Study of BCG-Substracted Images of Nearby Clusters

by

Juan Manuel Espejo Salcedo

Advisor:

Henk Hoekstra

March 2017

"Inspirational phrase here."

Stephen Hawking

Abstract

Natural Sciences Faculty

Sterrenwacht

The mt all.

Acknowledgements

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

Contents

List of Figures

List of Tables

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

Chapter 1

Introduction

Old stuff

Chapter 2

Theoretical Framework

Tyter.

2.1 Galaxy Clusters

Glas.

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

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

Whuster.

2.2   Gravitational Lensing

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-Hawii 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 fof the CFHT

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

3.1   Sextractor

Stars and selection of galaxies

3.2   Galfit

3.3   Color images

In er.

Chapter 4

Study of images

We ter.

Chapter 5

Conclusions

Thes.

Bibliography

[1] Treu, Tommaso. 2010 *Strong Lensing by Galaxies*. Annu. Rev. Astron. Astrophysics. 2010. 48:87-125.

[2] R. F. J. Van der Burg et. al. 2015 *Evidence for the inside-out growth of the stellar mass distribution in galaxy clusters since z̃1*. preprint arXiv:1412.2137v2.

[3] Binney J., Tremaine S. *Galactic Dynamics*. Princeton University Press, 1994.

[4] C. O. Wright & Teresa G. Brainerd, Teresa. 1999 *Gravitational Lensing by NFW halos*. preprint arXiv:astro-ph/9908213v1.

[5] Smith, Russell. 2014 *Variations in the initial mass function in early-type galaxies: a critical comparison between dynamical and spectroscopic results*. MNRASL 443, L69-L73 (2014).

[6] C. Bildfell et. al. 2012 *Evolution of the red sequence giant to dwarf ratio in galaxy clusters out to z̃0.5*. MNRAS 425, 204-221 (2012).

[7] Smith, Russell & Lucey, John. 2013 *A giant elliptical galaxy with a lightweight initial mass function*. MNRAS 000, 1-14 (2013).

[8] R. J. Smith et. al. 2015 *The IMF-sensitive 1.14-μm Na I doublet in early-type galaxies*. MNRAS 000, 1-14 (2013).

[9] C. Sifon et. al. 2015 *Constraints on the alignment of galaxies in galaxy clusters from ~14000 spectroscopic members*. A&A 575, A48 (2015).

[10] S. M. Adams et. al. 2012 *The environmental dependence of the incidence of galactic tidal features*. The Astrophysical Journal, 144:128(11pp) (2012).

[11] D. J. Sand et. al. 2011 *Intracluster supernovae in the multi-epoch nearby cluster survey*. The Astrophysical Journal, 729:142 (13pp) (2011).