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Spectroscopic Measurement of and Profiles using Atomic and Kinetic Models for Argon in the Texas Helimak

APPROVED BY

SUPERVISING COMMITTEE:

**Supervisor:**

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Spectroscopic Measurement of and Profiles using Atomic and Kinetic Models for Argon in the Texas Helimak

by

Kenneth Carter Dodd, B.S.

Hidden text: identical to name in UT transcript. Abbreviate previous degrees earned.

Thesis

Presented to the Faculty of the Graduate School of

The University of Texas at Austin

in Partial Fulfillment

of the Requirements

for the Degree of

**Master of Science in Applied Physics**

The University of Texas at Austin

<Month year>

Dedication

<Optional: If you do not include a Dedication, delete the entire page. **Do not delete the section break below.** It is needed to initiate the printing of page numbers from the Acknowledgements page on.>

Acknowledgements

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Abstract

Spectroscopic Measurement of and Profiles using Atomic and Kinetic Models for Argon in the Texas Helimak

Kenneth Carter Dodd, M.S.

The University of Texas at Austin, <year>

Supervisor: Kenneth Gentle

Hidden text: The abstract may be included at the discretion of the supervisor.

Spectroscopic profiles for electron density and temperature were determined in a self-consistence way using line emission spectroscopy and collisional radiative models for neutral and singly ionized Argon (Ar I and Ar II) in the Texas Helimak. Neutral Argon density profiles were calculated using a kinetic gas model. Electron-impact excitation and Ionization rates were corrected to account for the electron velocity distribution deviating slightly from a true Maxwellian distribution due to inelastic electron-neutral collisions. Results show an electron temperature which roughly agrees with probe diagnostics. This method gives an electron density that is about twice as high, which may be possible from a power balance perspective.

Table of Contents

HIDDENT TEXT: If you choose to place the chapter number (“Chapter 1”) and the chapter title (“Introduction”) on different lines, the automatically generated table of contents will reflect that format. After creating a new table of contents, set them on the same line by deleting the page number and paragraph marker at the end of each chapter number line.

List of Tables (if any, Heading 2,h2 style: TOC 2) nn

List of Figures (if any, Heading 2,h2 style: TOC 2) nn

List of Illustrations (if any, Heading 2.h2 style: TOC 2) nn

MAJOR SECTION (IF ANY, HEADING 1,H1 STYLE: TOC 1) NN

Chapter 1 Name of Chapter (Heading 2,h2 style: TOC 2) nn

Heading 3,h3 style: TOC 3 nn

Heading 4,h4 style: TOC 4 nn

Heading 5,h5 style: TOC 5 nn

Chapter n Name of Chapter (Heading 2,h2 style: TOC 2) nn

Heading 3,h3 style: TOC 3 nn

Heading 3,h3 style: TOC 3 nn

Appendix A Name of Appendix (if any, Heading 2,h2 style: TOC 2) nn

Glossary (if any, Heading 2,h2 style: TOC 2) nn

Bibliography (Heading 2,h2 style: TOC 2) nn

Vita (Heading 2,h2 style: TOC 2) nn

## List of Tables

Table n: Title of Table: (Heading 7,h7 style: TOC 7) nn

Table n: (This list is automatically generated if the paragraph style Heading 7,h7 is used. Optional: If you do not include a List of Tables, delete the entire page.) nn

## List of Figures

Figure n: Title of Figure: (Heading 8,h8 style: TOC 8) nn

Figure n: (This list is automatically generated if the paragraph style Heading 8,h8 is used. Optional: If you do not include a List of Figures, delete the entire page.) nn

## List of Illustrations

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