12.9(1)	316.0(1)	7.7(1)

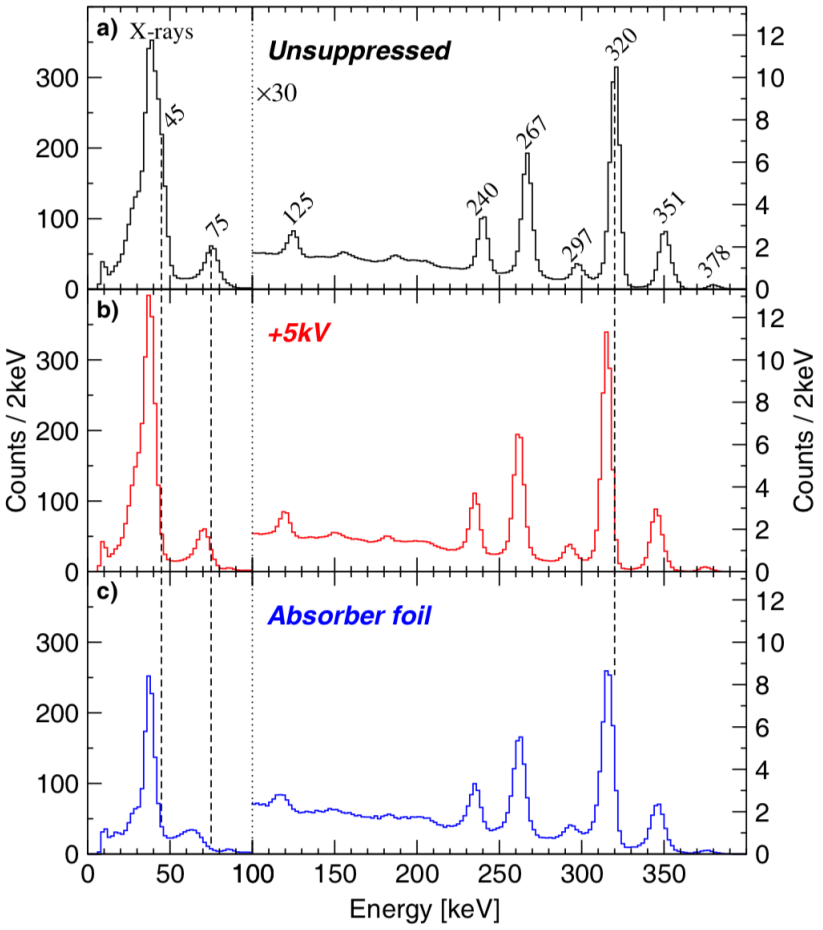

Figure 5.1: Comparison of three setups on detected radiation. Reproduced from [7]

6 Conclusion

Any final reflections on the labs, learning outcomes, contextualisation of detectors and gamma-ray spectroscopy in physics.

References

[1] G.R. Gilmore, *Practical Gamma-ray Spectrometry* (Wiley, 2008), ISBN 978-0-470-86196-7

[2] J. Lilley, *Nuclears Physics, Principles and Applications* (Wiley, 2001), ISBN 978-0-471-97936-4

[3] G.G. Knoll, *Radiation Detection and Measurement* (Wiley, 1979), ISBN 978-0-470-13148-0

[4] K.S. Krane, *Introductory Nuclear Physics* (Wiley, 1987), ISBN 047180553X

[5] T. Kibédi et al., Nuclear instruments & methods in physics research. Section A, Accelerators, spectrometers, detectors and associated equipment **589**(2), 202 (2008), ISSN 01689002, **DOI** 10.1016/j.nima.2008.02.051

[6] Y. Khazov, A. Rodionov, F.G. Kondev, Nuclear Data Sheets **112**, 855 (2009), ISSN 00903752, **DOI** 10.1016/j.nds.2009.06.002

[7] P. Papadakis et al., European Journal of Physics A **54** (2018)