



# Galaksi Kümelerindeki Merkezi Parlak Galaksilerde (BCGs) Yıldız Oluşum Aktivitesi

Süleyman Fişek, Sinan Aliş, E. Kaan Ülgen, F. Korhan Yelkenci

İstanbul Üniversitesi, Fen Fakültesi  
Astronomi ve Uzay Bilimleri Bölümü

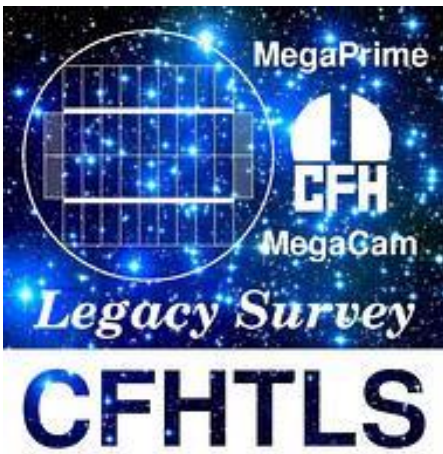
[suleymanfisek@gmail.com](mailto:suleymanfisek@gmail.com)

# İçerik

- Motivasyon
- Amaç
- Veriler
- Yıldız Oluşum Hızlarının Hesaplanması
- Sonuçlar

# Motivasyon

- Gökyüzü Tarama Projeleri



**Sloan Digital Sky Survey**

The logo icon shows a purple satellite dish with a white grid pattern. The text 'Sloan Digital Sky Survey' is written in white, bold letters on a dark background.

Mapping the Universe



The Dark Energy Survey

The background features a large, glowing orange and yellow grid of hexagons, resembling a honeycomb or a mesh. A blue hexagon in the bottom right corner contains a starry field with several bright stars. The text 'The Dark Energy Survey' is written in white, serif font across the top of the grid.

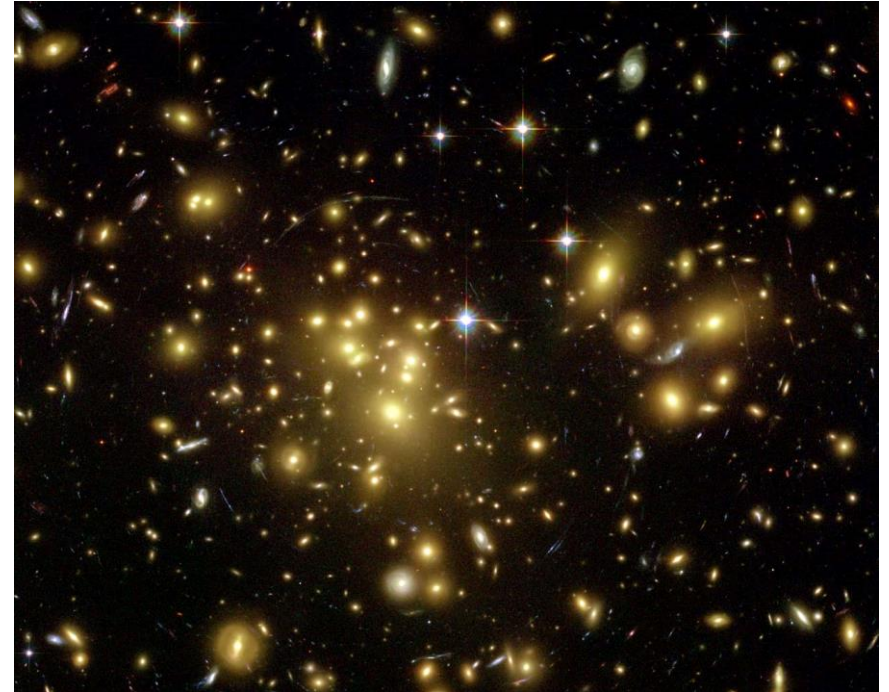
# Motivasyon

## - Galaksi Kümeleri

Kütleçekimsel olarak birbirlerine bağlı çok sayıda galaksi

Evrendeki en büyük yapılar

1 – 2 Mpc büyüklüğünde ve  $10^{14} - 10^{15} M_{\odot}$  kütlesinde



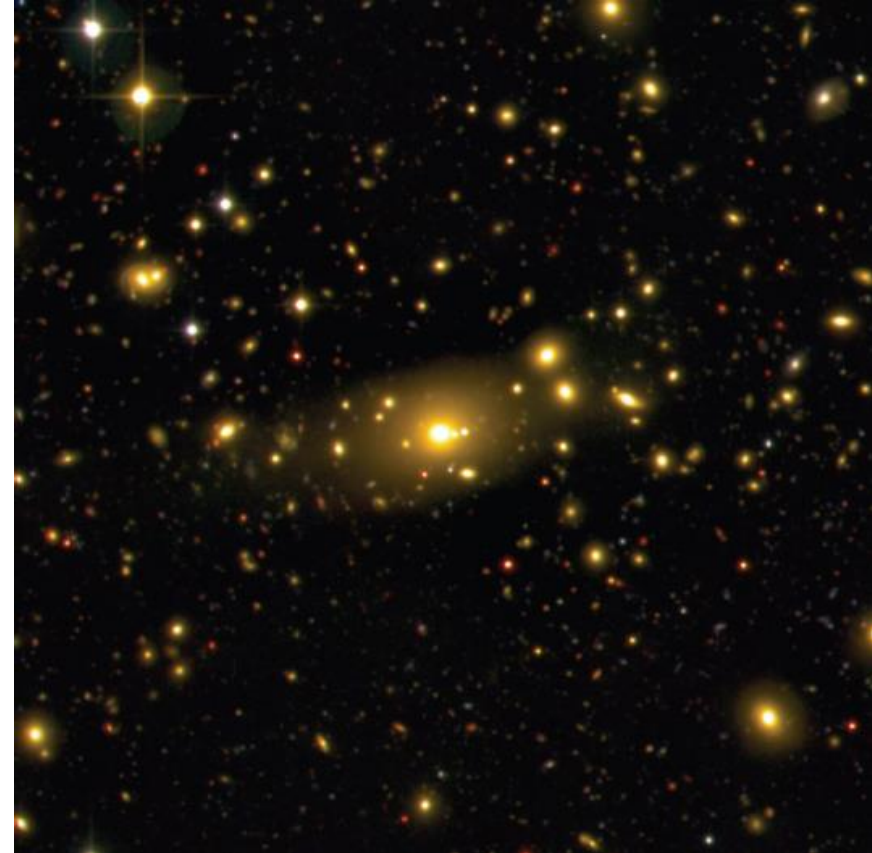
# Motivasyon

## - BCGs

Evrendeki en parlak ve en kütleli galaksiler

Galaksi kümelerinin merkezlerinde yer alırlar

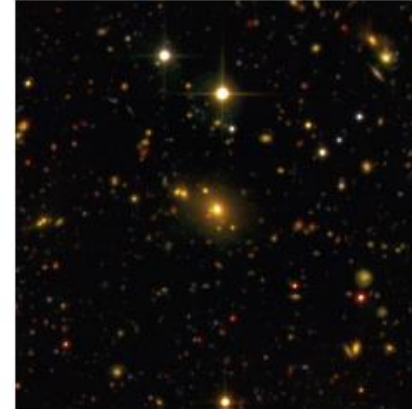
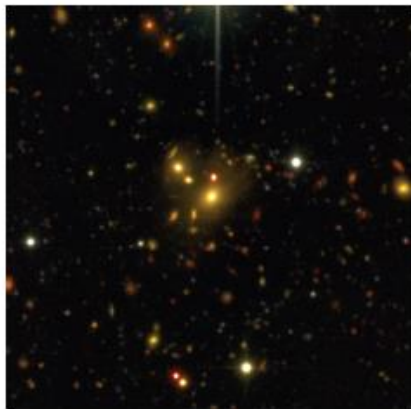
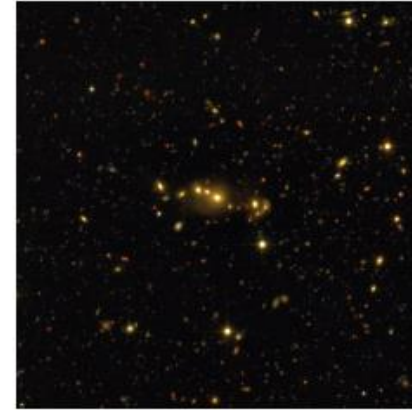
$\leq 100$  Kpc,  $\leq 10^{12} M_{\odot}$



# Motivasyon

## - BCGs

CFHTLS-Deep alanında tespit edilmiş BCG'lerden örnekler



# Amaç

- Galaksi kümelerinin merkezi galaksilerinde yıldız oluşum etkinliğini arařtırmak
- Yıldız oluşum hızının zamana ve ortama baėlılıėını kontrol etmek

# Veriler

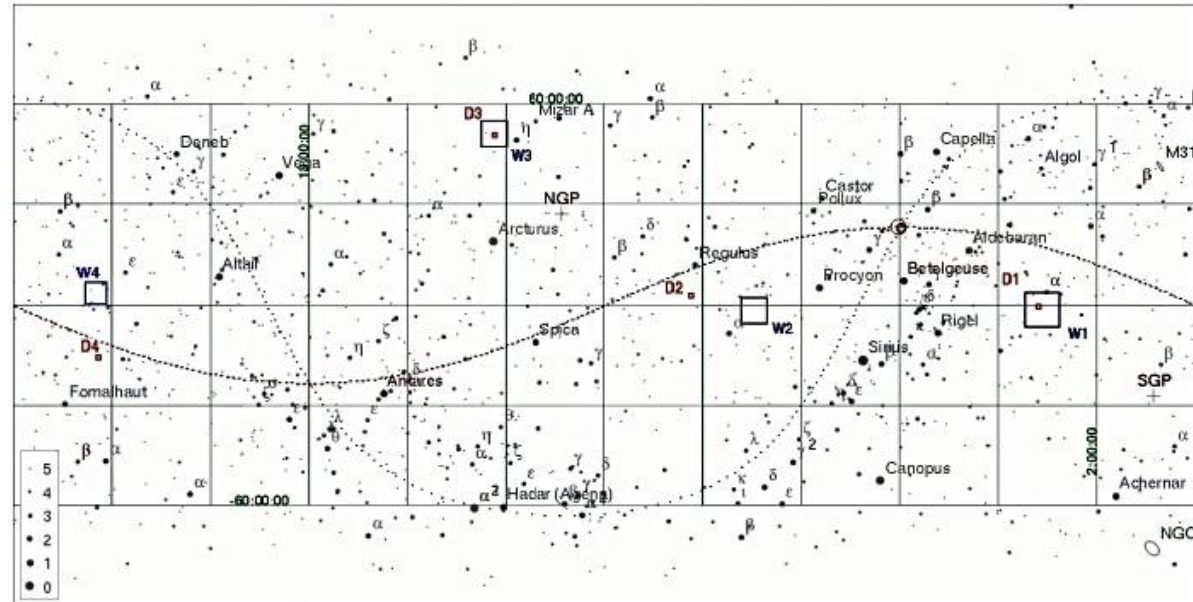
## - Fotometrik veriler:

CFHTLS ( Canada – France – Hawaii Telescope Legacy Survey )

D1, D2, D3, D4

$u^*$ ,  $g^*$ ,  $r^*$ ,  $i^*$ ,  $z^*$ , photo  $z$

89 BCG ( Aliş ve ark., 2012 )



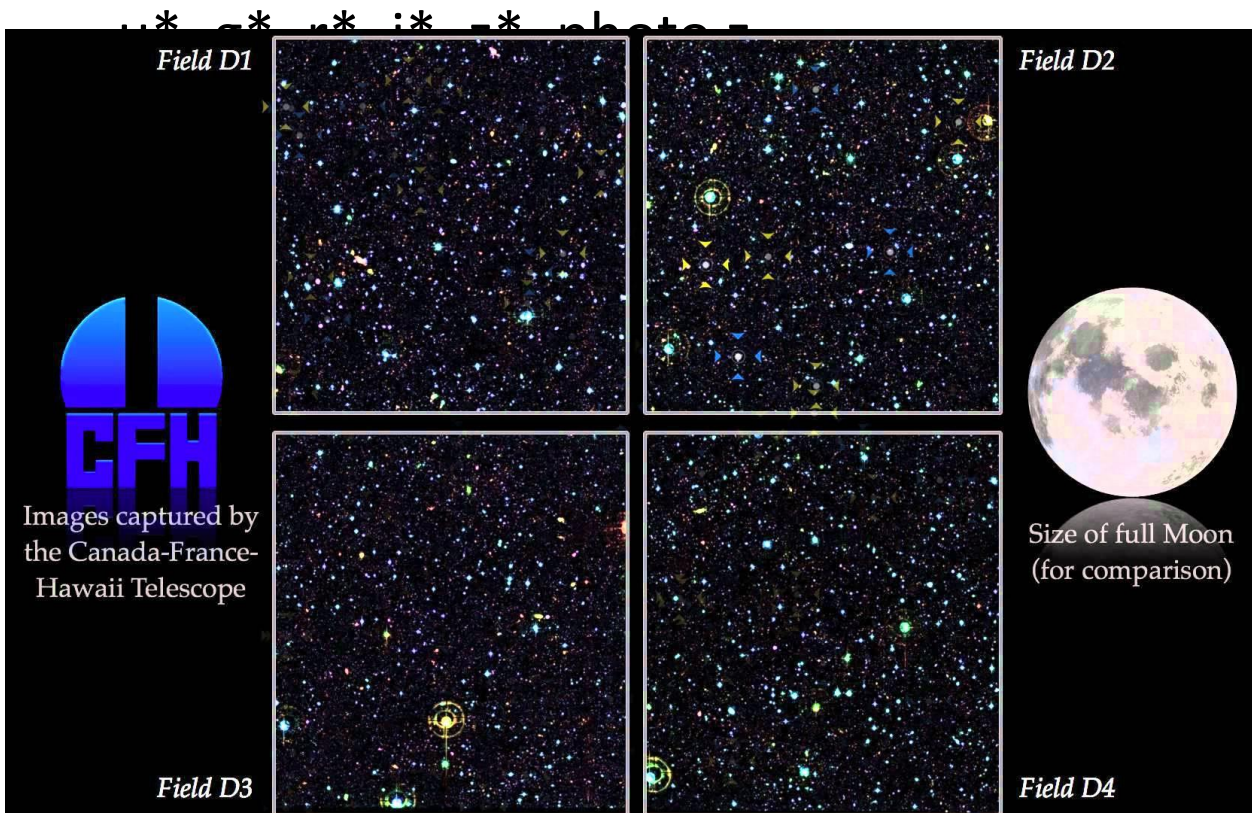


# Veriler

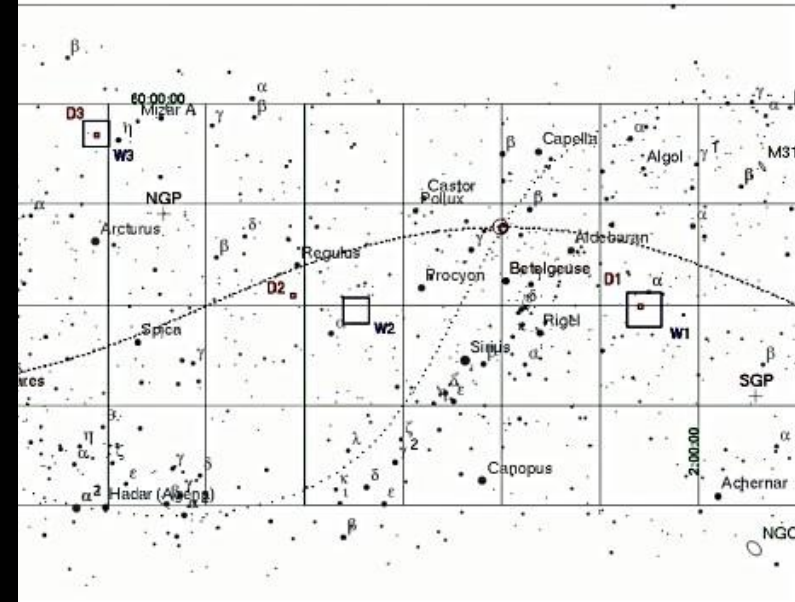
- Fotometrik veriler:

CFHTLS ( Canada – France – Hawaii Telescope Legacy Survey )

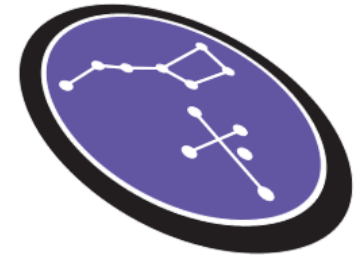
D1, D2, D3, D4



Images captured by  
the Canada-France-  
Hawaii Telescope



# Veriler



## - Spektroskopik veriler:

SDSS DR12 ( Sloan Digital Sky Survey – DR 12 )

emissionLinePort ( GANDALF, Sarzi et al. 2006 )

GalSpecLine ( Tremonti et al. 2004; Brinchmann et al. 2004 )

**DR12 Tools**

- Getting Started
- Famous places
- Get images
- Scrolling sky
- Visual Tools
- Search
- Object Crossid**
- CasJobs

### SDSS CrossID for DR12

Scroll down for Help

Search type	Search scope	Upload type	JOIN with
<input type="radio"/> Images (PhotoObj)	<input type="radio"/> Nearest Primary Object <input type="radio"/> Nearest Object <input type="radio"/> All Nearby Primary Objects <input type="radio"/> All Nearby Objects	<input type="radio"/> RA, dec <input type="radio"/> run-rerun-camcol-field-obj	<input type="checkbox"/> Spectra
<input checked="" type="radio"/> Spectra (SpecObj)	<input type="radio"/> Nearest Primary Spectrum <input type="radio"/> Nearest Spectrum <input type="radio"/> All Nearby Primary Spectra <input type="radio"/> All Nearby Spectra	<input type="radio"/> RA, dec <input type="radio"/> plate-MJD-fiberID	<input type="checkbox"/> Images
<input type="radio"/> Infrared Spectra (apogeeStar)	<input type="radio"/> Nearest	<input type="radio"/> Equatorial (RA/dec) <input type="radio"/> Galactic (l/B)	

Search radius [arcmin] (Max 3.0 arcmin)  Number of preceding non-data columns

Cut and paste your upload list here:   
A1 15.5 0.5  
A2 14.5 0.6  
A3 13.9 0.8

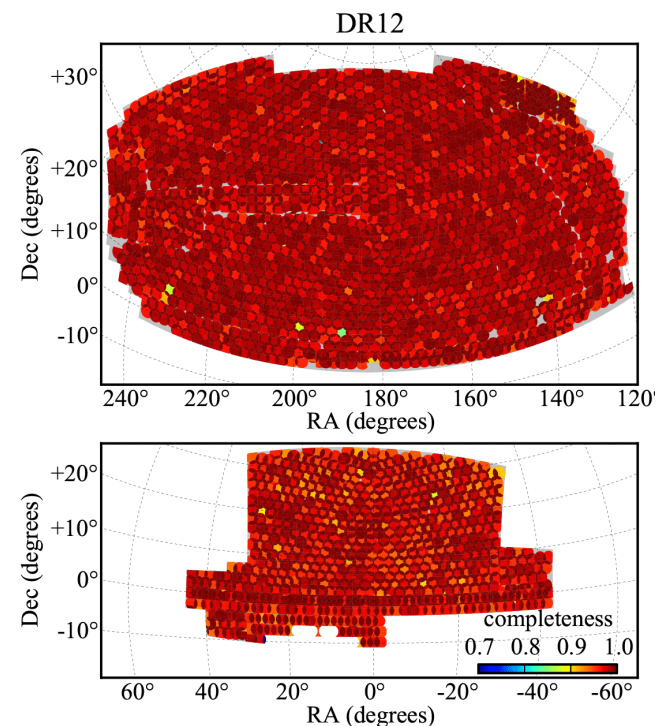
Or upload it as text file  BCG\_name\_radec.asc

Type your SQL query here (see below for help):

```
SELECT sf.specobjid, sf.SFR, e.bpt, ga.bptclass, s.snMedian, s.class, s.zWarning, s.z FROM #upload u JOIN #x x ON x.up_id = u.up_id JOIN emissionLinesPort e ON e.specObjID = x.specObjID JOIN galSpecExtra ga ON ga.specObjID = x.specObjID JOIN stellarMassStarformingPort sf ON sf.specObjID = x.specObjID JOIN SpecObjAll s ON s.specObjID = x.specObjID WHERE s.zWarning=0 AND s.snMedian >= 3
```

Submit  HTML  XML  CSV  JSON  VOTable  FITS  MyDB **NEW!**

Table name



# SFR

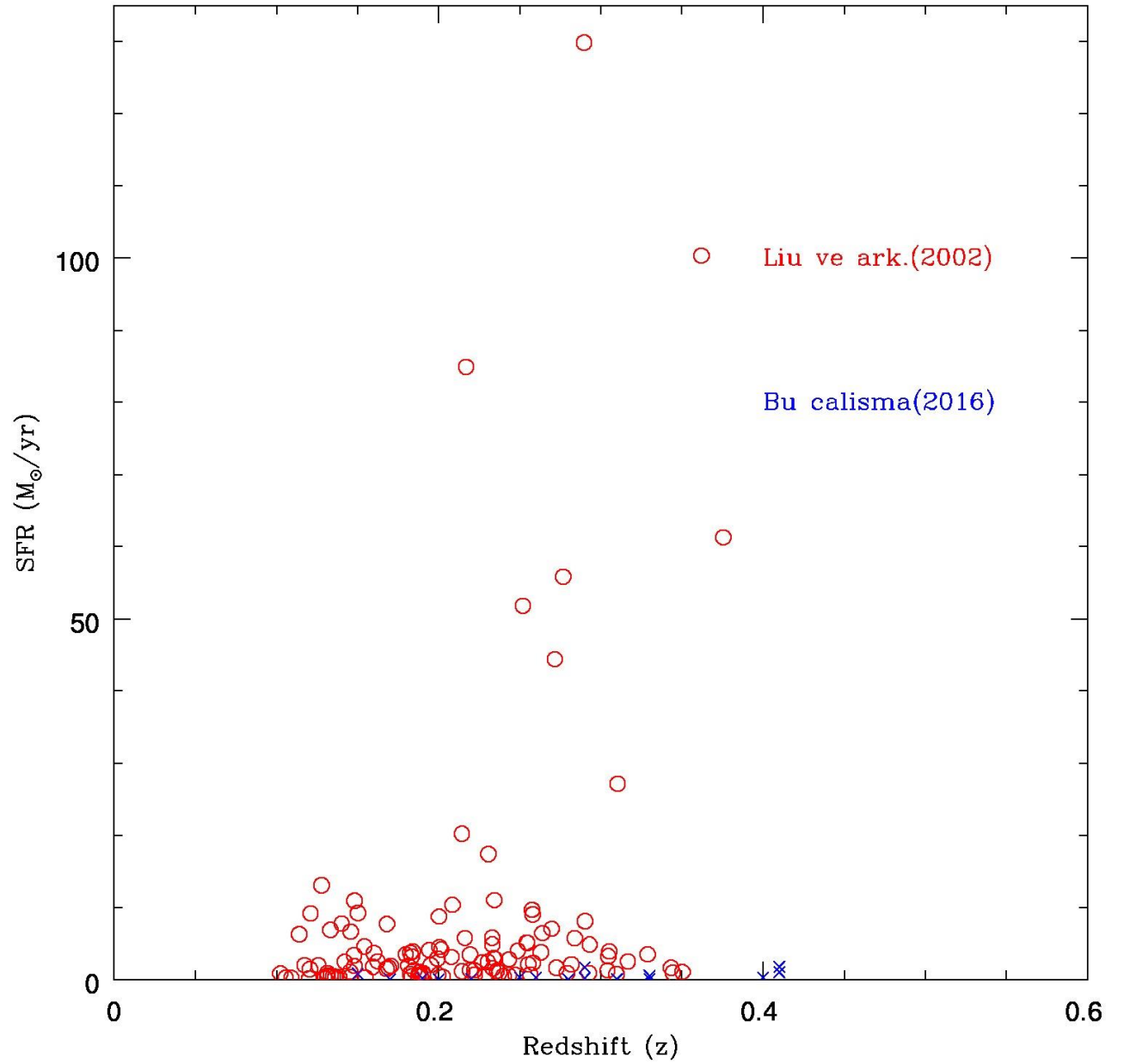
$$\text{SFR}(M_{\odot} \text{ year}^{-1}) = 7.9 \times 10^{-42} \times L(\text{H}\alpha) \text{ (ergs s}^{-1}\text{)}$$

Kennicutt, 1998

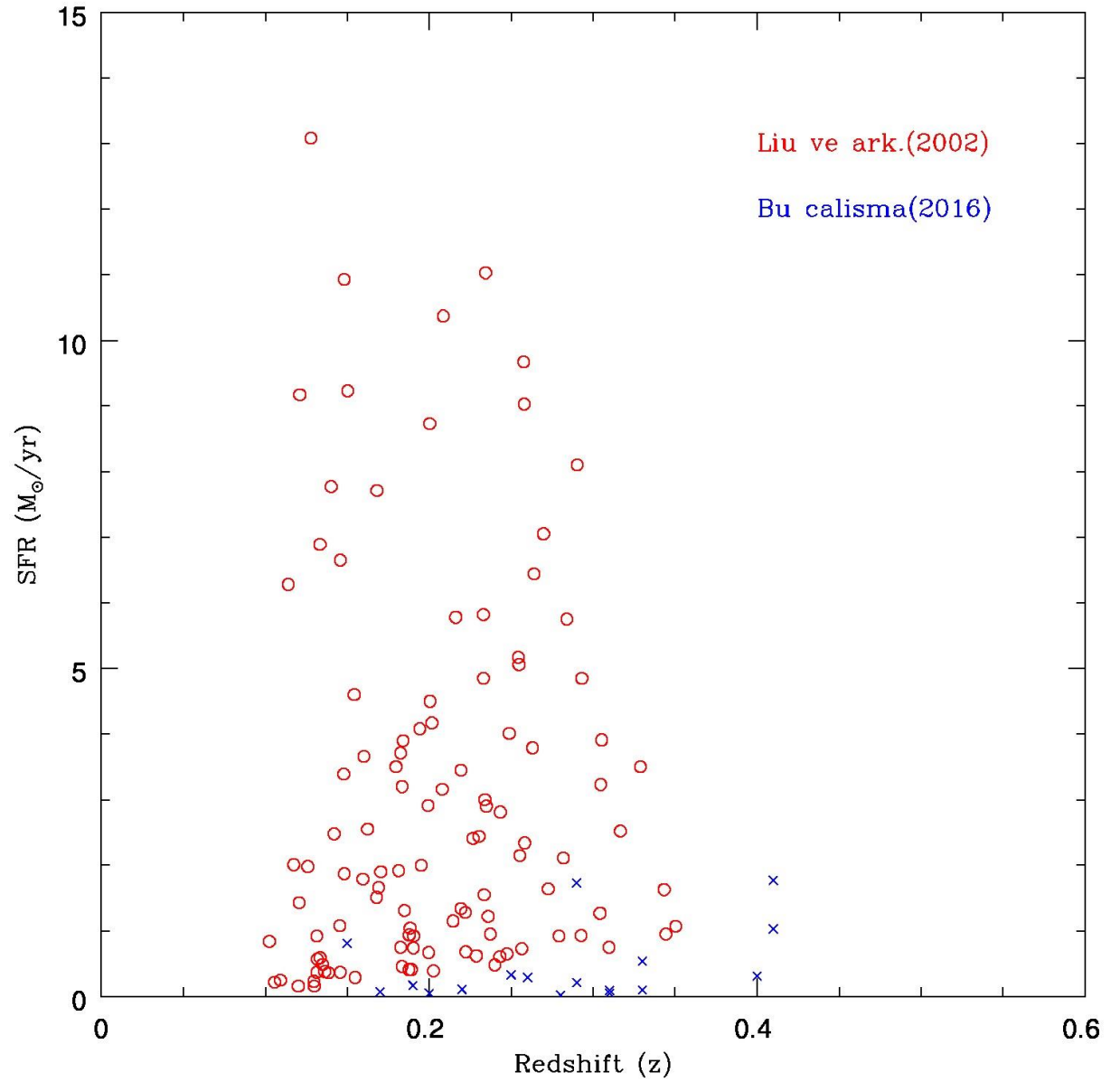
Küme Adı	BCG R.A.	BCG Dec.	Photo z	$f_{H\alpha(6562\text{\AA})}$	SFR	R
CFHTLS-CL-J022434-041421	36.1384	-4.2387	0.29	82.23	1.73	59.69
CFHTLS-CL-J022508-040118	36.2937	-4.0305	0.22	9.55	0.11	25.80
CFHTLS-CL-J022523-044049	36.3529	-4.6792	0.31	3.60	0.09	20.92
CFHTLS-CL-J022531-041421	36.3781	-4.2385	0.17	10.90	0.07	34.93
CFHTLS-CL-J022618-035952	36.5756	-3.9994	0.26	17.67	0.29	15.07
CFHTLS-CL-J022629-043153	36.6182	-4.5234	0.25	22.30	0.33	27.21
CFHTLS-CL-J022653-041005	36.7168	-4.1658	0.41	21.70	1.03	17.67
CFHTLS-CL-J022725-043232	36.8584	-4.5372	0.33	3.47	0.10	32.83
CFHTLS-CL-J095943+023537	149.9383	2.5776	0.15	169.16	0.81	13.06
CFHTLS-CL-J100014+021224	150.0758	2.2034	0.19	21.39	0.17	37.74
CFHTLS-CL-J100022+022321	150.0909	2.3912	0.28	0.82	0.02	16.15
CFHTLS-CL-J100142+022510	150.4157	2.4302	0.20	5.66	0.05	34.54
CFHTLS-CL-J100151+020341	150.4473	2.0540	0.40	7.02	0.31	39.12
CFHTLS-CL-J141721+523541	214.3328	52.5939	0.31	1.91	0.05	31.13
CFHTLS-CL-J141722+525444	214.3444	52.9142	0.29	9.85	0.21	16.30
CFHTLS-CL-J141729+523819	214.3726	52.6379	0.41	37.49	1.77	29.33
CFHTLS-CL-J141904+530830	214.7728	53.1393	0.33	19.07	0.54	18.75

Not: H $\alpha$  akı deęerinin birimi:  $10^{-17} \text{ erg s}^{-1} \text{ cm}^{-2}$

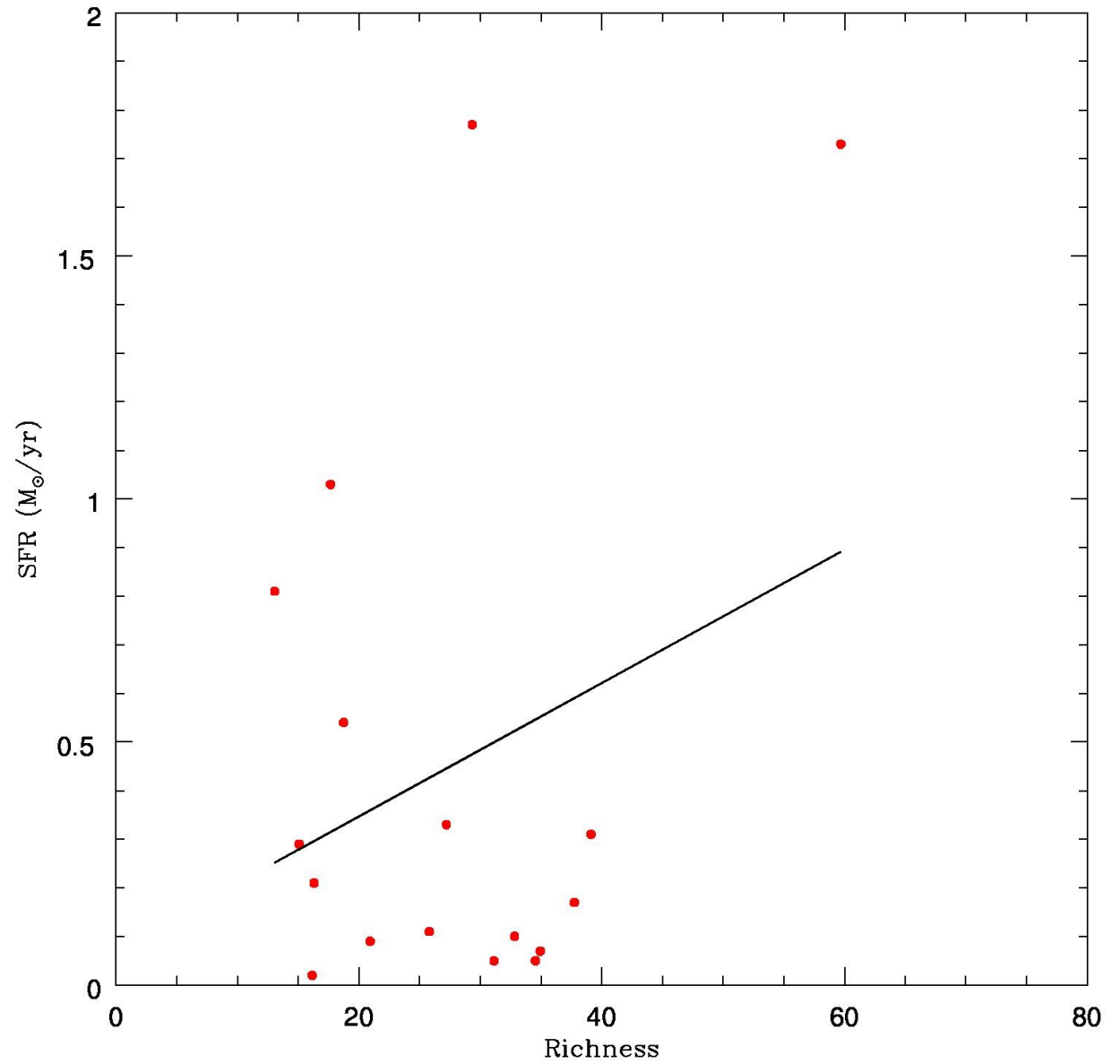
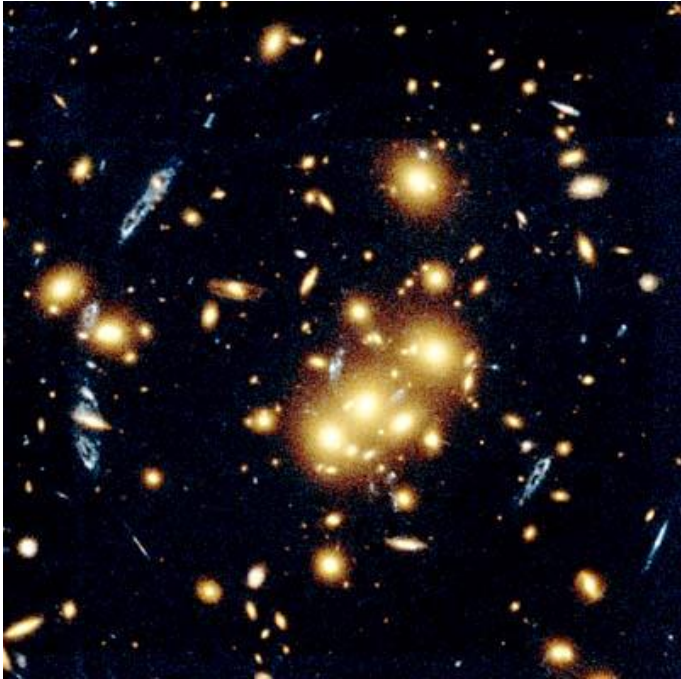
# Sonuçlar



# Sonuçlar



# Sonuçlar



# Bir sonraki adım...

- [OII] akı değeri ile SFR hesabı
- SDSS'in yeni sürümlerinin ve tayf gözlemi yapacak yeni gökyüzü tarama projelerinin takibi
- Fotometrik yöntemler ile SFR hesabı
- CFHTLS, W1 (72 deg<sup>2</sup>) alanında aynı yöntemi uygulamak,  
Benoist, C. ve Aliş, S. ~4000 galaksi kümesi

# Bir sonraki adım...

- Yüksek “z” değerlerinde kaliteli tayf sorunu çözümü:



- 1) Hedef BCG'lerin doğrudan tayfı alınabilir
- 2) **NIR** bölgede J, H, K bantları ile fotometrik gözlem fırsatı



Dinlediđiniz iin teŖekkür ederim...