



IMPLEMENTATION OF GAMMA PHOTON RADIATION DETECTOR

This thesis is presented in partial fulfillment for the award of Bachelor in Electrical
Engineering (Hons.)

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ABSTRACT

The purpose of this project is to implement a device that can detect the presence of gamma photon radiation. The detection circuit can be divided into a few small sub functions that consist of signal sensor, amplifier and comparator.

That signal will be detected by using PIN photodiode. Detected signal is then being amplified by using the low noise amplifier. The low noise amplifier being chosen in the system due to the incoming signal might be very small. Therefore, the probability that the signal noise affecting the system can be minimize.

After the pre-amplifying process, the final stage is to compare the incoming signal with initial reference voltage. The design circuit produces high pulse if the incoming signals match with the system specification.

The circuit for the gamma photon radiation detector is being tested using PSPICE computer simulation program and actual setup of the circuit. The result between the both approaches is then being compared and discuss.

Key words: Gamma Photon Radiation, Low noise amplifier and PIN diode.

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CHAPTER 1

INTRODUCTION

1.1 Introduction

Photon is a unit or "particle" of electromagnetic radiation, carrying a quantum of energy which is characteristic of the particular radiation¹. The studies on characteristics of photon are one of the scopes in photonics researches. There are so many researches that involve the usage of photon currently being developed nowadays. One of the examples on the successful photonics research is the data transmission using the fiber optics cable.

Gamma photon radiation is one of the radioactive energy that inheritance from the photon energy. The presence of the gamma photon radiation need to be detected first of all before the signal can be use for nay kind of applications.

In order to manipulate the nature of gamma photon radiation for any application, the presence of the radiation need to be identified before the research goes to the next level. Normally, the presence of the gamma photon or gamma ray can be detected using special device that detect radioactive material. Such equipment is quite difficult reach and implementation of the application of gamma photon radiation with that equipment would be not easy and may facing problem.

Therefore, the implementation of the gamma photon radiation detector by using normal semiconductor material will be given much advantage in terms of expending the usage of gamma rays. Due to the simple operation of the circuit, this detector can be attached with other application with ease.

¹ From The Effects of Nuclear Weapons, Third Edition, Samuel Glasstone and Philip J. Dolan, US Department of Defense and Department of Energy, 1977