**Charlie Woodrow**

# Montecarlo Simulation for >WRITE A REAL TITLE<

Albion College

Department of Physics

**Author:** Charlie Woodrow

**Contact information:** `charlotte.woodrow@q3w3e3.dev`

**Supervisor:** Philip Voss

**Title:** Montecarlo Simulation for >WRITE A REAL TITLE<

**Project:** Bachelor's Thesis

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**Abstract:** This is where my abstract would go?

**Keywords:** Bachelor's Theses, GEANT4, >INSERT REAL KEYWODRS<

# Preface

This is where I can write a preface if I want?

Charlie Woodrow, June 20, 2020

The Author

# Glossary

Do I want to keep this section  Just a glossary

# List of Figures

# List of Tables

# Contents

# 1 Introduction

## 1.1 Motivation for lifetime measurement

## 1.2 Experimental details

## 1.3 Introduction to the simulation code

# 2   Installation and Software details

## 2.1   Radware

- xquartz/x11 issues at first
- Radware was easy, though some files had to be modified to get all channels to read from the file

## 2.2   GEANT4 and ROOT

- Issues with x11 headers missing and anaconda???
- Issues with more x11 calls?
- Clhep base directory issues (maybe there were issues with clhep other than the version)
- Issues with ROOT calls? (maybe it wasnt installed without issue) ($PATH issues because of ROOT install directory)
- Linker fails:

  - -lgcov was replaced.
  - I just went into all the makefiles and swapped the -lgcov flag with –coverage
- Still having issues with:

  - Tgframe.h still "missing" (from root)
  - "ld: library not found for -lMinuit clang: error: linker command failed with exit code 1"
- Could not fix library issues on OSX

  - MacOS

    * Issues with XCode
    * Issues with linker (documented in email)
    * CLang version naming????
    * Difficulty running old compiler on MacOS(caused by XCode)
  - Selection of ubuntu 12.04

∗ Installation went super smoothly

## 2.3 $^{37}$Ar specific code

### 2.3.1 Detector specific changes

### 2.3.2 Reaction specific changes

# 3 Preliminary Comparisons

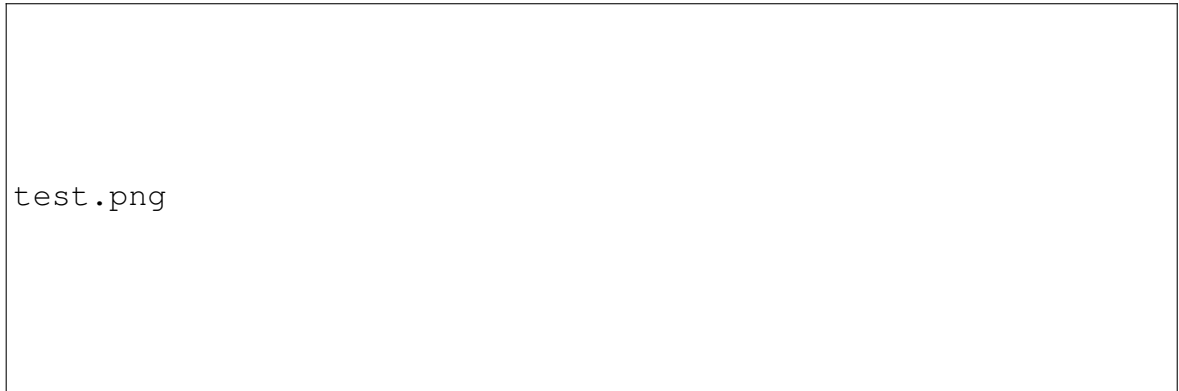## 3.1 Particle energy deposits in pin array

### 3.1.1 Beam properties

test.png

Figure 1. A test.

Figure 1 shows a test image.

### 3.1.2 Target properties

### 3.1.3 Reaction properties
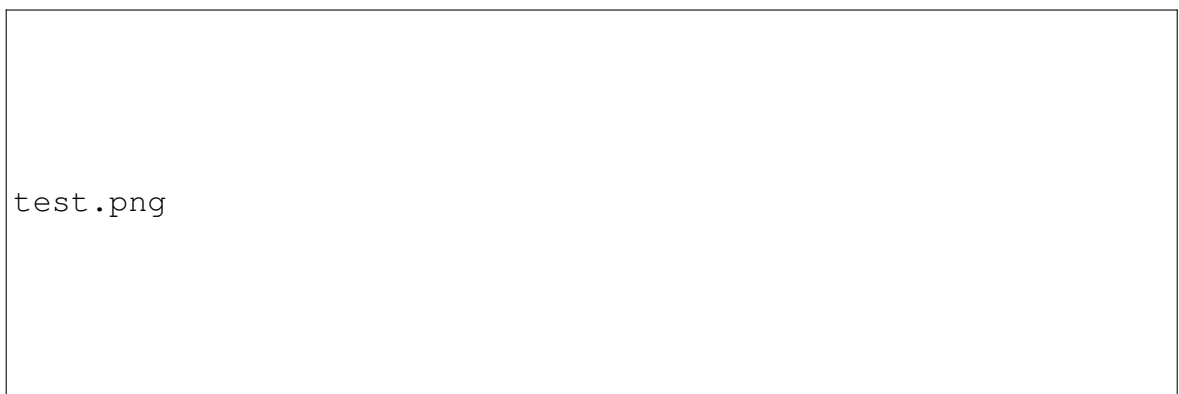
## 3.2 $\gamma$-ray lineshapes

test.png

Figure 2. A test.

Figure 2 shows a test image.

# 4 Discussion and Conclussion

## 4.1 Key contributions

## 4.2 Main results and current status

## 4.3 Future efforts

# 5 Special properties of the document class

Generally, gradu3 behaves like the report document class that is shipped with LaTeX. There are, however, some differences:

- no need to load the packages inputenc, fontenc, and babel.
- Specify the metadata of thesis using the commands given in Table 1. They must be given before the \maketitle command.

| Command | Meaning |
| --- | --- |
| \title | The title of the thesis (do not use the \thanks command... it breaks things...) |
| \abstract | Abstract |
| \keywords | Keywords |
| \author | Author's name (if multiple authors, give each their own command – the \and command is not supported) |
| \contactinformation | The contact information of the author |
| \supervisor | The supervisor of the thesis (if multiple supervisor, give each their own command; optional if using the bachelor option) |

Table 1. Commands for declaring metadata

- Write a preface after the \maketitle command. Use the \preface to start it.
- Write a list of terms by using the thetermlist environment. Inside it, you can use the \item[*term*] command to indicate which term you are defining.
- After \maketitle, preface (if any), and term list (if any), use the \mainmatter command. It will automatically generate the tables of contents, figures, and tables that are needful.
- The commands \subsubsection, \paragraph ja \subparagraph are not supported.
- Appendices are not \chapters, they are \sections.

# Appendices

## A    appendix section