## CONTENTS

<table>
<thead>
<tr>
<th>Chapter</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>PREFACE</td>
<td></td>
<td>i</td>
</tr>
<tr>
<td>CONTENTS</td>
<td></td>
<td>iii</td>
</tr>
<tr>
<td>LIST OF FIGURES</td>
<td></td>
<td>vi</td>
</tr>
<tr>
<td>LIST OF TABLES</td>
<td></td>
<td>vii</td>
</tr>
<tr>
<td><strong>CHAPTER I</strong></td>
<td><strong>INTRODUCTION</strong></td>
<td></td>
</tr>
<tr>
<td>a)</td>
<td>General</td>
<td>1</td>
</tr>
<tr>
<td>b)</td>
<td>Deuteron formation processes</td>
<td></td>
</tr>
<tr>
<td>i)</td>
<td>Pick-up process</td>
<td>6</td>
</tr>
<tr>
<td>ii)</td>
<td>Butler and Pearson model</td>
<td>9</td>
</tr>
<tr>
<td>iii)</td>
<td>Other Models</td>
<td>17</td>
</tr>
<tr>
<td><strong>CHAPTER II</strong></td>
<td><strong>EXPERIMENTAL TECHNIQUE</strong></td>
<td></td>
</tr>
<tr>
<td>a)</td>
<td>Details of the stack</td>
<td>25</td>
</tr>
<tr>
<td>b)</td>
<td>Scanning procedure and selection criteria</td>
<td>25</td>
</tr>
<tr>
<td>c)</td>
<td>Measurements</td>
<td></td>
</tr>
<tr>
<td>c1)</td>
<td>Methods of measurements</td>
<td>27</td>
</tr>
<tr>
<td>c2)</td>
<td>Details of measurements</td>
<td>44</td>
</tr>
<tr>
<td>d)</td>
<td>Identification of particles</td>
<td>46</td>
</tr>
<tr>
<td><strong>CHAPTER III</strong></td>
<td><strong>PRODUCTION OF HIGH ENERGY DEUTERONS</strong></td>
<td></td>
</tr>
<tr>
<td>a)</td>
<td>Introduction to the analysis of data</td>
<td>51</td>
</tr>
</tbody>
</table>
### Chapter IV
PRODUCTION OF HIGH ENERGY DEUTERONS FROM LIGHT NUCLEI (C, N, O) IN NUCLEAR EMULSION

<table>
<thead>
<tr>
<th>Section</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>a)</td>
<td>Introduction to the analysis of data</td>
<td>76</td>
</tr>
<tr>
<td>b)</td>
<td>Production of deuterons by the collision of cascade nucleons with other nucleons of the target nucleus.</td>
<td>85</td>
</tr>
<tr>
<td>c)</td>
<td>Production of deuterons from the cascade nucleons by the pick-up process</td>
<td>88</td>
</tr>
</tbody>
</table>

### Chapter V
SUMMARY AND OUTLOOK

<table>
<thead>
<tr>
<th>Section</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>92</td>
</tr>
</tbody>
</table>
REFERENCES .... 97

ACKNOWLEDGMENTS .... 104