#### TITLE OF THE THESIS

by

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## A thesis submitted to the University of Birmingham for the degree of DOCTOR OF PHILOSOPHY

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### Abstract

This thesis vastly improved the knowledge of humanity, while revolutionising several fields in the meantime.

### Dedication

To Alejandro Vigna-Gómez and James William Makepeace Barrett III.

### Acknowledgements

"Cheesy quote."

Funding for my studies was provided by the University of Birmingham.

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### Chapter 1

### Introduction

For a circular orbit, we can equate the centripetal force  $F_{\rm c,i}=m_i r_i \dot{\theta}^2$  to the gravitational force  $F_{\rm g}=Gm_1m_2/r^2$ , and solve for  $\dot{\theta}^2$  in order to derive Kepler's Third Law in the form

$$\dot{\theta}^2 = \frac{GM}{r^3}. ag{1.1}$$

Equation 1.1 is Kepler's Third Law.

#### Hertzsprung-Russell Diagram Effective Temperature, K 7,000 6,000 30,000 10,000 4,000 - 10-Rigel O Deneb -10<sup>5</sup> -8 **SUPERGIANTS (1)** Canopus -6 O **Antares** δ Cephei Achernar -2-Absolute Magnitude, M<sub>V</sub> RR Lyrae O 0-**GIANTS (II,III)** 0 Regulus 2 Altair Sirius MAIN SEQUENCE (V) SUBGIANTS (IV) 6 - 10<sup>-1</sup> 8-10-- 10<sup>-2</sup> Sirius B 12-- 10<sup>-3</sup> Procyon B Barnard's Star 14-Colour Index (B-V) Proxima Cer +0.6 +0.3 0.0 O5 A0 MO BO KO F0 Ġ **Spectral Class**

Figure 1.1: HR diagram as shown in figure 1 of Althaus et al. [1].

### Chapter 2

### Paper I

#### 2.1 Introduction

Section. Introduction of the topic of interest.

#### 2.1.1 Population Synthesis

Subsection.

Rapid Population Synthesis

Subsubsection.

2.1. Introduction Chapter 2

Table 2.1: "Measured parameters of the Galactic DNSs used as a diagnosis in this study. ... References:  $^a$ Martinez et al. [2]." Table extract as presented in Vigna-Gómez et al. 3

Pulsar	P	e	$M_{ m plsr}$	$M_{\rm cmpn}$	Ref
	[days]		$[{ m M}_{\odot}]$	$[{ m M}_{\odot}]$	
J0453 + 1559	4.072	0.113	1.559	1.174	

### Chapter 3

### Conclusions

In this work we have unified physics.

### Appendix A

### First Appendix

Things that didn't make it to the main text.

### **Bibliography**

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