# CONTENTS


| | | PAGE |
|---|---|---|
| TITLE PAGE | | I |
| ABSTRAK | | II |
| ABSTRACT | | III |
| ACKNOWLEDGEMENTS | | IV |
| CONTENTS | | V |
| CHAPTER 1 | INTRODUCTION | 1 |
| | 1.1:The Transient Hollow Cathode Discharge (THCD) | 2 |
| | 1.2:Applications of The Transient Hollow Cathode Discharge | 7 |
| | 1.3:The Outline of This Thesis | 9 |
| CHAPTER 2 | THE TRANSIENT HOLLOW CATHODE DISCHARGE (THCD) SYSTEM | 11 |
| | 2.1:The Electrodes and The Chamber | 11 |
| | 2.2:The Electrical System | 13 |
| | 2.2.1:The Marx Circuit | 13 |
| | 2.2.2:The Triggering Circuit | 16 |
| | 2.3:Operational Procedures of The THCD | 19 |
| CHAPTER 3 | DIAGNOSTICS AND INSTRUMENTATION | 21 |
| | 3.1:The Rogowski Coil | 21 |
| | 3.2:Charge Collector | 25 |
| | 3.3:PIN Diodes As X-Ray Detectors | 28 |

| | | |
|---|---|---|
| | 3.4:Calculation of Mass-Absorption Coefficient (μ) | 29 |
| | 3.5:Beam Target X-Ray Detection | 35 |
| | 3.6:Three Channel Diode X-Ray Spectrometer – The DXS System | 36 |
| CHAPTER 4 | STUDY ON THE ELECTRON BEAM OF THE TRANSIENT HOLLOW CATHODE DEVICE | 43 |
| | 4.1:Mapping The Potential And Electric Field Lines In The Transient Hollow Cathode Device | 44 |
| | 4.2:The Effect of Pressure And Charging Voltage | 54 |
| | 4.3:Influence of The Hollow Cathode Diameter On The Electron Beam | 59 |
| | 4.4:The Intensity of The Pre-Breakdown Electron Beam | 62 |
| | 4.5:Measurement of Electron Beam Energy | 67 |
| | 4.6:The Mechanism of The Pre-breakdown Electron Beam Formation | 71 |
| CHAPTER 5 | CONCLUSION | 75 |
| | 5.1:Suggestion For Future Work | 77 |
| REFERENCE | | 78 |