



LEIDEN UNIVERSITY

# Study of BCG-Subtracted Images of Nearby Clusters

by

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*“Inspirational phrase here.”*

Stephen Hawking

# *Abstract*

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The mt all.

# *Acknowledgements*

I would like to thank my advisor king on...

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*Dedicated to my parents, whose love and support are my biggest  
motivation. . .*



# Chapter 1

## Introduction

Old stuff

## Chapter 2

# Theoretical Framework

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### 2.1 Galaxy Clusters

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dwarf stars contribute very little to the integrated light from an old stellar population (Smith 2015)

Galaxy clusters contain a population of stars gravitationally unbound to individual galaxies, yet still bound to the clusters overall gravitational potential, created by the stripping of stars from galaxies during interactions and mergers



FIGURE 2.1: G

T

$$I(R)\sigma_p^2(R) = \frac{2}{\Gamma} \int_R^\infty \left(1 - \beta \frac{R^2}{r^2}\right) \frac{\nu \bar{v}_r^2 r dr}{\sqrt{r^2 - R^2}} \quad (2.1)$$

Whuster.

## 2.2 Gravitational Lensing

At small radii, stars dominate the lensing mass, so that lensing provides a direct probe of the stellar mass to light ratio, with only small corrections needed for dark matter.

In the paper of Russell Smith (a giant elliptical galaxy with a lightweight initial mass function) they find a stellar mass to light ratio of 3.01 plus minus 0.25

Modelling the lensing configuration provides the total projection mass within an aperture.

bulges have heavier IMFs than disks

Several recent studies have presented evidence for "heavyweight" IMFs in giant ellipticals, with a mass-to-light-ratio twice that of a Milky Way like IMF.

## **2.3 IMF in BCGs**

## Chapter 3

# Observational Procedures

the full description of the survey is in: D. J. Sand et. al. 2011

MegaCam wide field imager on the CFHT (Canada-France-Hawaii Telescope). The cluster sample consisted of 101 clusters within the range of redshifts from  $0.05 < z < 0.55$

58 clusters from the MENEACs (Multi-Epoch nearby cluster survey)

The meneacs clusters represent all clusters in the BAX X-ray cluster database that are observable for the CFHT

the redshifts of the clusters as given by C. Bildfell et. al. 2012

g and r images

### 3.1 Sextractor

Stars and selection of galaxies

### 3.2 Galfit

### 3.3 Color images

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## Chapter 4

# Study of images

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## Chapter 5

## Conclusions

Thes.

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