Star Formation in Galaxy Clusters Over the Past 10 Billion Years

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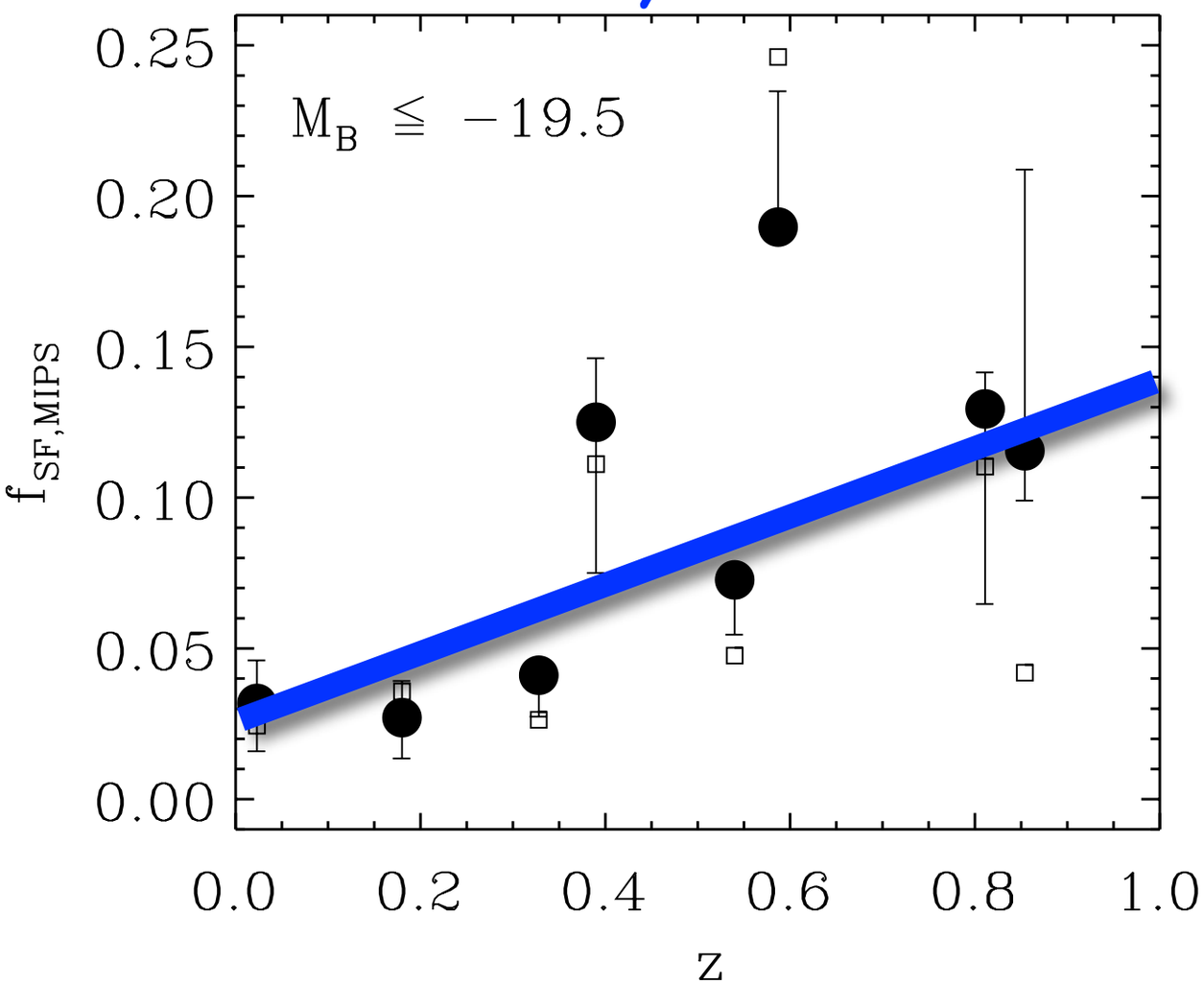
Mid-Infrared SF Rates 0<z<1

Luminosity Selected

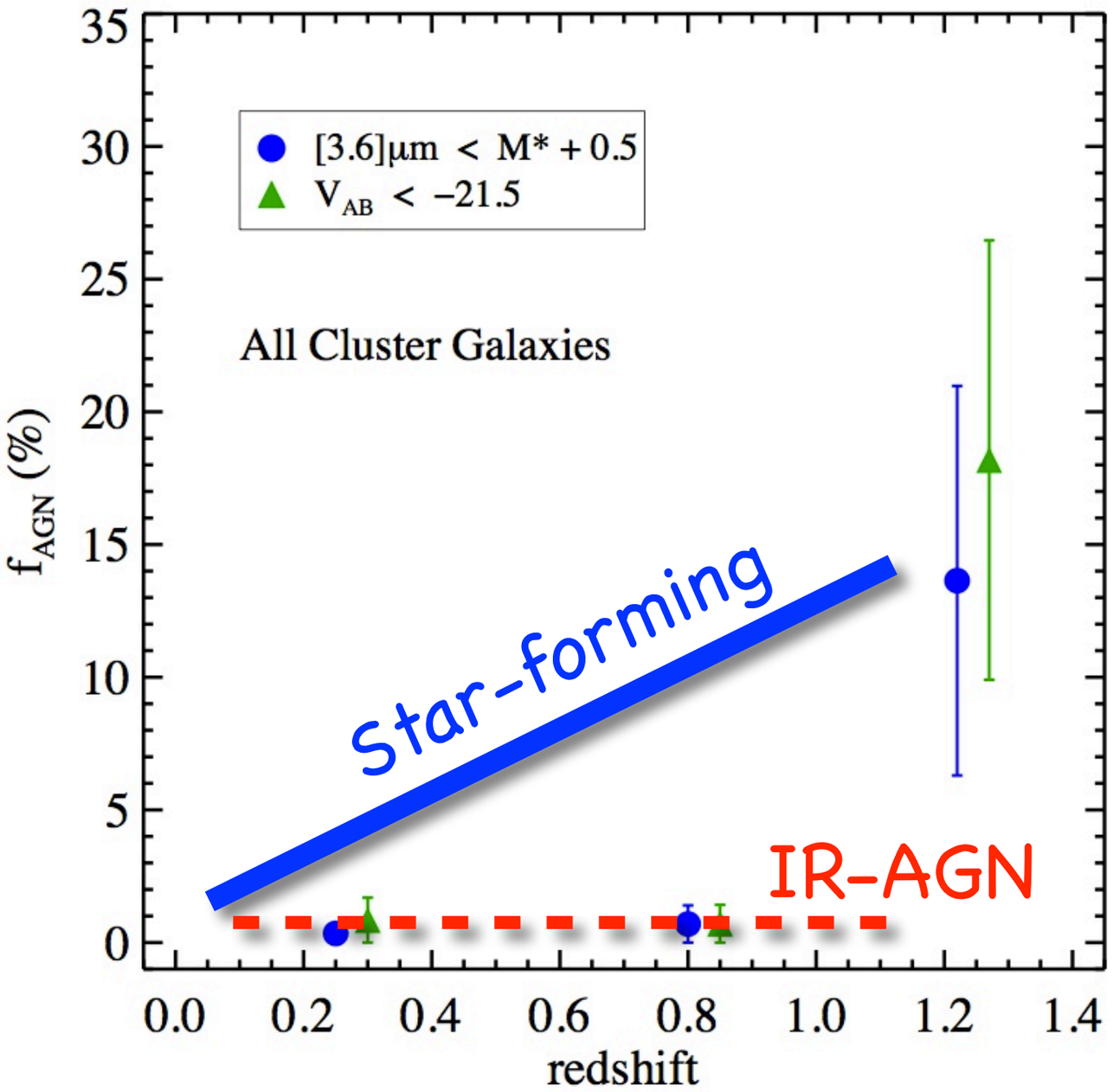


Increasing % of Dusty Star-forming Members with redshift.

Fraction from optical colors alone underestimate total Star Formation.

Saintonge, Tran, & Holden+08

IR-AGN Fraction 0<z<1.3



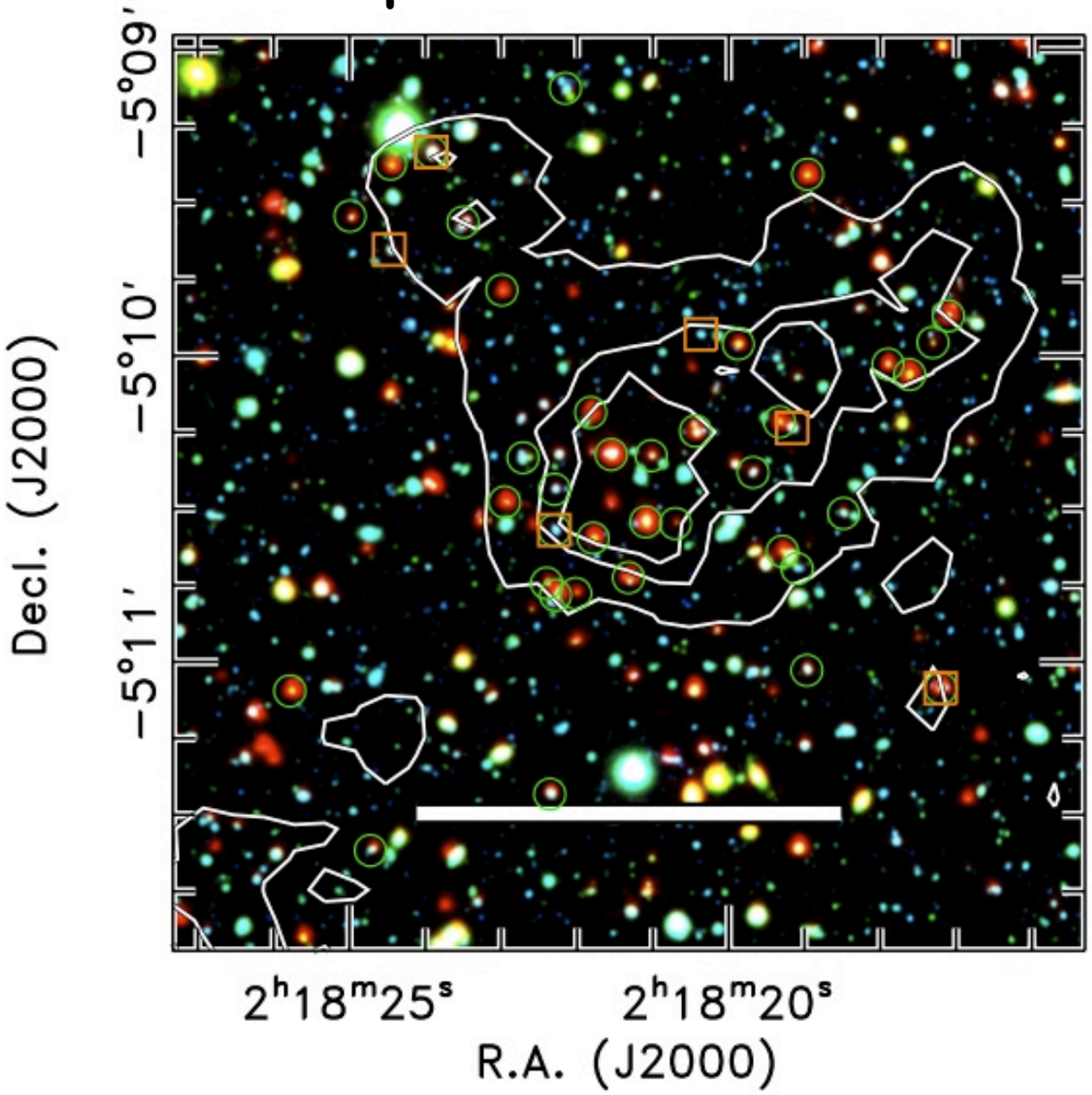
IRAC selected AGN fraction in same clusters uniformly low except at z>1

AGN quenched SF ?

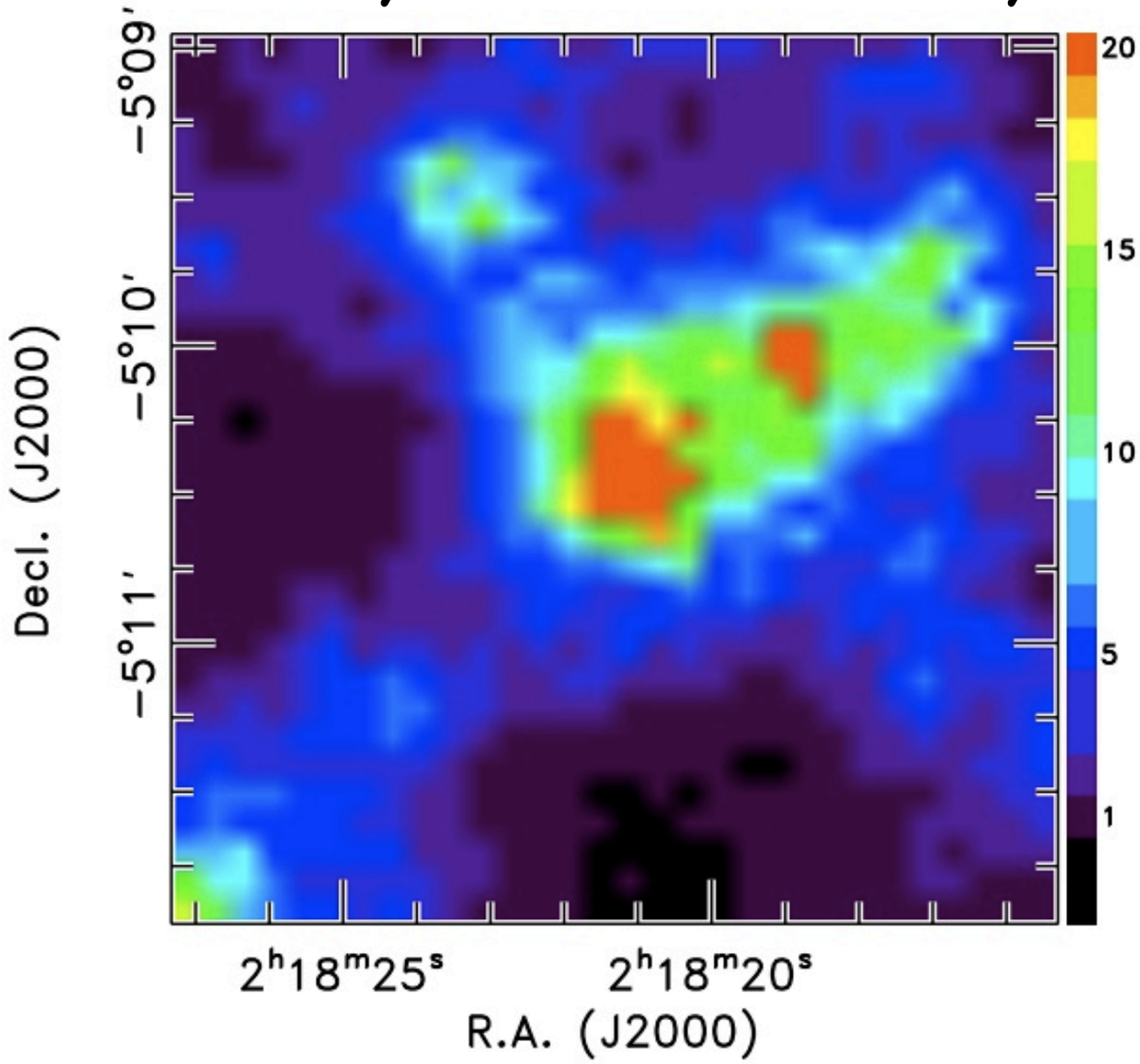
Tomczak, Tran, & Saintonge 2011

ClG J0218.3-0510 @ z=1.62

Optical+IRAC



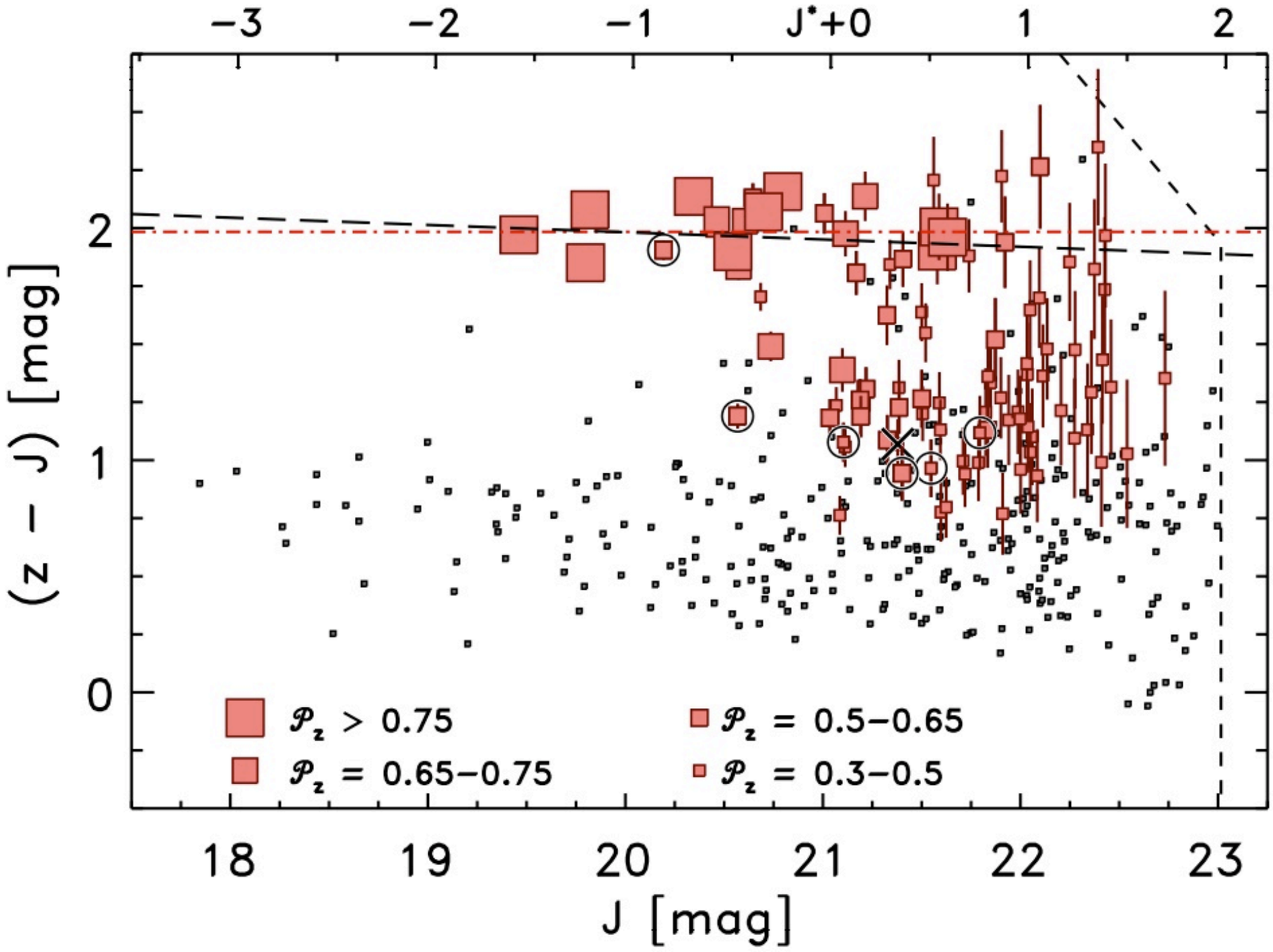
Galaxy Surface Density



Papovich+2010, Tanaka+2010

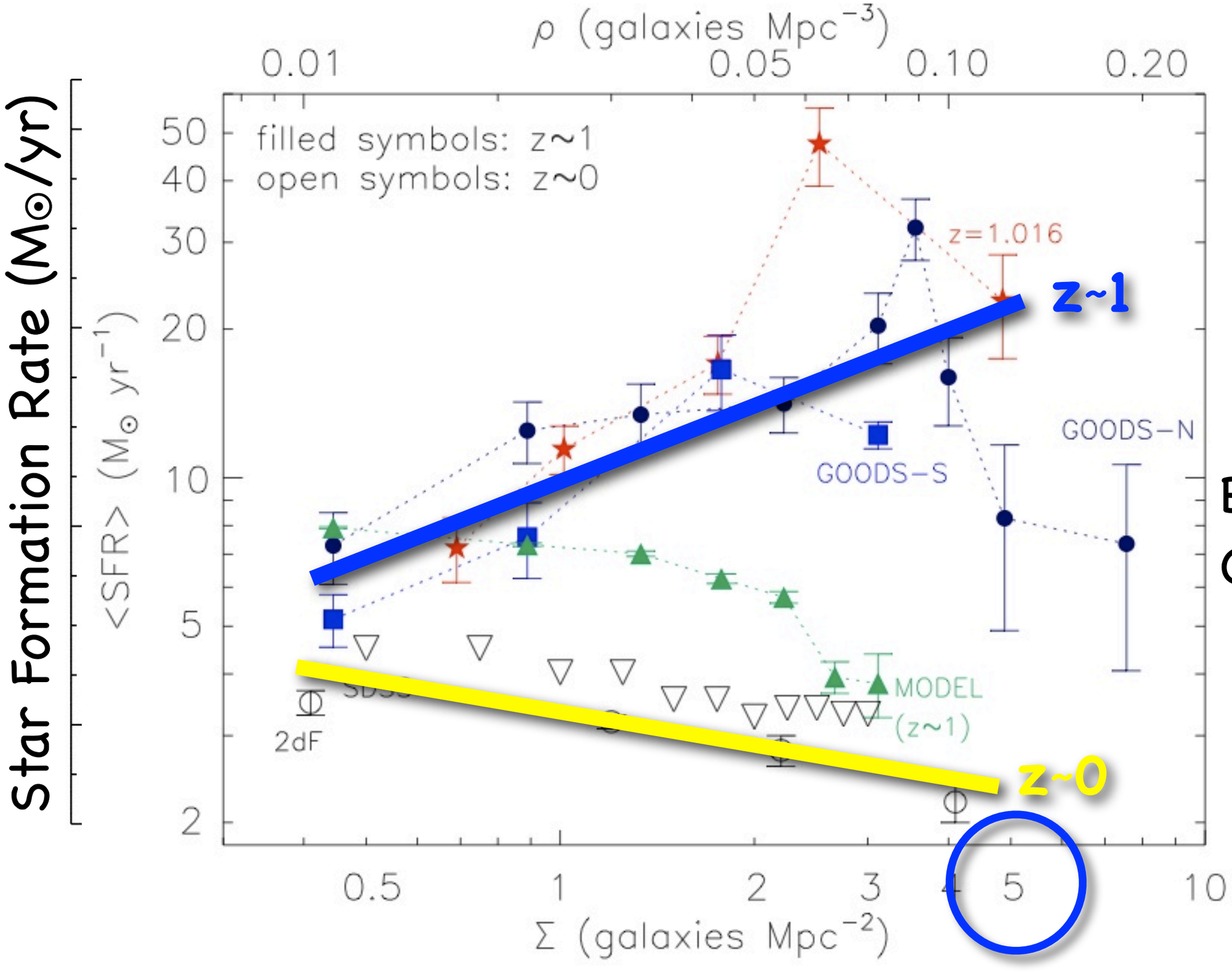
Follow-up spectroscopy confirms 12 members

ClG J0218.3-0510 @ z=1.62



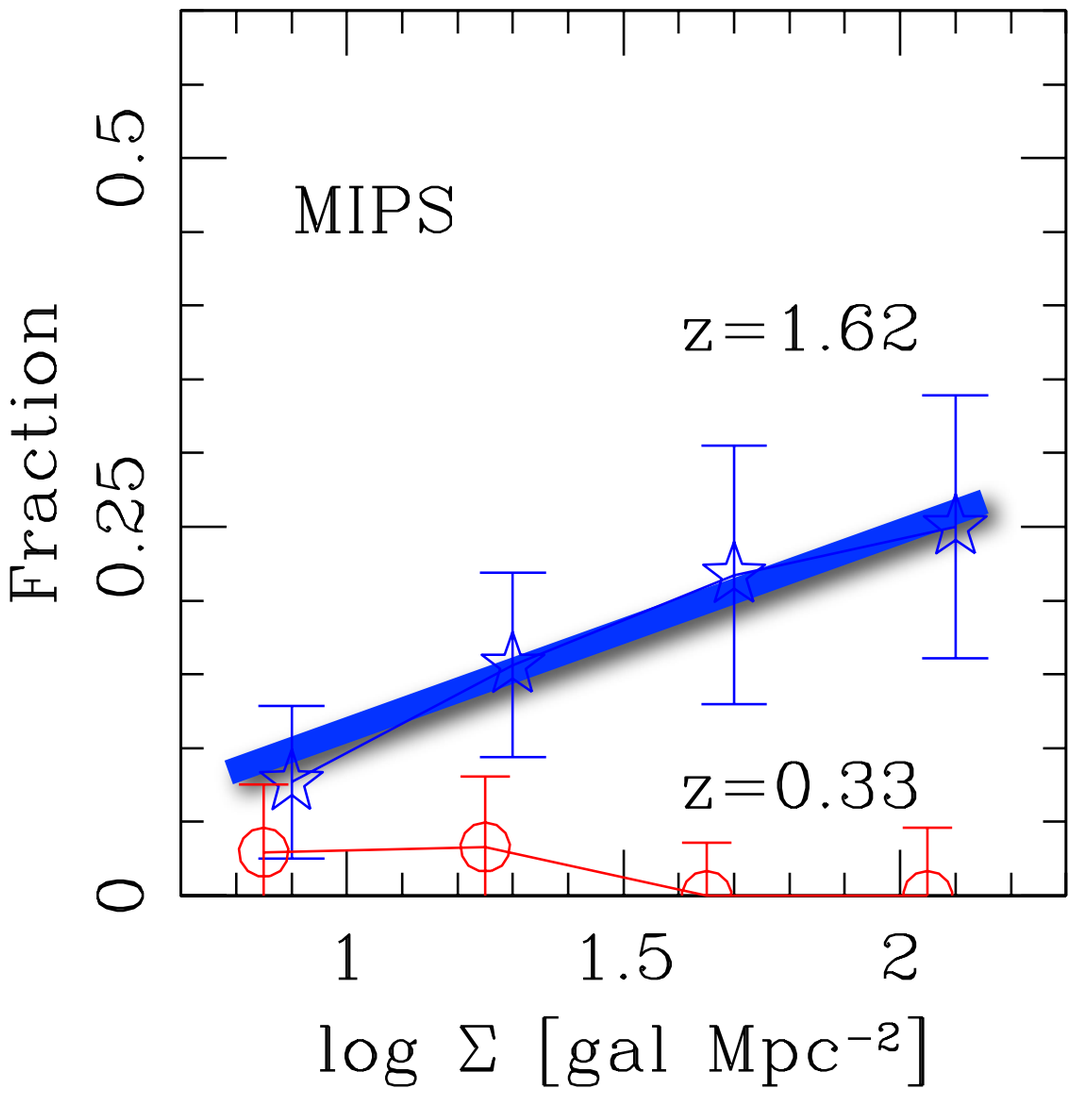
Color-Magnitude Diagram (Papovich+2010)

Star Formation vs. Environment



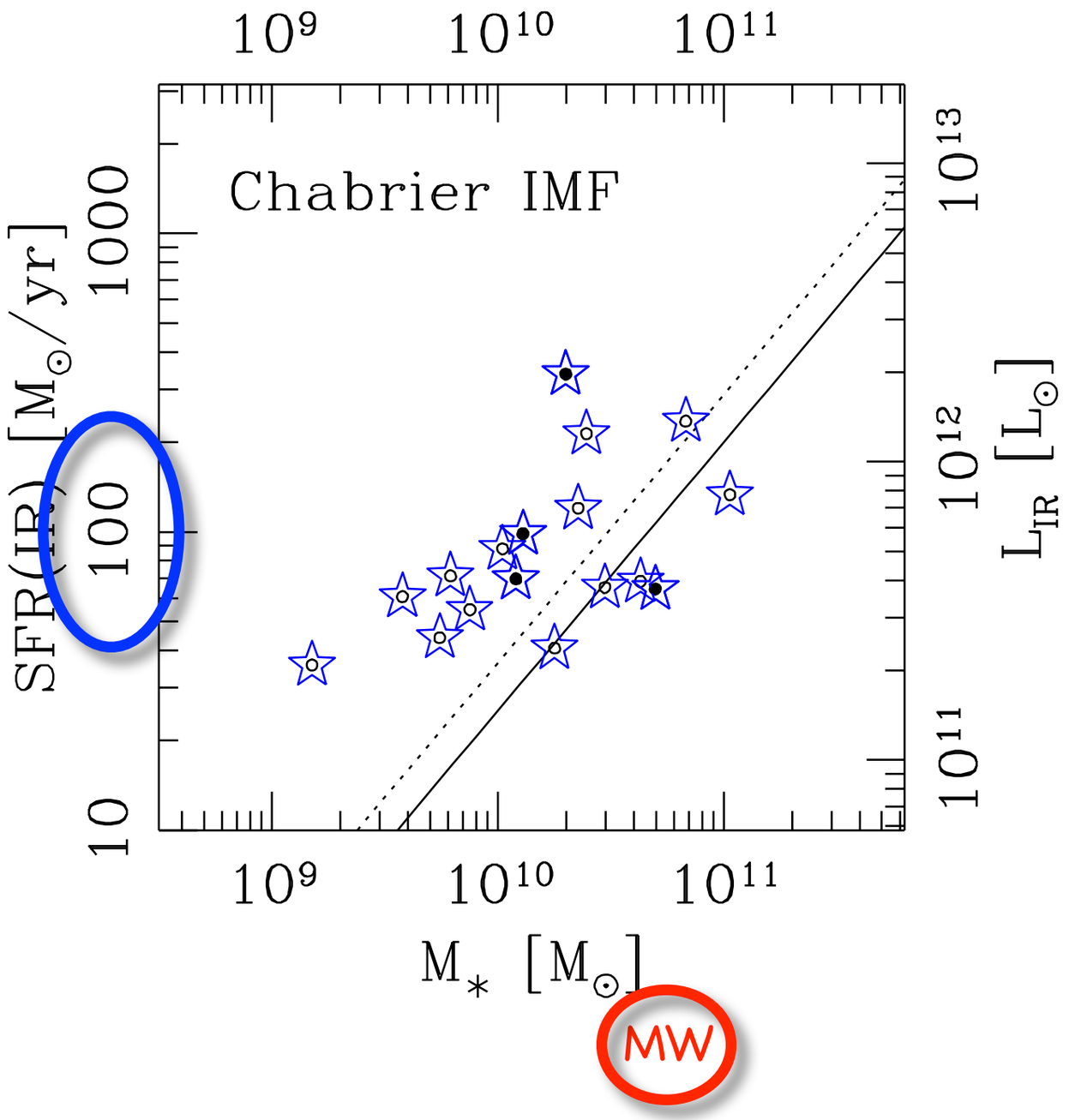
Elbaz+07
Cooper+08

Star Formation-Density @ z=1.62



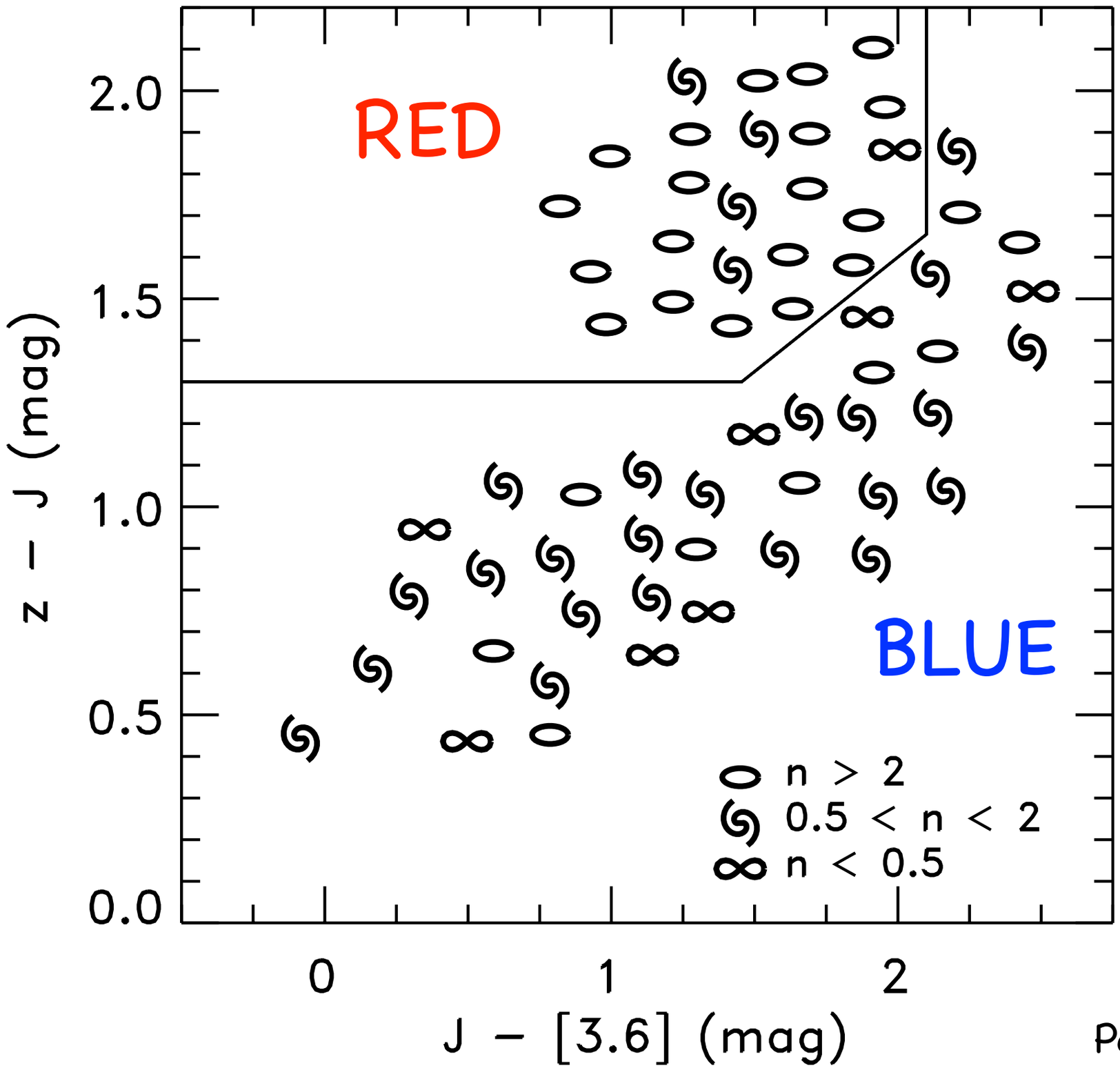
Cluster Core SF rate

~1700 M⊙/yr/Mpc²

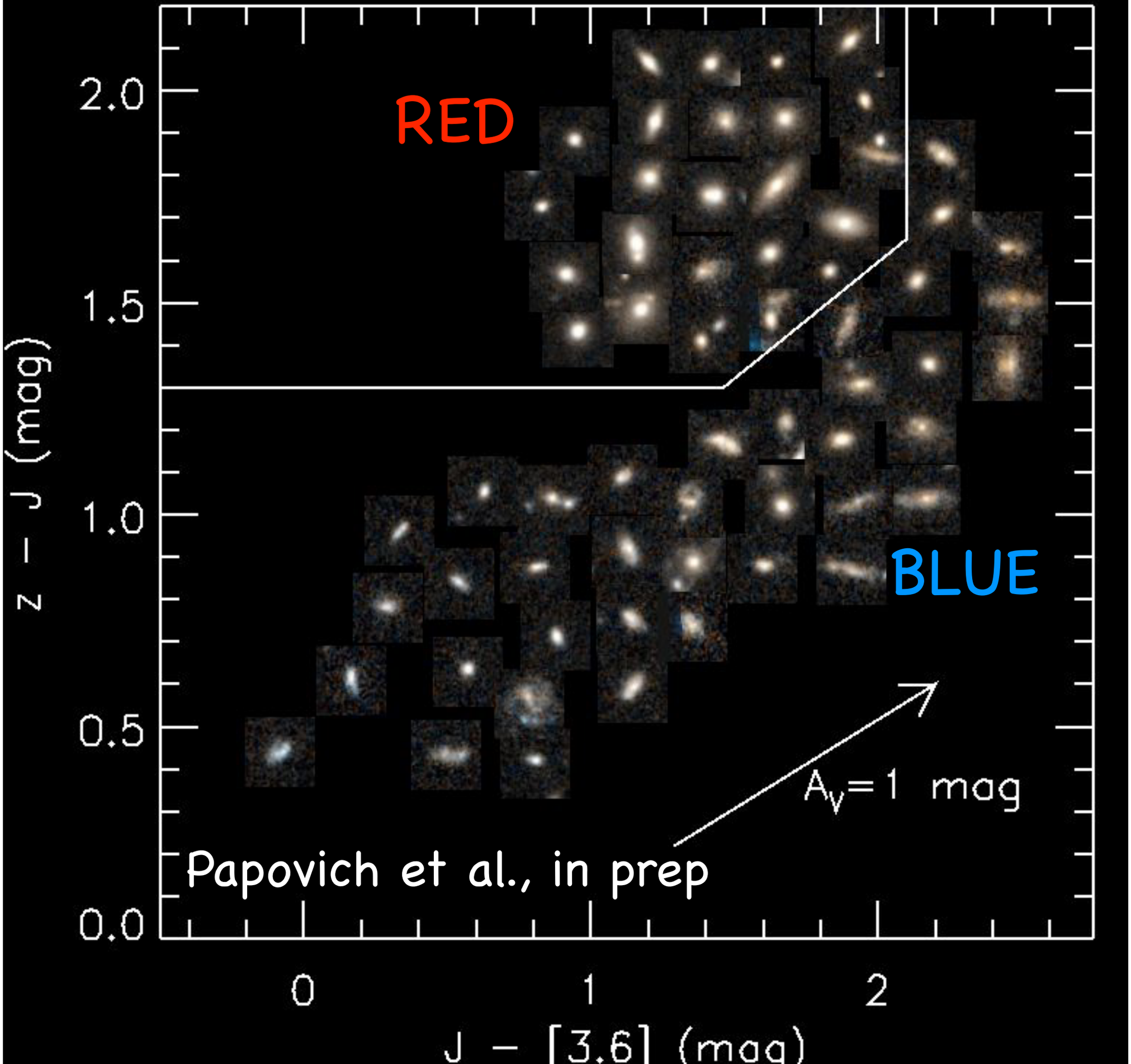


Tran+2010

Color-Morphology @ z=1.62

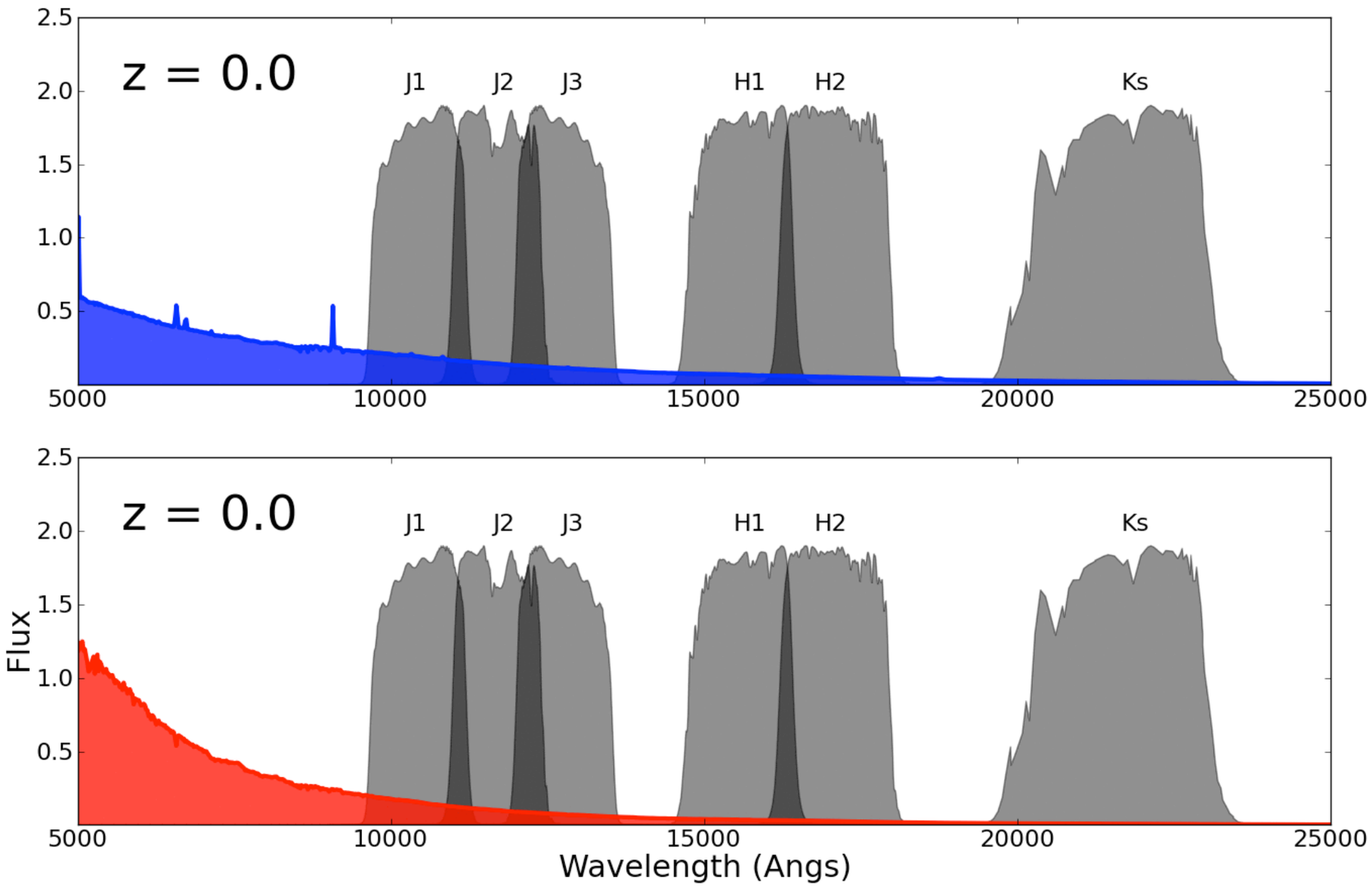


Papovich et al., in prep



WFC3
CANDELS

zFourGE Survey



Four-Star:

Near-IR camera on Magellan (7′x7′)

$J_1J_2J_3$~25.5

H_lH_s~25

K_s~24.5

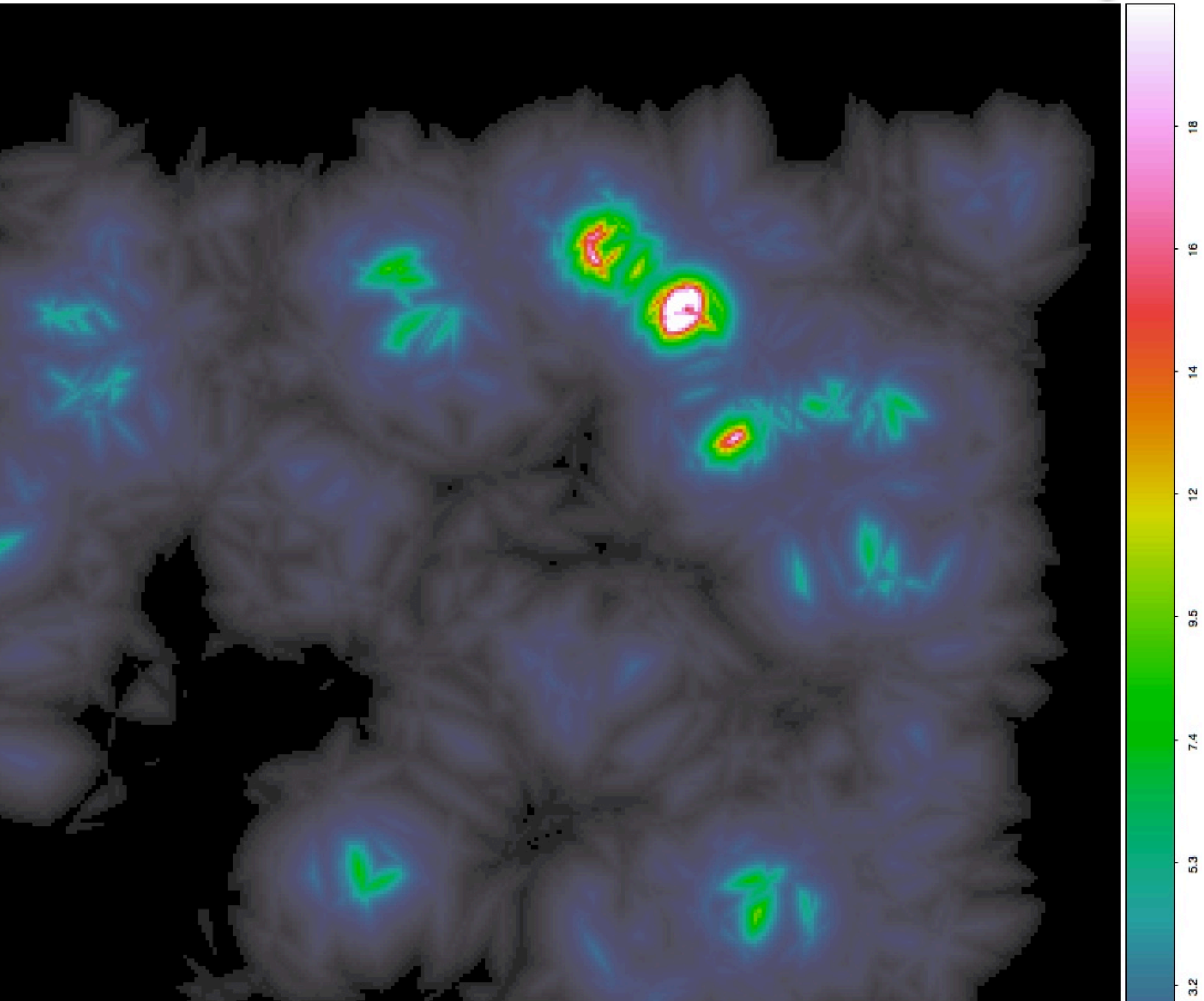
Photo-z uncertainties about 0.02

Ivo Labbé, Karl Glazebrook, Janice Lee, Pat McCarthy, Andy Monson, Casey Papovich, Eric Persson, Ryan Quadri, Lee Spitler, Kim-Vy Tran, Pieter van Dokkum

NEWFIRM
K 12 hours

Four-Star
K 30 minutes

zFourGE Survey

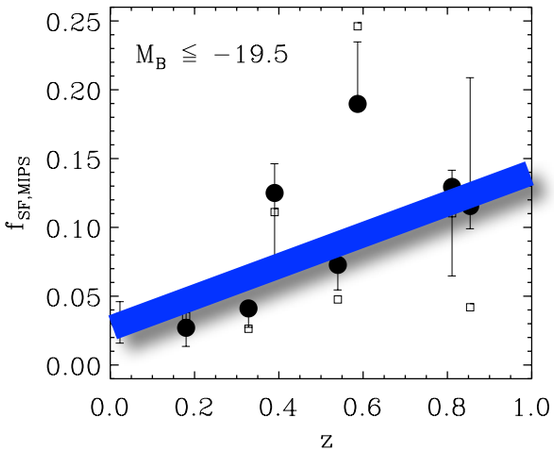


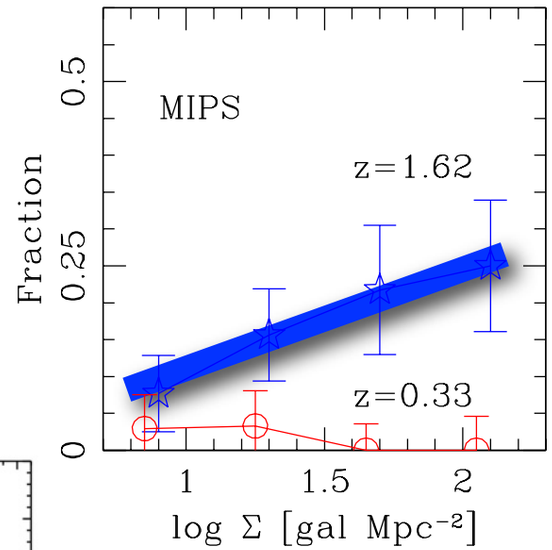
Candidate z~2 cluster

Spitler et al, in prep

Summary

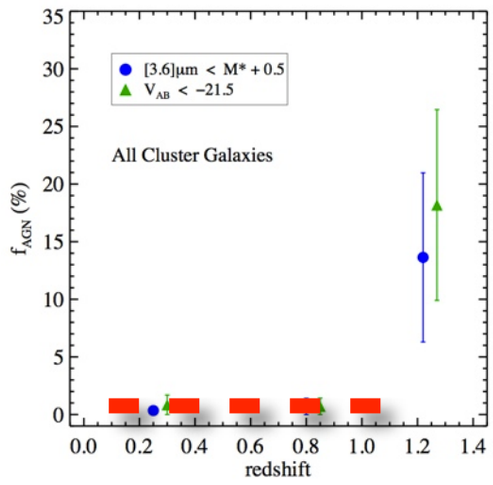
How do galaxies in massive clusters form their stars ?





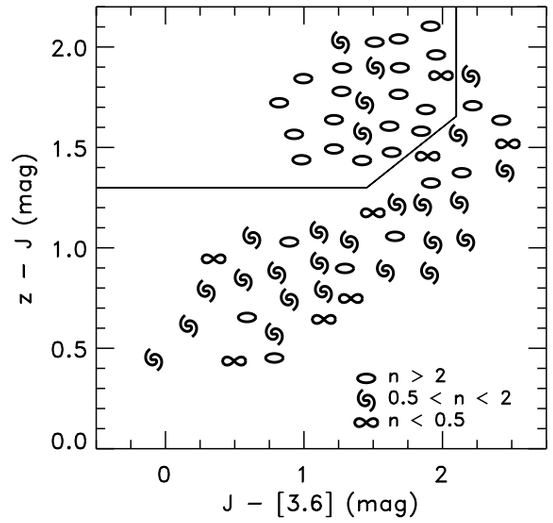
1. Very quickly
(high stellar birthrates)

2. Pretty early in the universe
(higher redshift)



3. AGN quenched SF? TBD

4. Color-Morphology Relation @z=1.62



5. zFourGE Survey