

國立清華大學

碩士論文

我的論文標題 (中文)

My thesis title (Chinese)



系 所：物理研究所

學 號：105022511

研 究 生：韓正忻 (Cheng-Hsin Han)

指導教授：徐百嫻 博士 (Prof. Pai-Hsien Jennifer Hsu)

中 華 民 國 一〇七 年 十 二 月



# Todo list

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## 我的論文標題 (中文)

### 摘要

在此寫上你的中文摘要。

**關鍵字：**關鍵字, 論文, 樣板, 讓我畢業





My thesis title (Chinese)

# Abstract

Write your English abstract here.

**Keywords:** Keyword, Thesis, Template, Graduate me







# Acknowledgement

Thanks NCU, and sppmg's L<sup>A</sup>T<sub>E</sub>X template `_sppmg/tw_thesis_template_????`.





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# Glossary

Use table for symbol list. You can also use package “nomencl” (simple) or “glossaries” (powerful). see packages document or my tutorial (but it’s Chinese).

## Glossary

VIM : The best guy’s editor  
Emacs : The God’s editor  
CTAN : Comprehensive TeX Archive Network, [ctan.org](http://ctan.org)





# Chapter 1

## Introduction

(You can copy “chapter\_template.tex” or “chapter\_template\_demo.tex” to create new sub-file(chapter). )

Write your Introduction here. eg,

I don't want my chaste thesis impinge by M\$. But  $\LaTeX$  is little hard.





## Chapter 2

# The ATLAS detector

## 2.1 Coordinates

The ATLAS (**A** Toroidal **LHC** Apparatu**S**) experiment is one of the seven detector in Large Hadron Collider (LHC) at CERN (European Organization for Nuclear Research). Its cylindrical symmetry and end caps covers nearly  $4\pi$  in solid angle.

A coordinate system is used to describe every recorded signals nearby. The origin is set at the center of the detector, or the interaction point (IP). The x-axis points toward the center of the LHC ring; the y-axis points vertically upward; the z-axis points along one of the beam pipe direction such that a right-handed coordinate sysetem is created.

A modified version of cylindrical coordinate is more commonly used in the experiment. The pseudorapidity  $\eta \equiv -\ln \tan(\theta/2)$ , in which  $\theta$  is the polar angle in cylindrical coordinate, is used to deccribe the angle between the z-axis and the direction of interest.  $(r, \phi)$  is the same system to describe the tranverse plane, with  $\phi$  being the azimuthal angle. In addition, the cone size is defined as  $\Delta R \equiv \sqrt{(\Delta\phi)^2 + (\Delta\eta)^2}$ .

## 2.2 Components of ATLAS

Depending its function, the components are categorized into four parts - inner detector, calorimeter, muon detector, and the magnetic system. Each of them consist of smaller layers.

### 2.2.1 Inner Detector

Beginning few centimeters from the IP, the inner detector's main function is to track the trace of charged particles by their interactions with the materials. A 2T magnetic field, which surrounds the whole inner detector, causes the charged ones to bend. Based on the directions and the curvatures, one can determine their charges and momenta preliminarily. The inner detector comprises three parts - the pixel detector, the semi-conductor tracker (SCT), and the transition radiation tracker.

Located at the innermost part, the pixel detector contains three layers of modules, which is made up of 250  $\mu\text{m}$ -thick silicon, each is 2 centimeters by 6 centimeters in size in the direction perpendicular to the beam. Three disks, which are made up of similar material, are at each end cap of the detector. Each module includes about 47,000 pixels, measuring 50 by 400  $\mu\text{m}$  each. It covers pseudorapidity range  $|\eta| < 2.5$  and its proximity to the IP is meant to measure extremely precise trace of the charged particles.

The semi-conductor tracker, having a similar concept and function to the pixel detector, lies in the middle part of the inner detector. Although having a resemblance to the pixel detector, the SCT is in a long and narrow strip-shape rather than small pixels and covers the perpendicular directions to the beam instead of nearly full coverage. The SCT, which overlays a larger area than that of the pixel detector, has more sampled points and thus can track

### 2.2.2 Calorimeter

### 2.2.3 Muon Detector

## Chapter 3

# Result

I had a nice thesis.







## Chapter 4

# Conclusion

I am free, I am not own by M\$.





# Chapter 5

## Chapter name(demo)

Content of chapter  
Content Content Content.

### 5.1 Section name

Content of section  
Content Content Content



#### 5.1.1 Subsection name

Content of subsection  
Content Content Content

##### 5.1.1.1 Subsubsection name

Content of subsubsection  
Content Content Content

**5.1.1.1.1 Paragraph name** Content of paragraph  
Content Content Content

**Subparagraph name** Content of subparagraph  
Content Content Content



## Chapter 6

# Test demo

First line. (next line in  $\text{\LaTeX}$  )still first line.  
Second line.





## Chapter 7

### figure

#### 7.1 Insert single figure(by sppmg's tool)

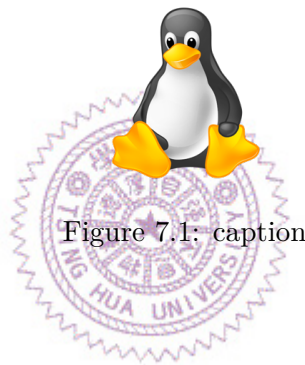


Figure 7.1: caption

#### 7.2 Insert figures

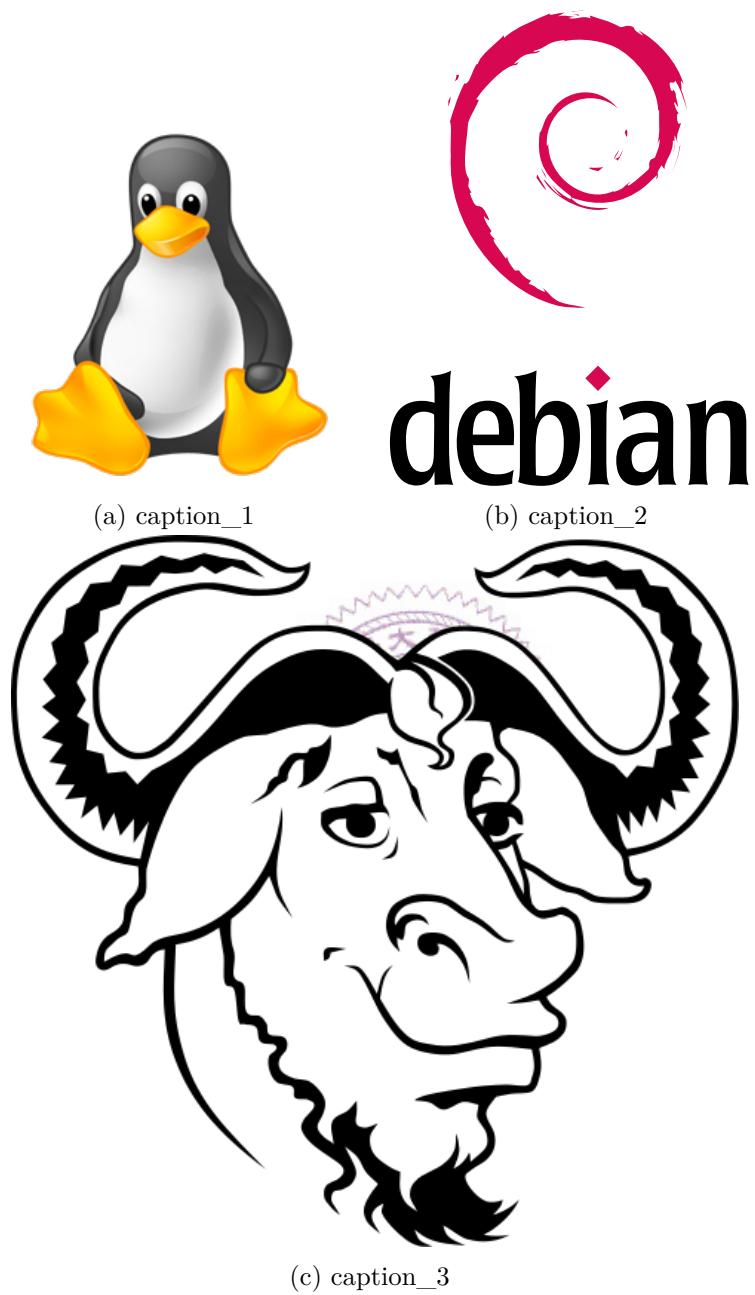


Figure 7.2: caption, use “(b)” get ID of subfigure(this ID is Debian) in caption



## Chapter 8

# Table

### 8.1 Simple table

Table 8.1: Solution

Component	Concentration(mM)
CaCl <sub>2</sub>	118.0

### 8.2 Auto break line table

short	short short
long	long long long long long long long long long



## Appendix A

### List of device

Table A.1: List of device

device	Model	Description
Linux	Debian 9	Best of best of best OS
Windows	10	Best of Best tool to prevent the aging of brain.





## Appendix B

# Solutions

### B.1 The solution

Table B.1: The solution

Component	Concentration(mM)
NaCl	1.0
CaCl <sub>2</sub>	2.0
NaCl	1.0
CaCl <sub>2</sub>	2.0



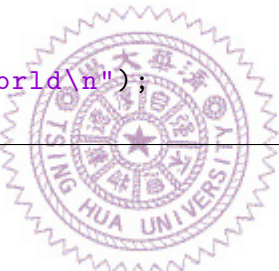
# Appendix C

## Code

### C.1 C

Code C.1: hello\_world\_c.c

```
1 #include <stdio.h>
2 main()
3 {
4     printf("hello, world\n");
5 }
```



### C.2 Matlab

Code C.2: hello\_world\_matlab.m

```
1 fprintf('hello, world\n');
```

### C.3 IDL

Code C.3: hello\_world\_idl.pro

```
1 print,"hello, world"
2
3 end
```