# Sizes and mass profiles of post-starburst galaxies at $z \sim 1.5$

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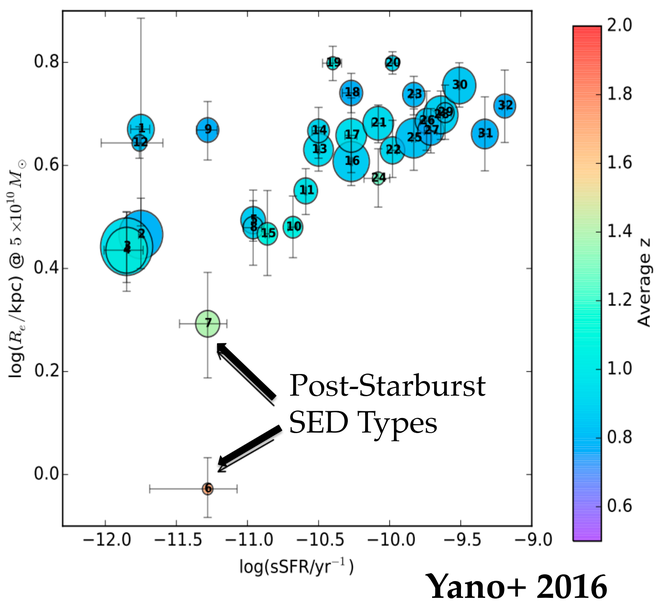
## Introduction & Background

Post-starburst galaxies: recently quenched galaxies, very rare in the local universe, dominated by A-type spectra

Post-starburst galaxies appear to be **smaller** than both star-forming and quiescent galaxies at similar masses and redshifts (Whitaker+ 2012, Yano+ 2016)

➡ These are half light sizes– will same trend show in half mass sizes?




**Yano+ 2016**

Possible mechanisms that can form compact quiescent galaxies: compaction, gas-rich major mergers, dissipational collapse

➡ Post-starbursts just quenched, so they are the ideal probe to test these scenarios

## Data

Galaxies from the **Newfirm Medium Band Survey** (NMBS; Whitaker+ 2011)
- Selection based on spectral shape (Kriek+ 2011)

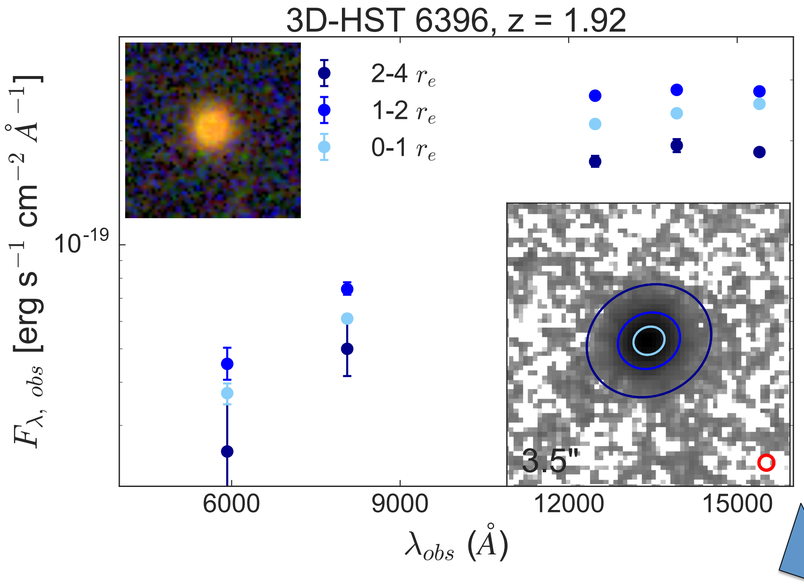
**CANDELS** (Grogin+ 2011) data and **3D-HST** (Brammer+ 2012; Skelton+ 2012) PSF-matched images let us measure photometry in annuli

## Methods

### 1. Measure flux in annuli

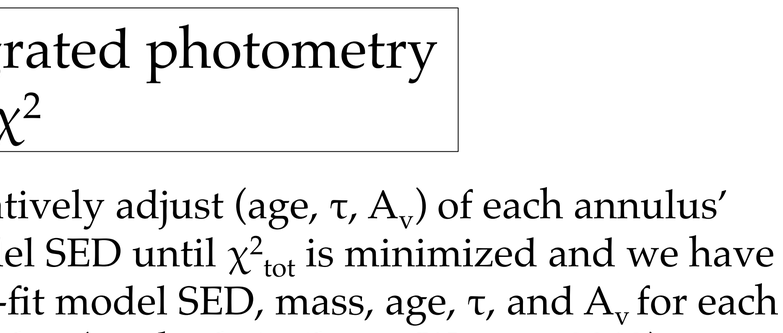
5 bands with resolved photometry; 39 bands with only integrated photometry

Annuli defined using 3D-HST GALFIT parameters convolved with HST PSF




### 2. Model SED for each annulus

Use Bruzual & Charlot (2003) models, FAST fitting code




The sum of all annuli SEDs does not match integrated photometry at long wavelengths

### 3. Adjust SEDs to better fit integrated photometry by minimizing total reduced $\chi^2$

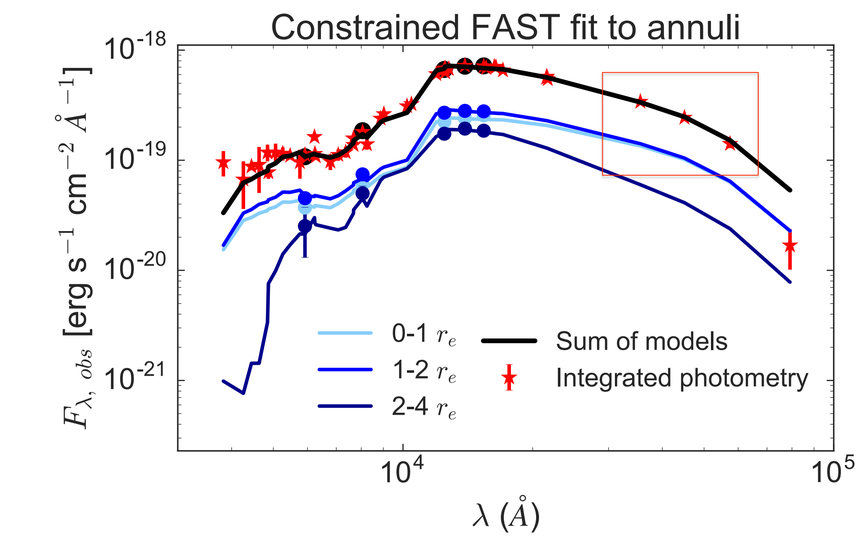
How well annuli SEDs fit resolved photometry + How well sum of annuli SEDs fits integrated photometry

$$\chi^2_{tot} = \frac{\chi^2_{FAST}}{\nu_{res}} + \frac{1}{\nu_{integ}} \sum_{j=1}^{N_{integ}} \frac{(F_j - \sum_{i=1}^{N_{res}} M_{i,j})^2}{E_j^2}$$

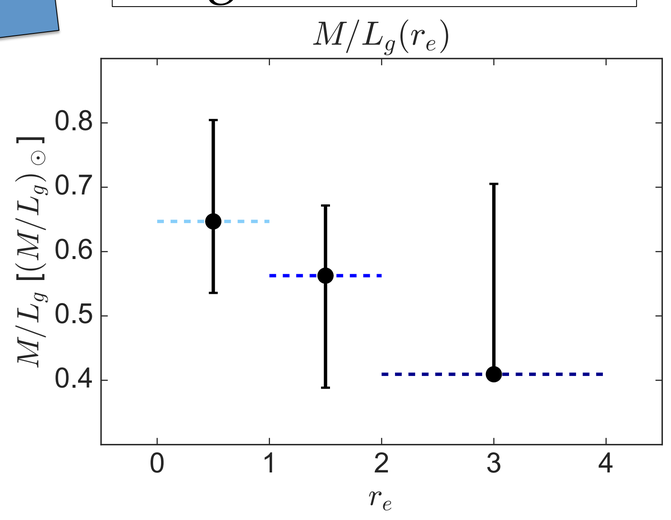
Measured flux in integrated filter

Sum of models at $\lambda$ of integrated filter

Iteratively adjust (age, τ, $A_v$) of each annulus' model SED until $\chi^2_{tot}$ is minimized and we have best-fit model SED, mass, age, τ, and $A_v$ for each annulus (method similar to Wuyts+ 2012)

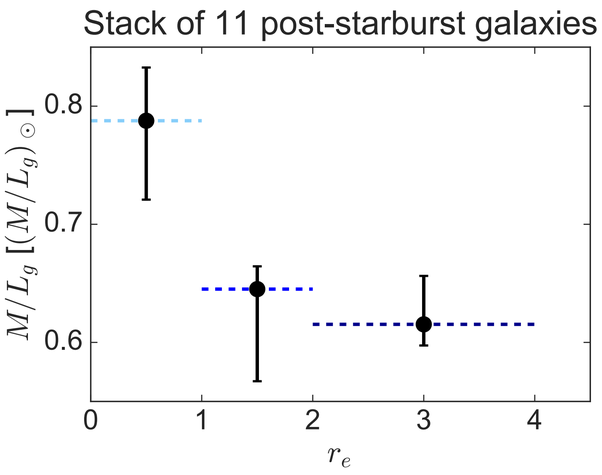



### 4. Measure mass-to-light ratio



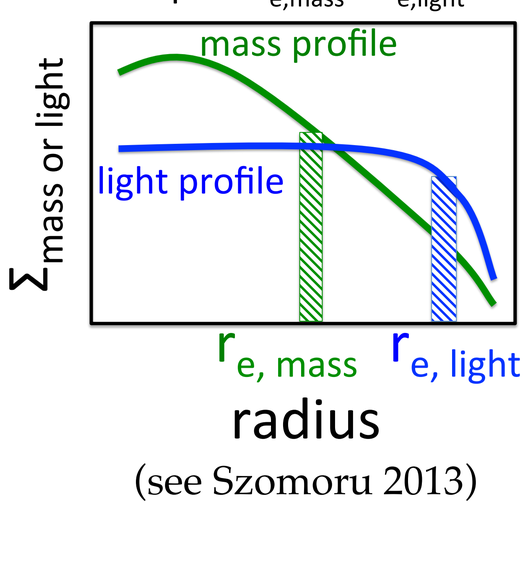

## Preliminary Results

Mass-to-light ratio **decreases** with $r_e$




Post-starburst galaxies may be **even smaller** than their half-light radii imply!

negative M/L implies $r_{e,mass} < r_{e,light}$




(see Szomoru 2013)

## Future Work

Select post-starburst galaxies from ZFOURGE (Straatman+ in prep; zfourge.tamu.edu)
- Deeper, covers COSMOS, CDFS, and UDS– more sky coverage means more post-starbursts to investigate, more galaxies in stack

Investigate mass-to-light gradients as a function of UVJ color
- How does M/L vary along the red sequence?

## References

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