

SDuGGLE Survey: Massive $z \sim 0.6$ Post-Starburst Galaxies Exhibit Flat Age Gradients

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We present Gemini GMOS IFU observations of six massive ($M_* \geq 10^{11} M_\odot$) A-star dominated post-starburst galaxies at $z \sim 0.6$. These galaxies are a subsample of the SQuGGLE Survey, which selects intermediate-redshift post-starbursts from the Sloan Digital Sky Survey spectroscopic sample (DR14) with spectral shapes that indicate they have recently shut off their primary epoch of star formation. Using $H\delta_A$ absorption as a proxy for stellar age, we constrain five of the galaxies to have young (~ 600 Myr) light-weighted ages at all radii and find that the sample on average has flat age gradients. We examine the spatial distribution of mass-weighted properties by fitting our profiles with a toy model including a young, centrally concentrated burst superimposed on an older, extended population. We find that galaxies with flat $H\delta_A$ profiles are inconsistent with formation via a central secondary starburst. This implies that the mechanism responsible for shutting off this dominant episode of star formation must have done so uniformly throughout the galaxy.

Post-starburst (PSB) galaxies: SED+A star

- 銀河が主要な星形成を止める物理を理解したい
- 近傍で観測されるものいくつかは“K+A”
- K starが支配的な年老いた銀河で星形成が起きてA starの特徴も見える
→ 銀河が初めてquenchingする段階ではない
- 特に近傍で観測されるmassiveなPSB銀河は“K+A”のようなものが多い

Intermediate-redshift PSBで星形成のPrimary epochのquenchingを理解する

SDuGGLE Survey: SDSS DR14からcolor-colorでPSBを同定
→ 広い探索領域によって、レアなA starが支配的なPSB銀河を見つけられる (Fig. 1)

GMOS IFUによる6天体の面分光観測でAge profile

- $z = 0.506 - 0.747$
- $\log(M)^* = 10.98 - 11.25$
- Ageは $H\delta_A$ で測定
- 5つ銀河で $r \sim 5$ kpcまで $H\delta_A > 7 \text{ \AA}$ のA-starが支配的な兆候
- 平均的なlight-weighted ageはflat Fig. 5

→ 近傍のPSBで見られる positive age gradientとは異なる

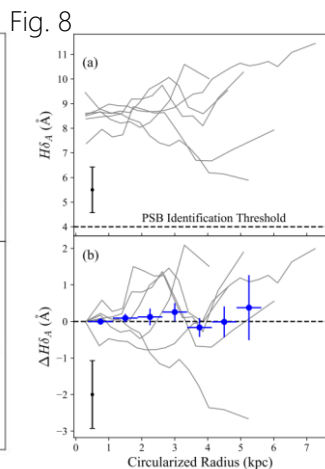
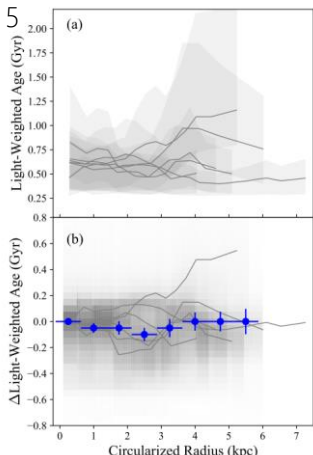
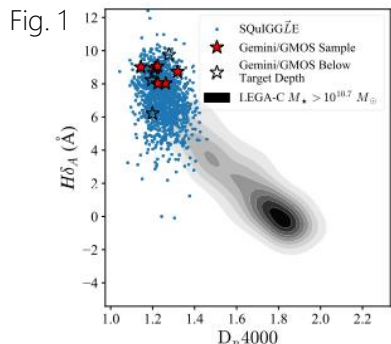


Fig. 6

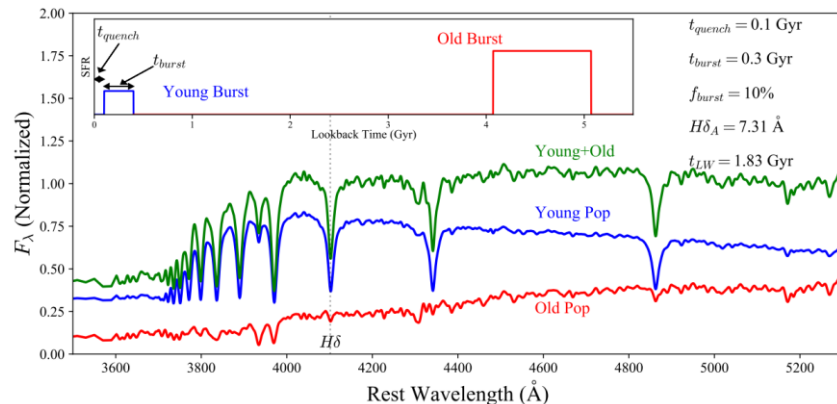
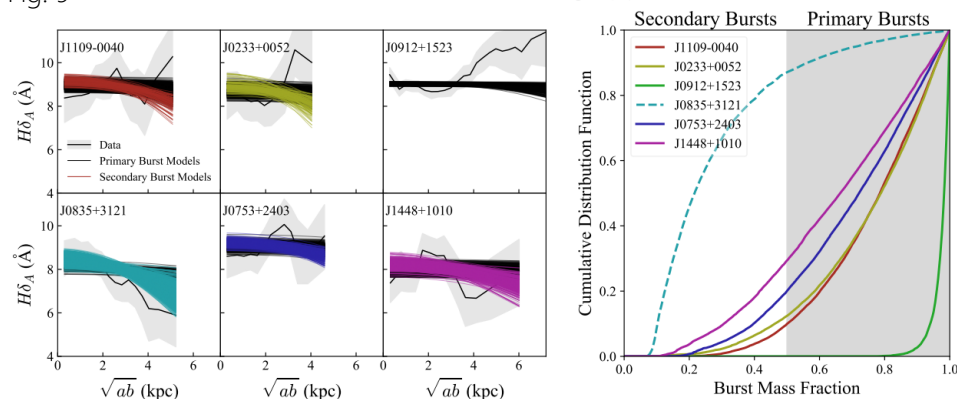


Fig. 9



中心のsecondary starburstが広がって見えているだけの可能性 (空間分解能が悪くなかった)

→ $z \sim 2$ でのold burst (disk)に若いcentral starburstを重ねてAge profileをフィッティング ($t_{\text{quench}}, f_{\text{burst}}, t_{\text{burst}}$)
→ 各銀河について($t_{\text{quench}}, f_{\text{burst}}, t_{\text{burst}}$)の事後確率分布が得られる
→ 一つを除き、 $f_{\text{burst}} > 0.5$ となるため central starburstだったとしても、primary epoch直後だと言える

- 今回の観測天体は primary epoch直後のPSB銀河か
- 空間分解能が悪いのは懸念点だが、そのような銀河はflat age gradientを持つかもしれない
→ 銀河全体で一様に星形成を終えるようなquenchingメカニズム

