

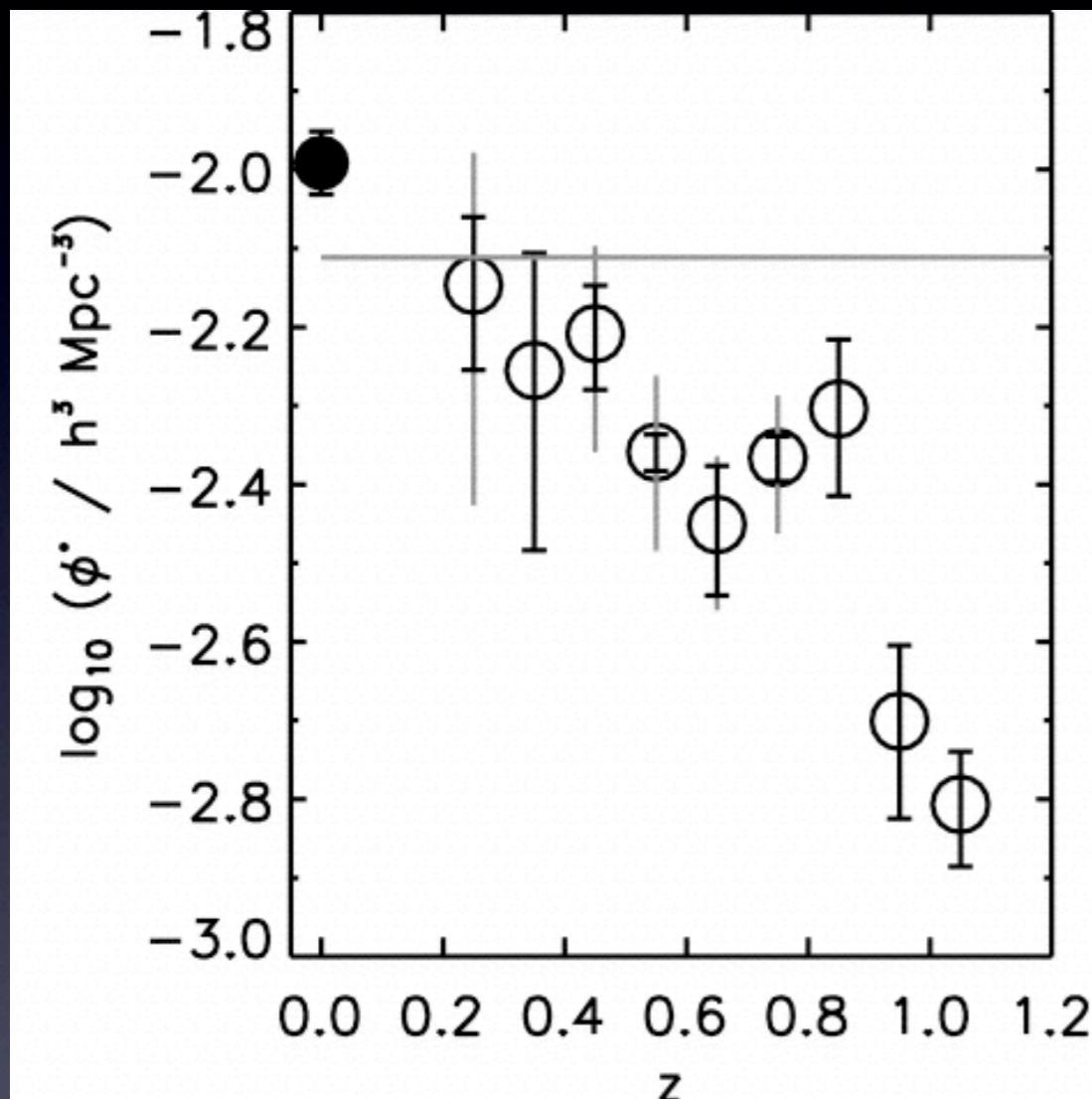
Compact, Disk-Dominated Early-Type Galaxies at $z = 2$

Arjen van der Wel

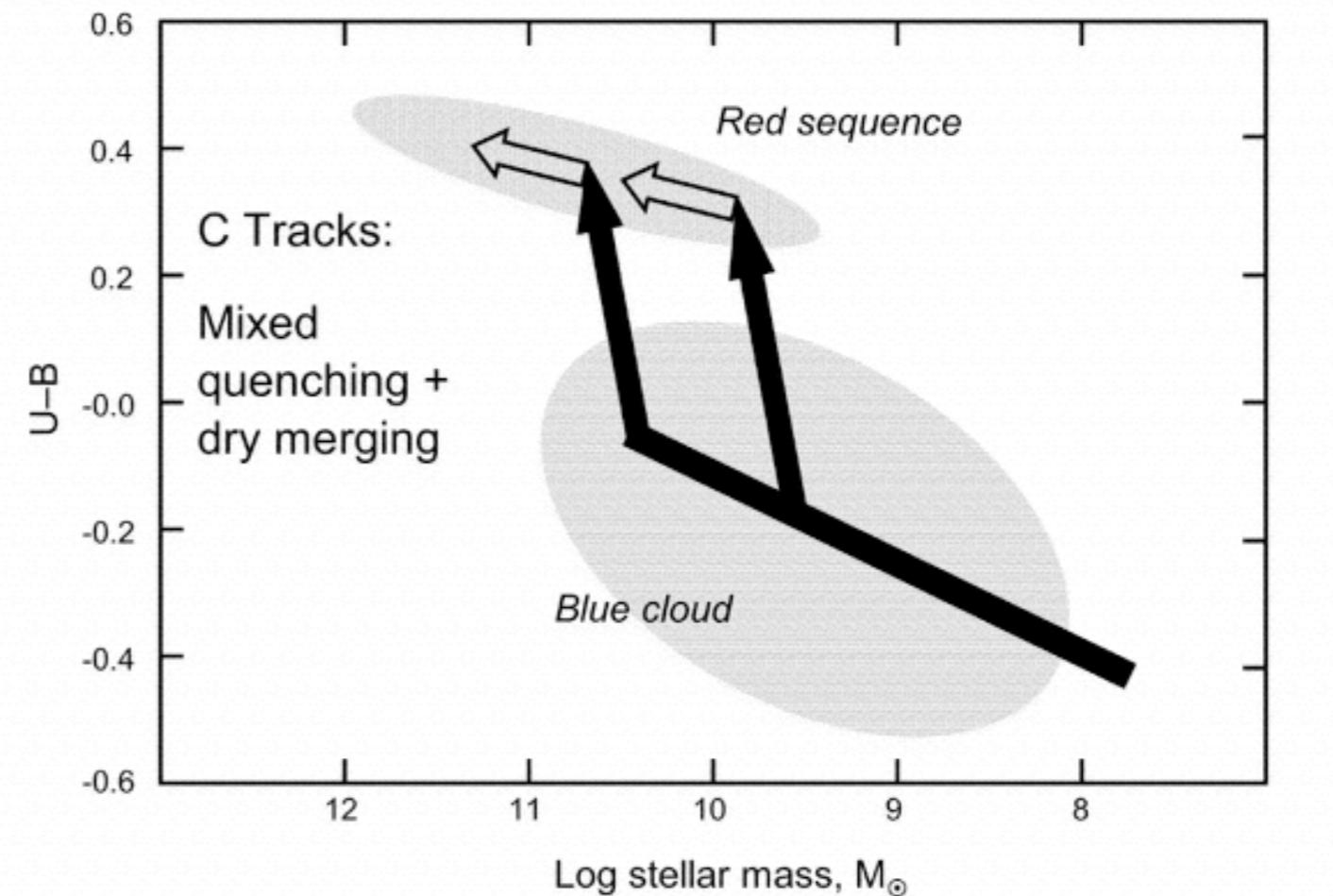
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Anton Koekemoer (STScI), Eric Bell (Michigan),
Bradford Holden (UCSC), Aday Robaina (Barcelona), Daniel McIntosh (Missouri)

Early-type galaxies evolve in number



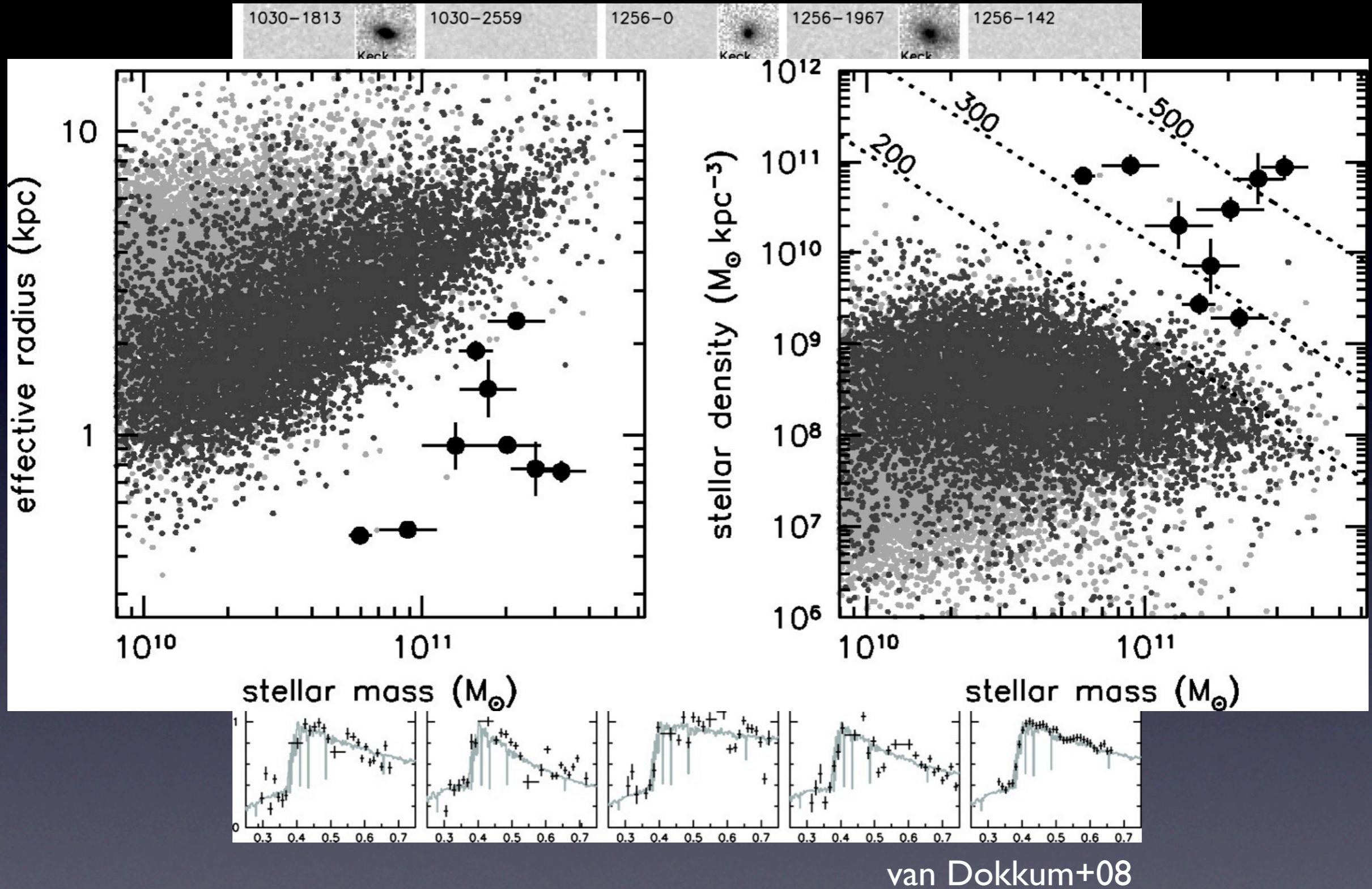
Bell et al. (2004)



Faber et al. (2007)

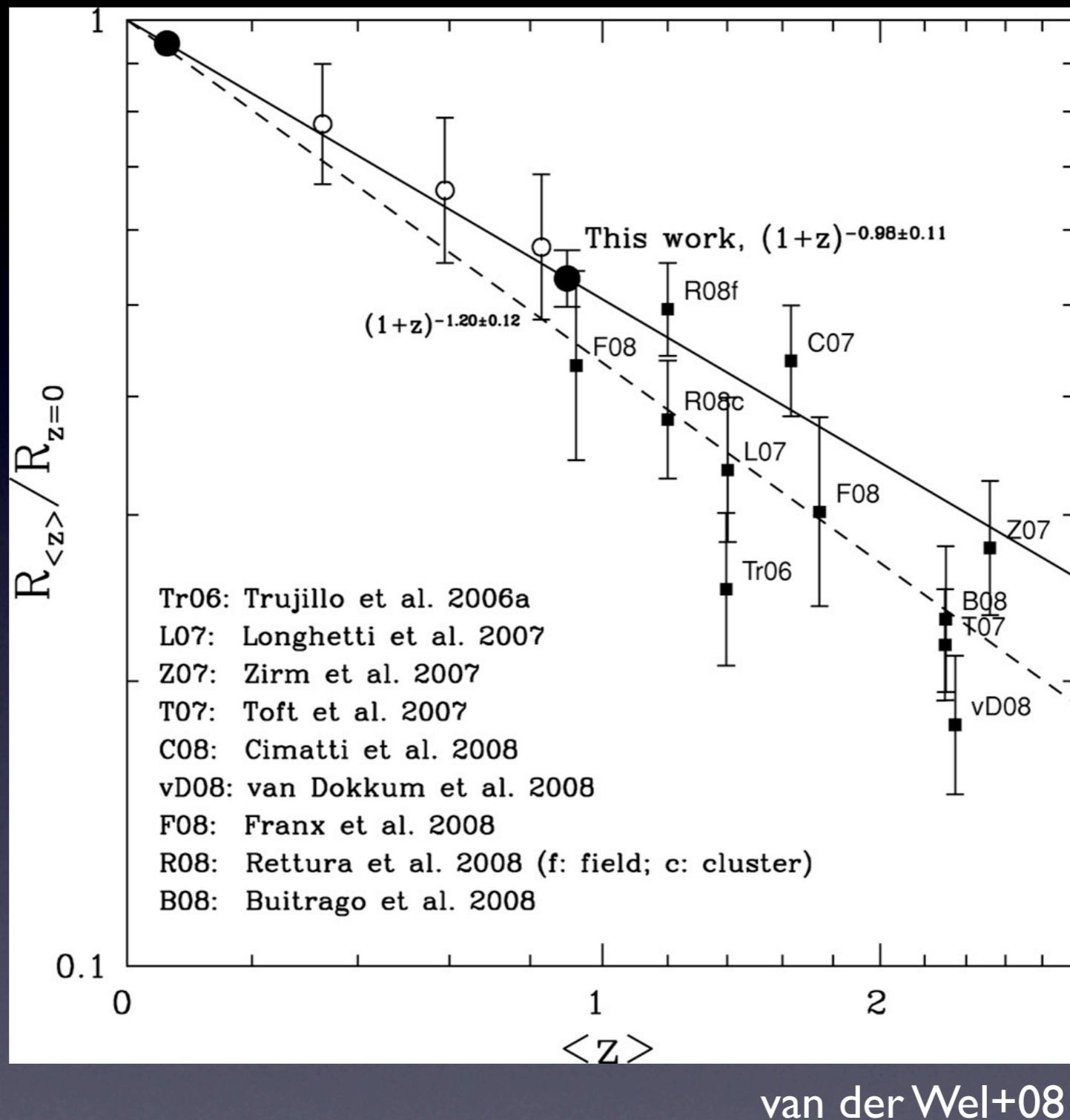
also see, e.g., Brown+07; Ilbert+10, Brammer+11

Massive early-type galaxies at $z \sim 2$ are small

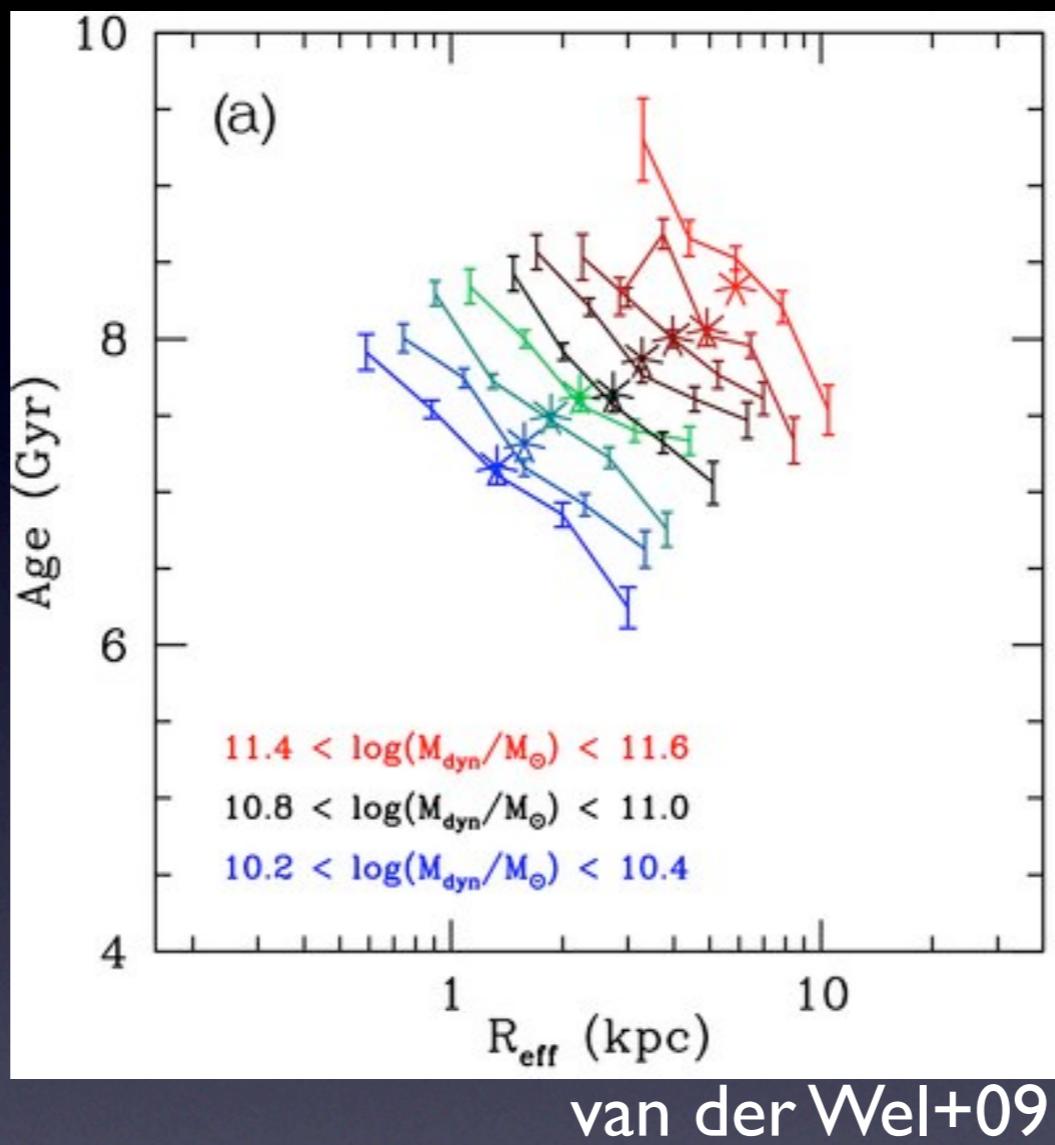


also see, e.g., Daddi+05; Trujillo+06; Zirm+07; Toft07

Early-type galaxies evolve in size gradually

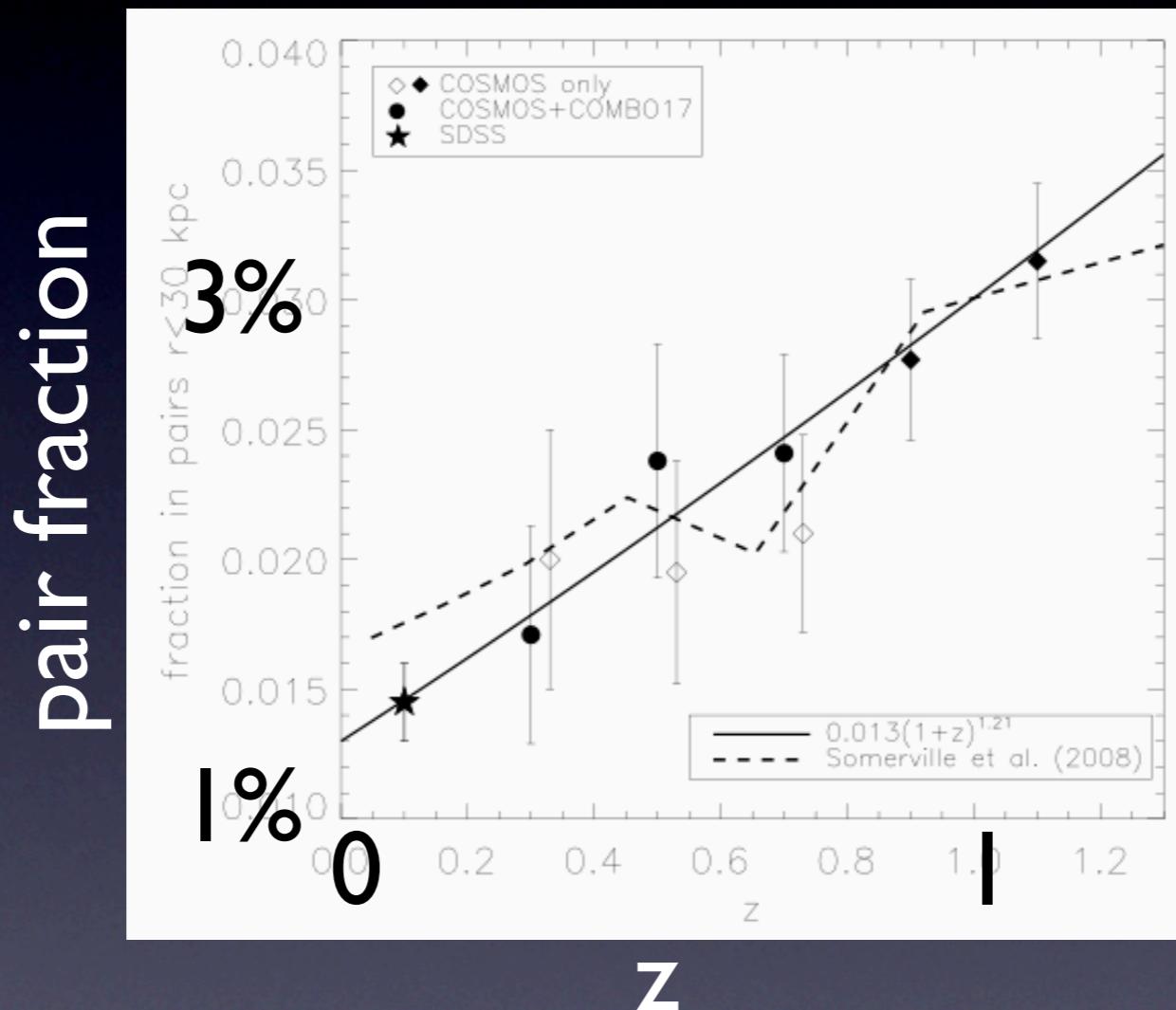


Small galaxies are older at fixed mass



~10k SDSS galaxies at $0.04 < z < 0.08$ w/o emission lines

Growth through merging (Robaina+10)

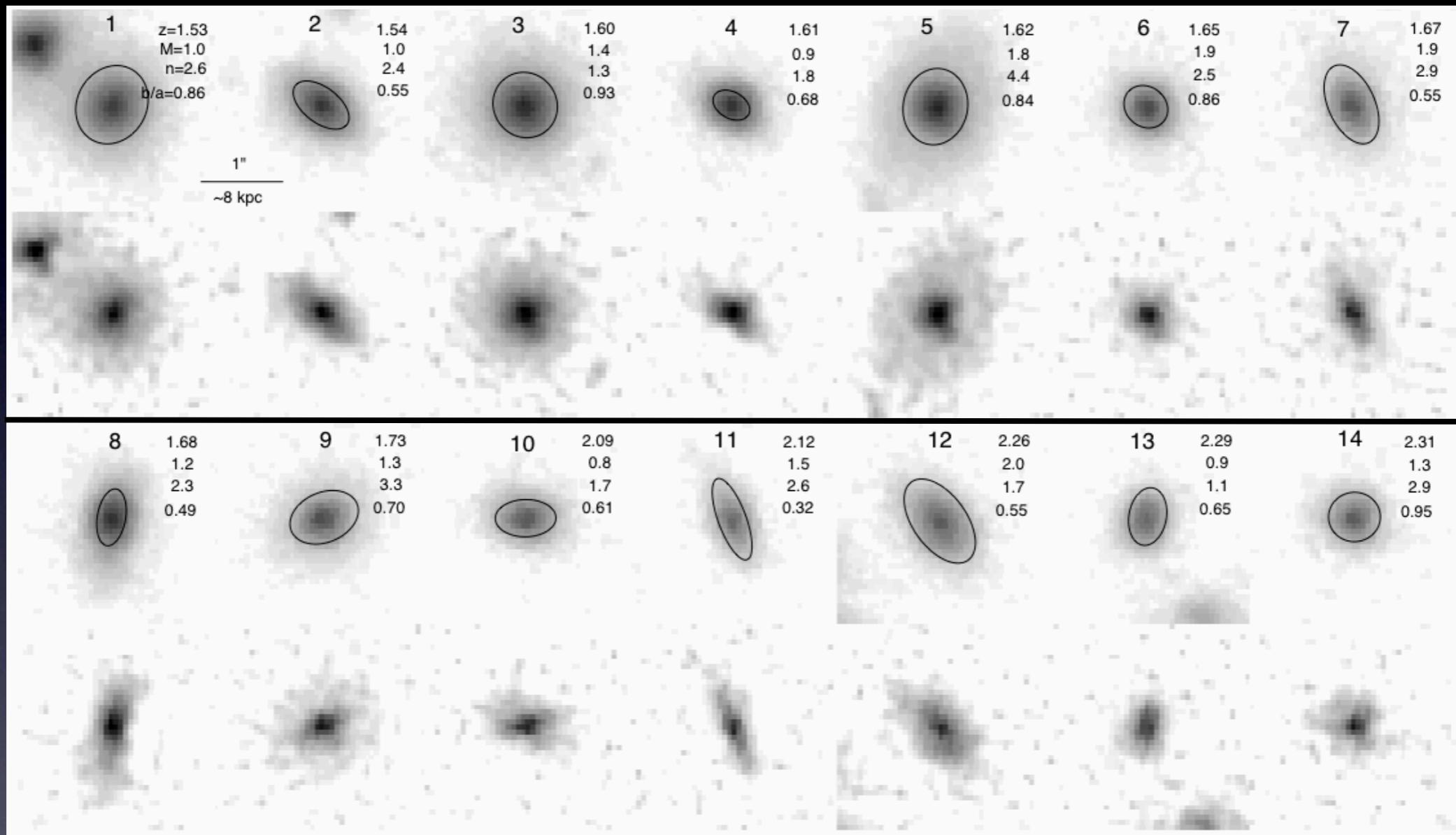


pair fraction in COSMOS+COMBO-17

Early-type galaxy evolution

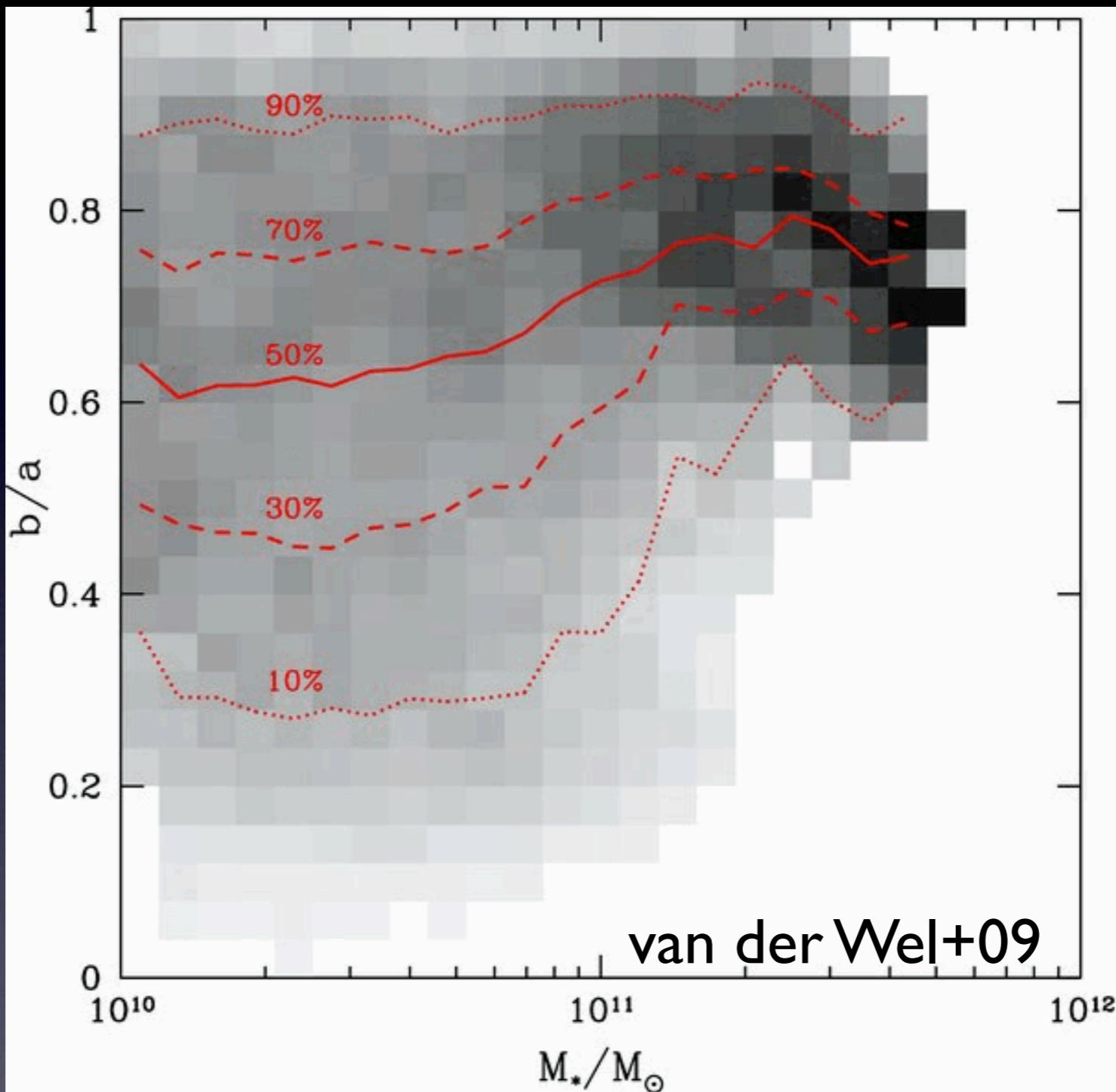
- gradual evolution in number density since $z \sim 2$
- gradual evolution in size since $z \sim 2$
- lower gas fraction in progenitors + merging
- compact $z \sim 2$ galaxies evolve into large ellipticals

Compact, massive early-type galaxies at $z \sim 2$ are often disks (van der Wel+11)



HST/WFC3 H-band imaging

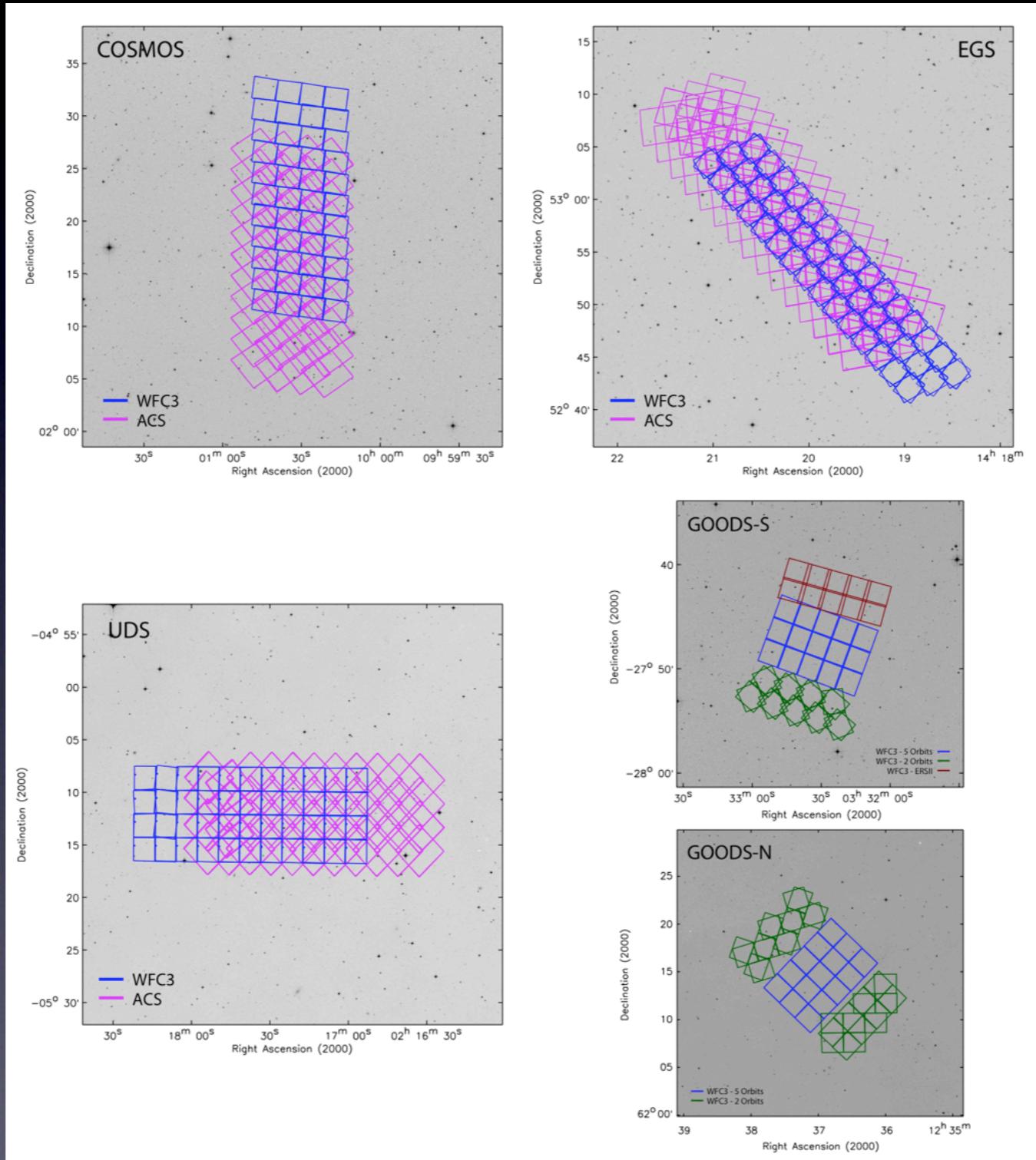
$z \sim 0$ early types are not round

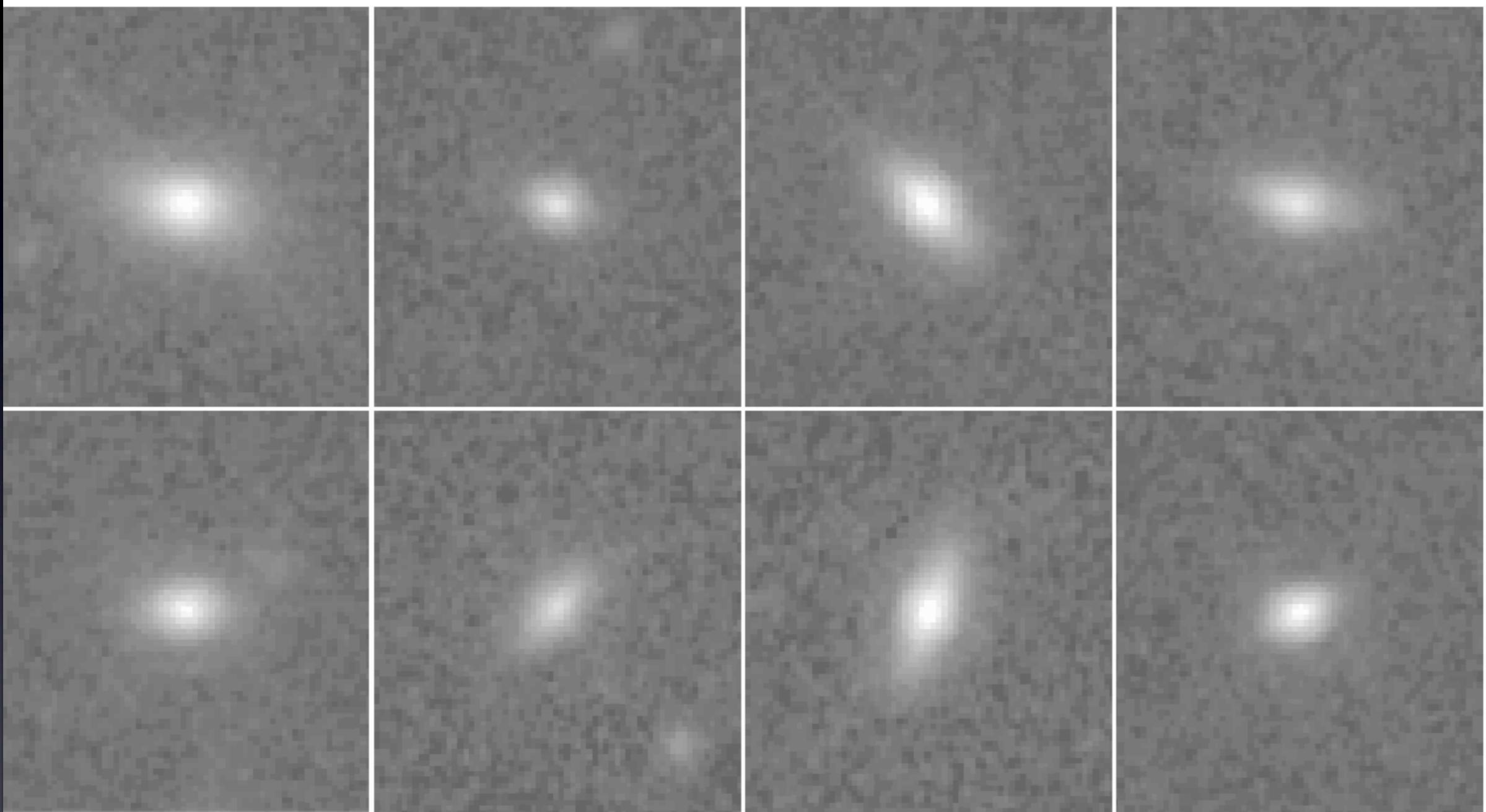


$\sim 10k$ SDSS galaxies at $0.04 < z < 0.08$ w/o emission lines

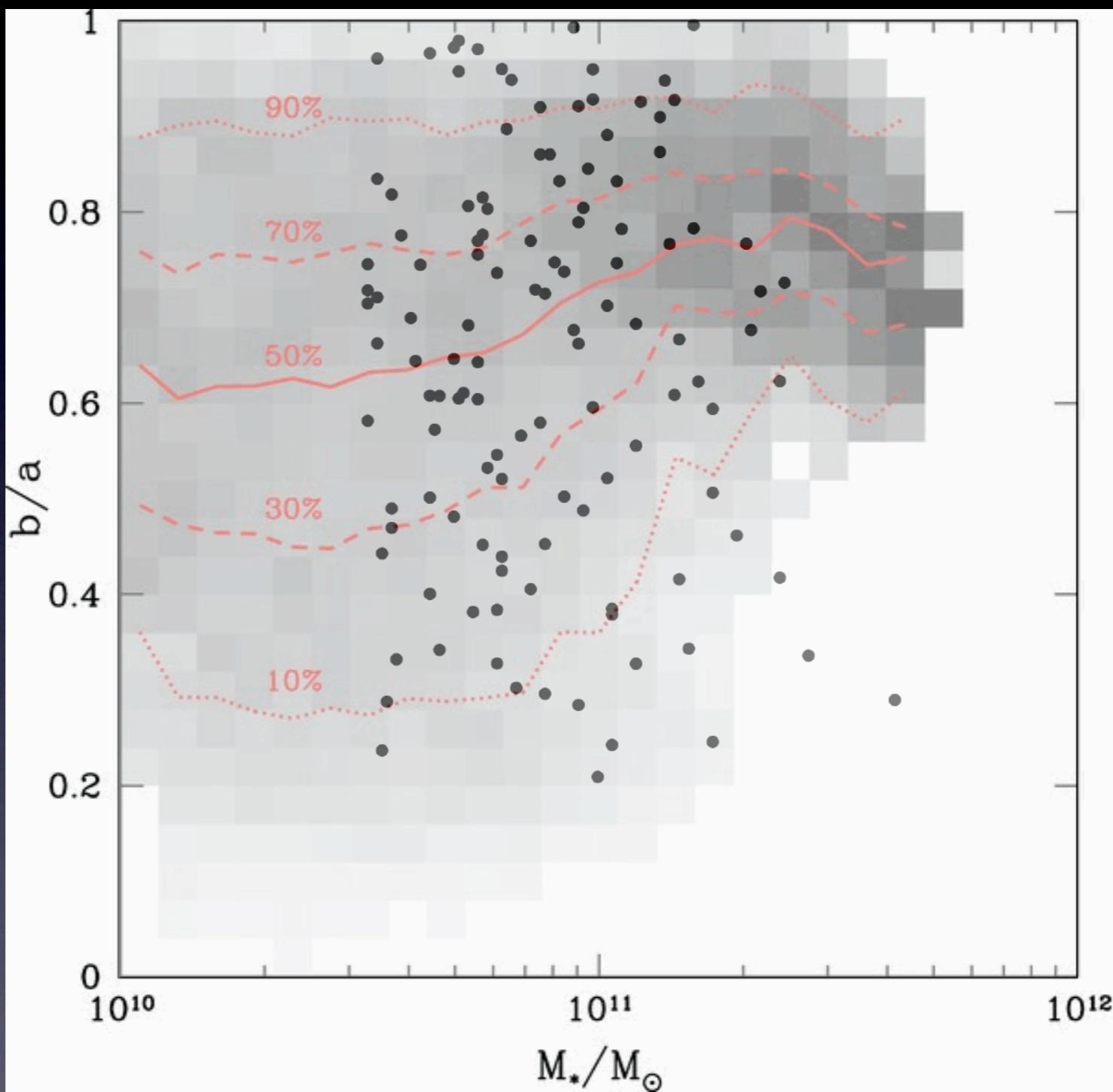
CANDELS

the largest HST multi-cycle treasure program (~900 orbits; PIs: Faber/Ferguson)

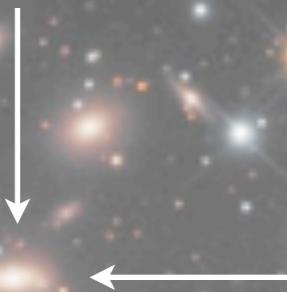




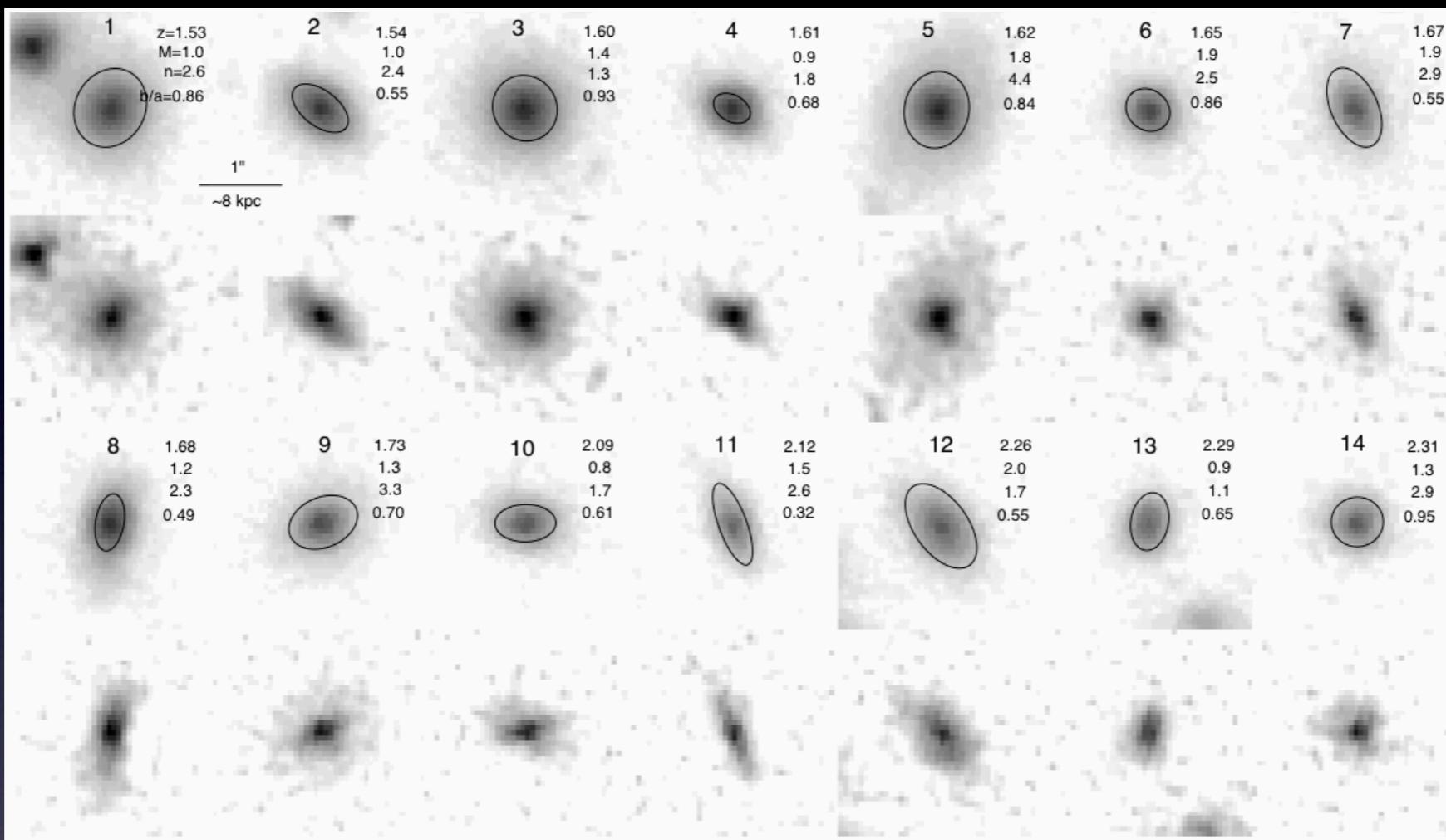
SDSS (z~0) + CANDELS (z~2)



Local analogs are ‘hiding’ right under our noses



Conclusion



Compact early-type galaxies at $z \sim 2$ are often disks
(van der Wel+11)