UNIVERSITY NAME

DOCTORAL THESIS

Non-linear structure formation in models beyond LCDM

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A thesis submitted in fulfillment of the requirements for the degree of Doctor in Physics

in the

Research Group Name
Department or School Name

January 6, 2017

Declaration of Authorship

I, Santiago CASAS CASTRO, declare that this thesis titled, "Non-linear structure formation in models beyond LCDM" and the work presented in it are my own. I confirm that:

- This work was done wholly or mainly while in candidature for a research degree at this University.
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"Thanks to my solid academic training, today I can write hundreds of words on virtually any topic without possessing a shred of information, which is how I got a good job in journalism."

Dave Barry

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Abstract

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Doctor in Physics

Non-linear structure formation in models beyond LCDM

by Santiago CASAS CASTRO

The Thesis Abstract is written here (and usually kept to just this page). The page is kept centered vertically so can expand into the blank space above the title too...

Acknowledgements

The acknowledgments and the people to thank go here, don't forget to include your project advisor…

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List of Abbreviations

LAH	**L**ist **A**bbreviations **H**ere
WSF	**W**hat (it) **S**tands **F**or

Physical Constants

Speed of Light $c_0 = 2.997\,924\,58 \times 10^8\,\mathrm{m\,s^{-1}}$ (exact)

List of Symbols

a	distance	m
P	power	W ($\mathrm{J\,s^{-1}}$)
ω	angular frequency	rad

For/Dedicated to/To my…

Chapter 1

Overview of Standard Cosmology

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1.2 Early Universe

1.2.1 Inflation

1.2.2 CMB

1.2.3 Dark Ages

1.2.4 BBN

1.3 Distances

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- Chapter 1: Introduction to the thesis topic
- Chapter 2: Background information and theory
- Chapter 3: (Laboratory) experimental setup
- Chapter 4: Details of experiment 1
- Chapter 5: Details of experiment 2
- Chapter 6: Discussion of the experimental results
- Chapter 7: Conclusion and future directions

This chapter layout is specialised for the experimental sciences.

1.4.2 Cosmological constant

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1.5.1 Quintessence

1.5.2 Neutrinos

1.5.3 Dark Matter

Chapter 2

Dark Energy and Modified Gravity

Chapter 3

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Chapter 4

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Chapter 5

The non-linear evolution of matter perturbations

Chapter 6

Conclusions

Appendix A

Appendix Title Here

Write your Appendix content here.