

# Thesis title here

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Ph.D. Thesis, September 2008

## Abstract

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# Thesis title

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A thesis submitted to the University of Durham  
in accordance with the regulations for  
admittance to the Degree of Doctor of Philosophy.

Institute for Computational Cosmology  
Department of Physics  
University of Durham  
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## Declaration

The work described in this thesis was undertaken between XXXX and XXXX while the author was a research student under the supervision of Prof. Big Cheese at the Institute for Computational Cosmology in the Department of Physics at the University of Durham. This work has not been submitted for any other degree at the University of Durham or any other university.

Parts of this work have appeared in the following paper:

- Crain, Robert A.; Eke, Vincent R.; Frenk, Carlos S.; Jenkins, Adrian; McCarthy, Ian G.; Navarro, Julio F.; Pearce, Frazer R., 2007, MNRAS, 337, 41C

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## **Acknowledgements**

Say something nice about your supervisors here....



# Chapter 1

## *Introduction*

### 1.1 Background

Text text text text text text text text text

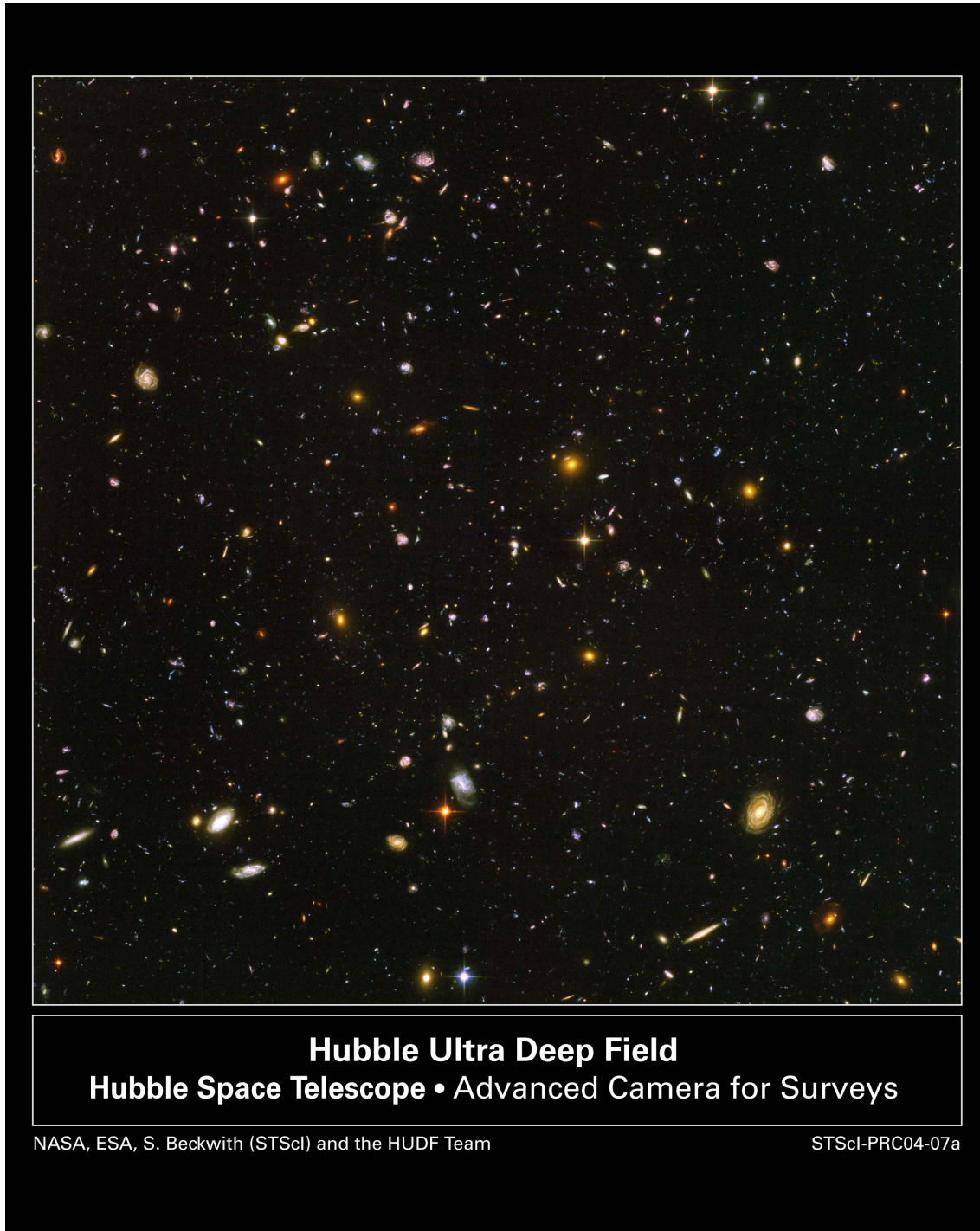


Figure 1.1: Long descriptive caption.

Region	x [ $h^{-1}$ Mpc]	y [ $h^{-1}$ Mpc]	z [ $h^{-1}$ Mpc]	Comoving radius [ $h^{-1}$ Mpc]	$M_{\text{gas}}$ (int. res) [ $h^{-1}M_{\odot}$ ]	$M_{\text{gas}}$ (high res) [ $h^{-1}M_{\odot}$ ]	N (int. res)	N (high res)	$z_{\text{final}}$ [int. res, high res]
$-2\sigma$	153.17	347.90	424.81	18	$1.16 \times 10^7$	$1.45 \times 10^6$	$2.23 \times 10^7$	$1.78 \times 10^8$	[0,0]
$-1\sigma$	387.91	316.48	113.46	18	$1.16 \times 10^7$	$1.45 \times 10^6$	$2.80 \times 10^7$	$2.24 \times 10^8$	[0,2]
$0\sigma$	271.94	108.29	107.45	18	$1.16 \times 10^7$	$1.45 \times 10^6$	$3.44 \times 10^7$	$2.75 \times 10^8$	[0,2]
$+1\sigma$	179.51	379.22	196.64	18	$1.16 \times 10^7$	$1.45 \times 10^6$	$4.30 \times 10^7$	$3.44 \times 10^8$	[0,2]
$+2\sigma$	233.10	139.30	387.38	25	$1.16 \times 10^7$	$1.45 \times 10^6$	$1.24 \times 10^8$	-	[0,-]

Table 1.1: Key parameters for the five GIMIC regions. The first four columns present the spatial location (in Millennium Simulation coordinates) and the nominal comoving radius of the regions at  $z = 1.5$ . The following two columns give the mass of the gas particles in both the intermediate- and high-resolution simulations. The dark matter particle mass is a factor of  $(\Omega_{\text{m}} - \Omega_{\text{b}})/\Omega_{\text{b}}$  greater. The next two columns show the number of particles of gas (or equivalently, CDM) particles within the zoomed region of the simulation, whilst the final column denotes the redshift at which each simulation was terminated. Note that the  $+2\sigma$  region was not run at high-resolution.



# Appendix A

*Typhoon: volume  
rendering software*

## A.1 Introduction

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# Bibliography