

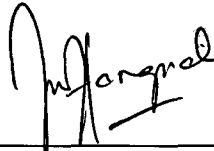
PHOTONIC CRYSTAL BIO SENSOR

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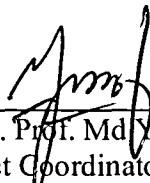
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This Final Year Report entitled “**Photonic Crystal Bio Sensor**” was submitted by Mohd Arif b Mohd Ghani, in partial fulfillment of the requirement for the Degree of Bachelor of Science (Hons.) Physics, in the Faculty of Applied Sciences, and was approved by



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ABSTRACT

The objective of this project is to investigate the suitability of a photonic crystal for detection dengue infected blood. In sensor application; photonic crystal is a periodic structure of materials with differing refractive indices. This paper presents the simulation of photonic crystal bio sensor for detection dengue infected blood. The project involved designing photonic crystal bio sensor. Finite Different Time Domain (FDTD) is used to stimulate reflection and transmission characteristic over range of wavelength. Band diagram of photonic crystal bio sensor is also calculated. The work presented here shows that the photonic crystal bio sensor is suitable for measuring dengue infected blood. This can be proved by the blue shift observed in the graph.

CHAPTER 1

INTRODUCTION

1.1 Introduction

Virus particles are a major cause for human disease and their early detection is important since modern transportation has enabled these disease agents to be spread through populations across the globe. That why we require biosensor capable of detecting a virus. [1]

Bio sensor is a device capable of transforming a biological reaction into a measurable signal. Integrated optic sensor attracted considerable interest taking into account their advantages such as small size and easy to handle. Bio sensor also can use for determination of mechanism and kinetic of biological event. For example is to test the Dengue blood count. [2]

The properties of light propagation can be modified in different ways due to the variation of absorptive, refractive or luminescence properties of biological layer. Visible light was choose because it not radioactive type and cost to produce was cheap.

Photonic crystals are materials that have a periodic variation in refractive index on a length scale that is comparable to the wavelength of light. At each interface the wave is partly reflected and transmitted. Its have variety of band dispersion and band gap.