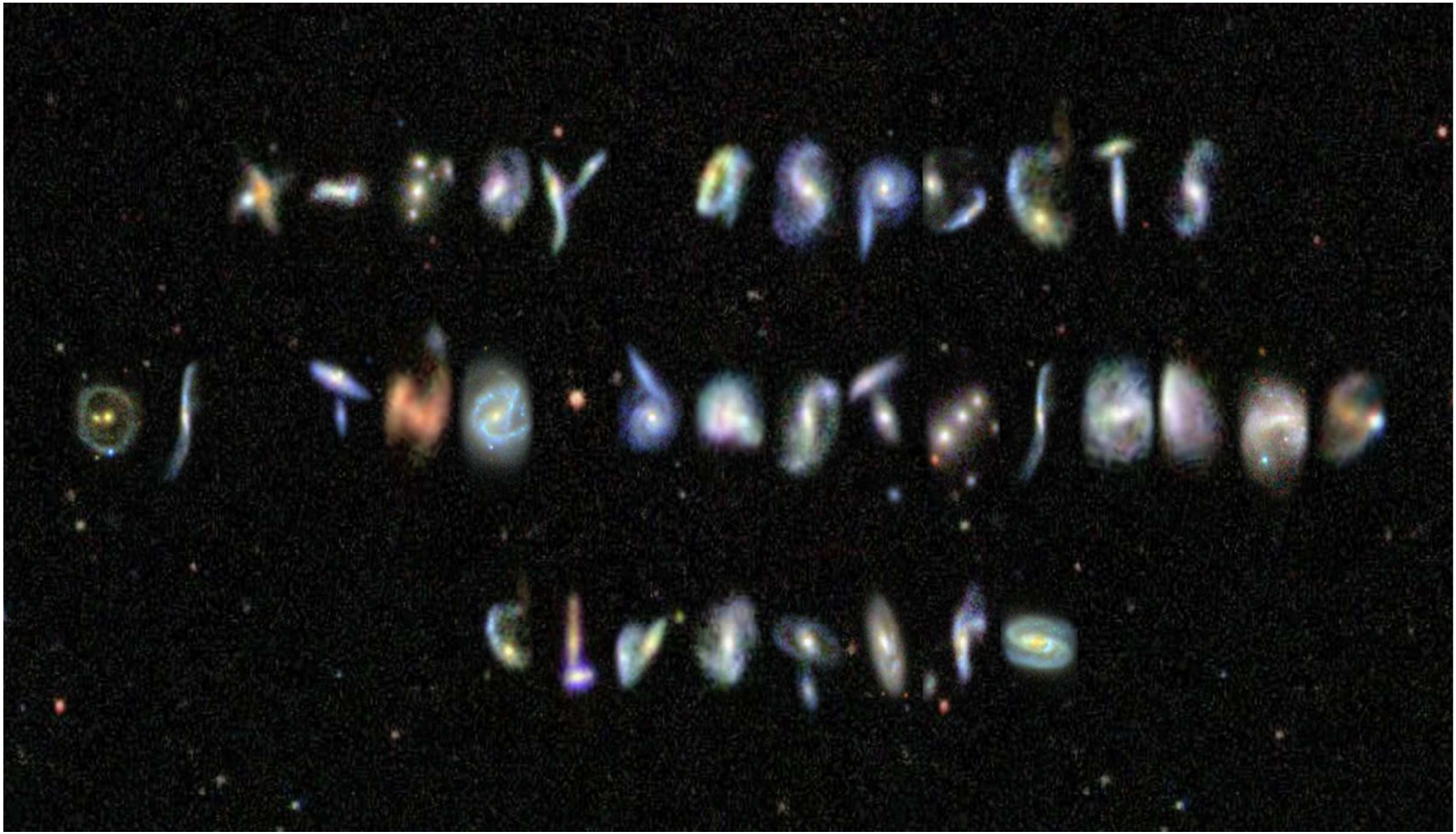
LAM
LABORATOIRE D'ASTROPHYSIQUE
DE MARSEILLE



Overview

- The DAFT/FADAS survey
- X-ray studies (mainly in collaboration with G. B. Lima Neto, F. Durret and M. P. Ulmer)
  - L-T relation
  - Looking for substructures
  - Comparison with a hierarchical method
- Objectives

The Team

-Melville P. Ulmer : Survey Coordinator

-Douglas Clowe : US Executive PI

-Christophe Adami : French Executive PI

- Loïc Guennou : in charge of observational aspects (optical,X-rays), photometric redshifts, spectroscopic redshift measurements, and cluster studies

-Vincent Le Brun : Database Manager

-Florence Durret : Cluster aspects

-Carlo Schimd : Theoretical expertise

-Raphael Gavazzi : Lensing expertise

-Marceau Limousin : Lensing expertise

et al.

Goals of the Survey

- Constrain Cosmology using weak lensing tomography on rich distant clusters

- Study of the clusters state after their initial formation:
  - ICL
  - Cluster dynamics
  - Substructures

The DAFT/FADA project so far

- 91 galaxy clusters to study (already observed by HST) in the [0,4;0,9] redshift interval

- More than 95% of the observations in optical bands and in NIR/IR are done: ~80 nights on world-wide different 4m and 10m class telescopes (http://cencos.oamp.fr/DAFT/)

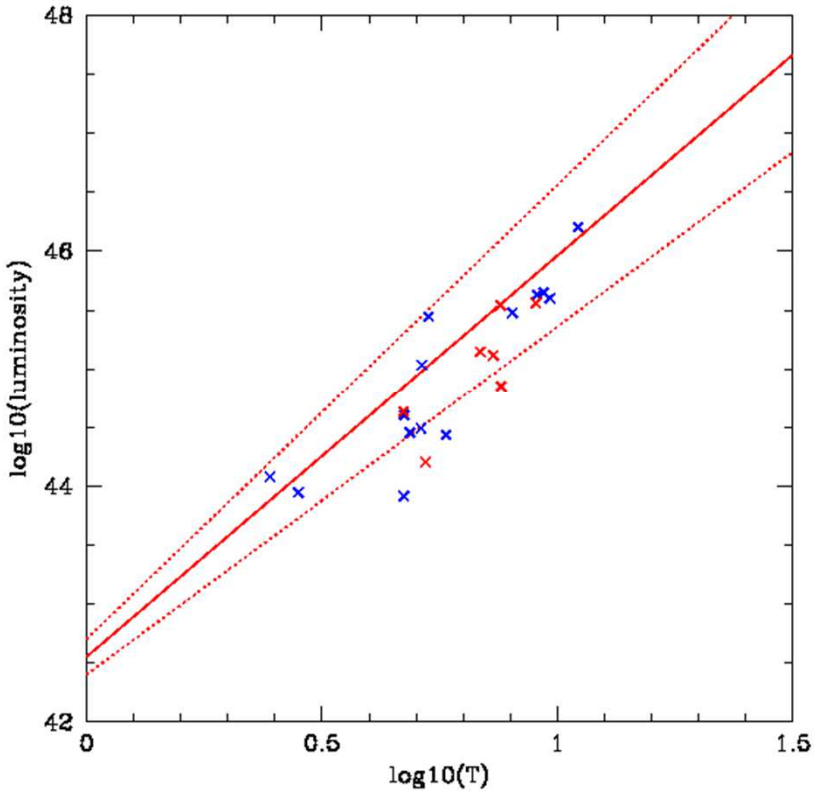
- ~40 clusters observed in X-rays

Ongoing studies

I) L-T relation

- Relation for z > 0.6

- Good agreement between our data and the result of Takey et al. in the same redshift range



II) Looking for substructures inside the clusters

Guennou, Durret et al., in preparation

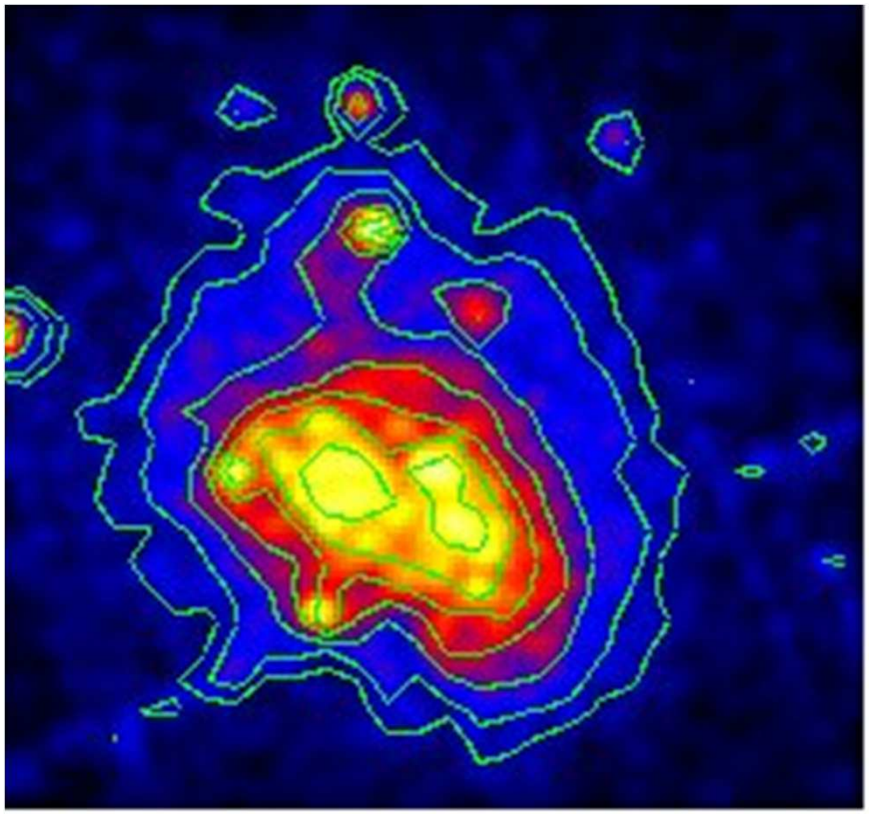
- Two methods used:
  - X-ray observations
  - Hierarchical models: Serna-Gerbal (based on galaxy redshift catalogs)

- Will allow a better understanding of the dynamical states and building histories of the clusters

X-ray observations

- XMM-Newton data

- Clusters in a redshift range between z= 0.4 and z=0.8

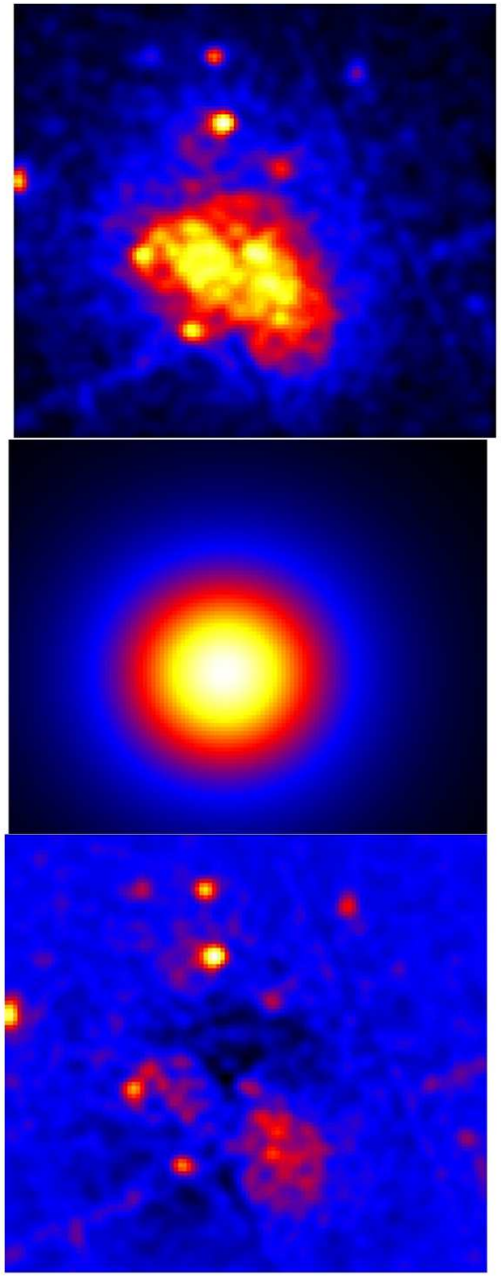


Sherpa

- CIAO package

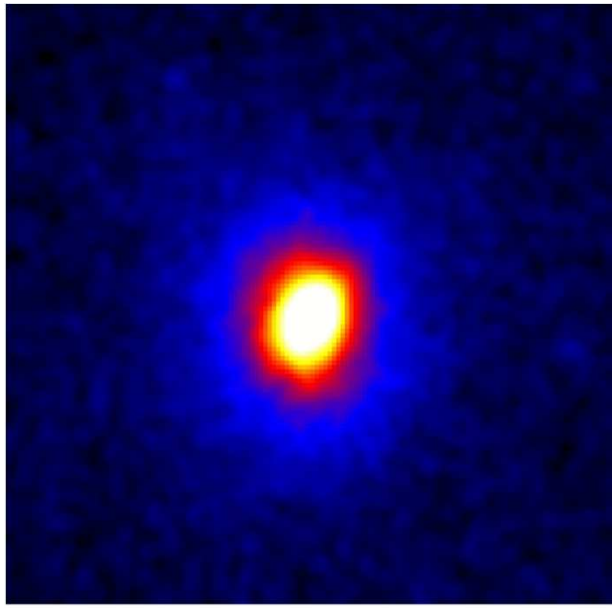
- Allow to substract a

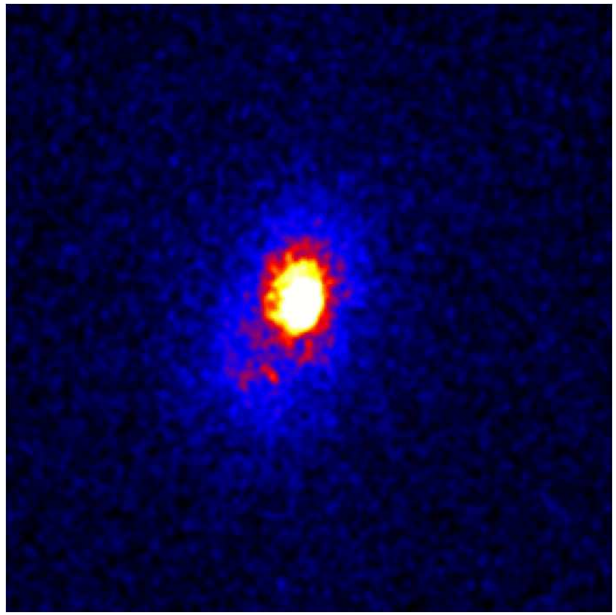
β-model to put in evidence substructures



Pinpoint point sources

- Chandra data

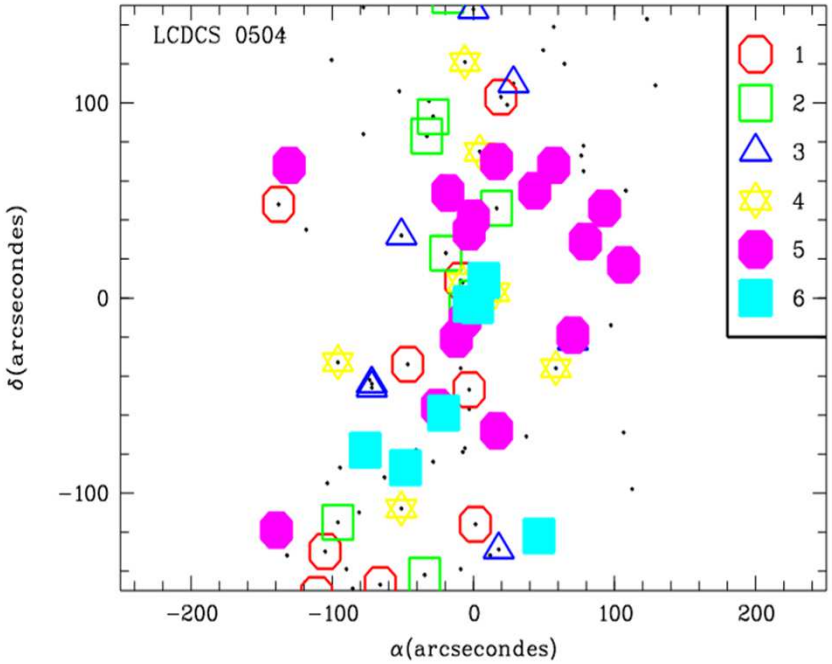




- Search for AGN via blind spectroscopy (ongoing)

Serna-Gerbal method

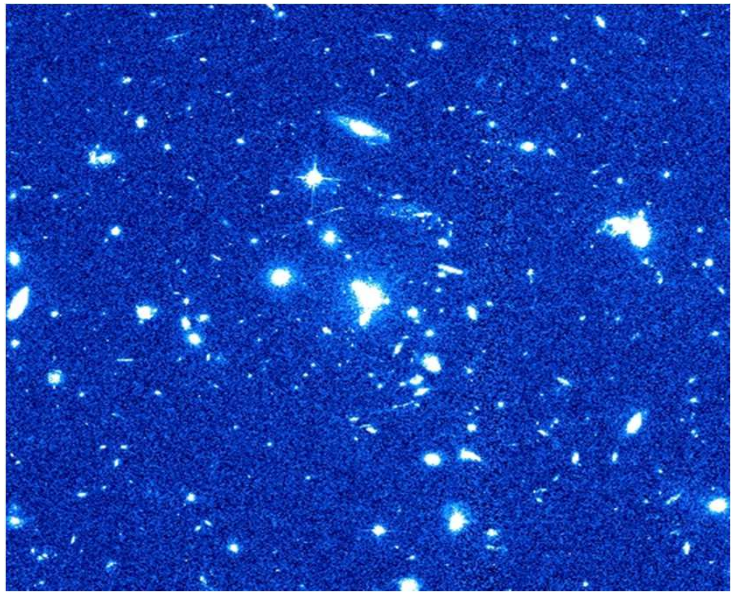
- Hierarchical method
- Based on the relative binding energy between galaxies

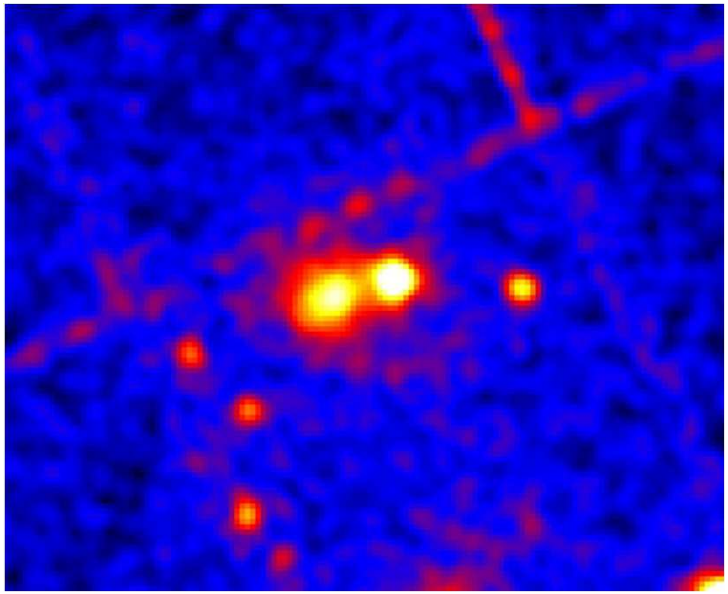


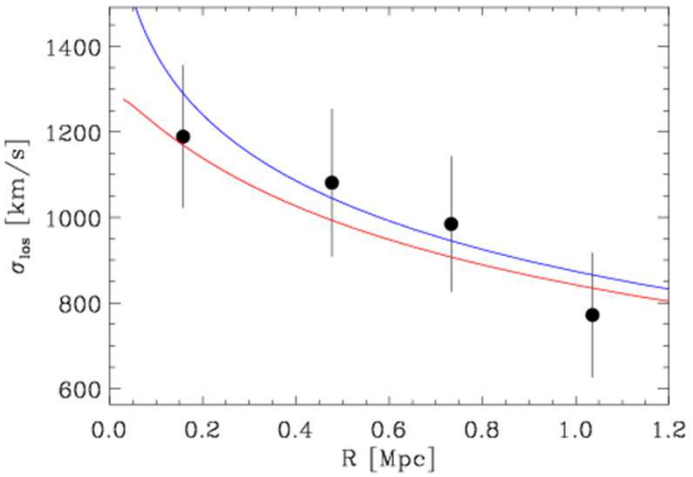
III) Dynamical state of the clusters

- Based on the position of galaxies
- Use of the Jeans equation
- Important parameters
  - Cluster center
  - Mass profile
- Obtainable by X-ray and/or weak lensing studies

An example: Cl 1216







Immediate goals

- Compare the location of substructures with both methods
- Apply the same tools used for Cl 1216 to the whole sample (ongoing with A. Biviano)
- Compare X-ray mass (via temperature) to virial mass (via galaxy velocity dispersion and weak lensing)
- Trend with redshift: dynamical state evolution between 0.4 and 0.8