Quiescent galaxies at $2<z_{spec}<5$: a spectroscopically-informed population study

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Context

Quiescent galaxies have been selected and studied extensively with large photometric surveys pre-*JWST*, but their properties at high redshifts remain uncertain.

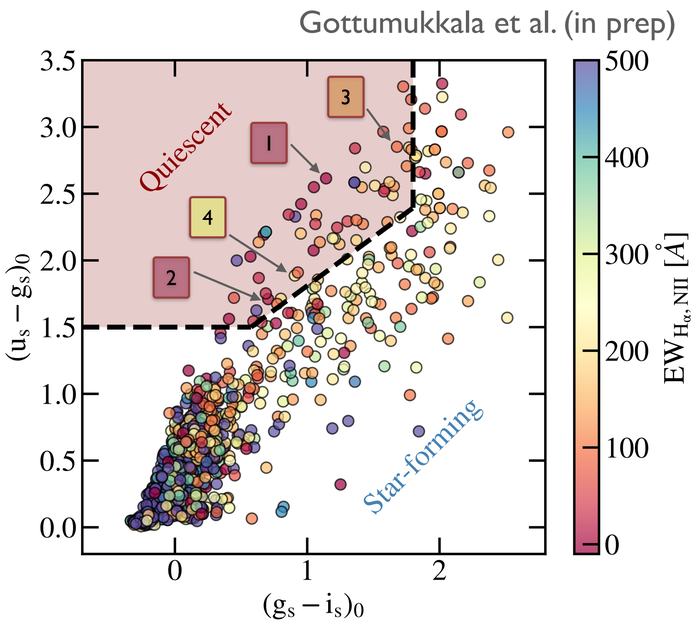
Scientific goal: spectroscopically derive continuum properties for quiescent galaxies at $2<z_{spec}<5$ with *JWST* NIRCam photometry and NIRSpec/PRISM spectroscopy.

Data and sample selection

Data: RUBIES (PID 4233, PIs: de Graaff and Brammer): *JWST*/NIRSpec survey of the UDS and EGS fields covering 150 arcmin².

Reduction: images reduced with `grizli` and spectra with `msaexp`; publicly available on the DAWN *JWST* Archive (DJA).

Gottumukkala et al. (in prep)



Selection: 1022 high-quality RUBIES spectra with $2<z_{spec}<5$ on the DJA.

Applying (ugi) colour-selection of quiescent galaxies (Antwi-Danso+23) results in 42 photometrically selected quiescent galaxies at $2<z_{spec}<5$.

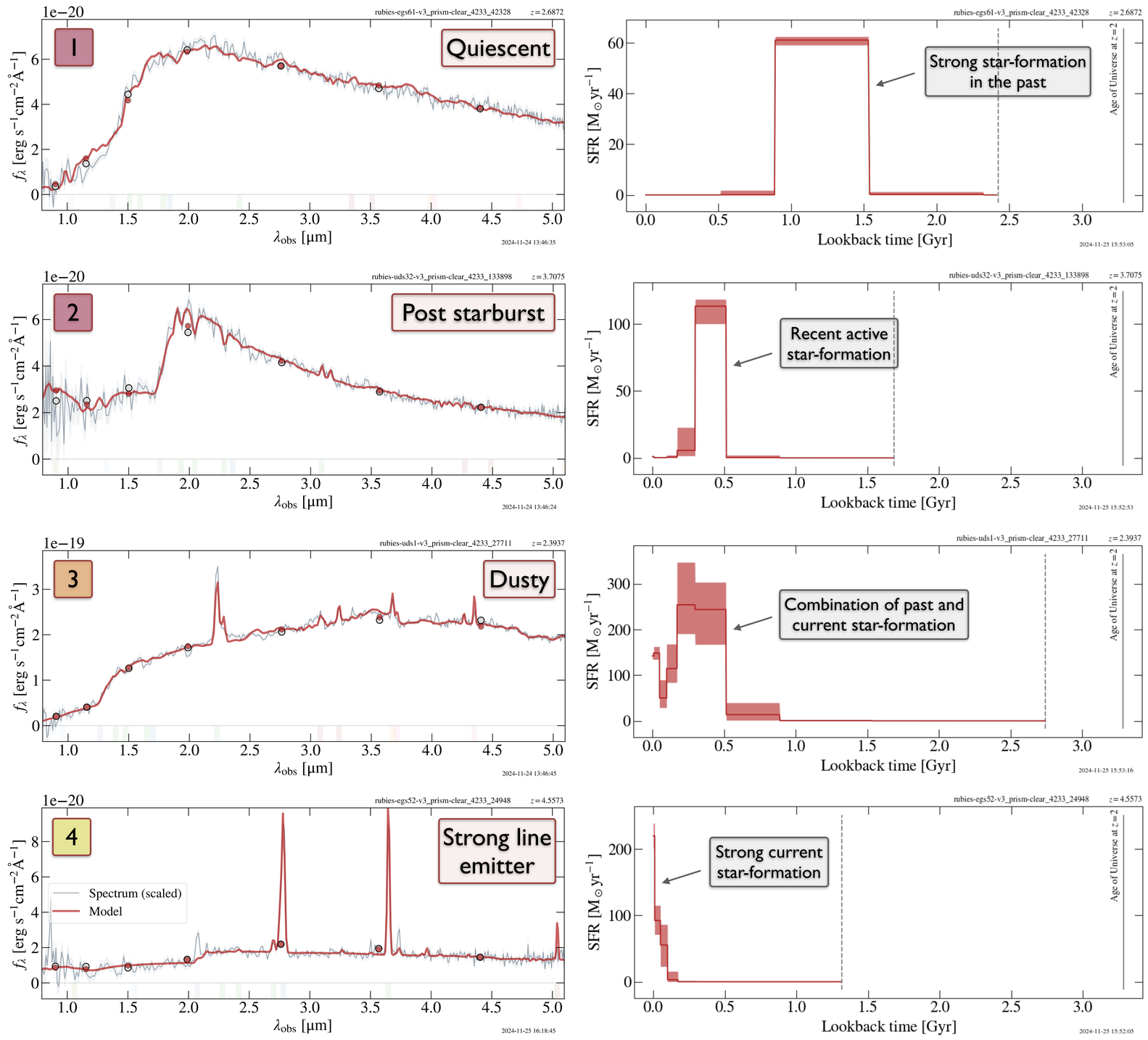
SED fitting

Joint spectrophotometric SED-fitting with BAGPIPES (Carnall+17) for 42 selected galaxies.

- Continuity non-parametric star-formation history (SFH)
- Kriek & Conroy (2013) dust law
- Uniform priors on logarithmic stellar mass and on metallicity

SEDs and star-formation histories

The SEDs and star-formation histories of colour-selected galaxies are diverse, including galaxies with strong star-formation in the past but also recent bursts.

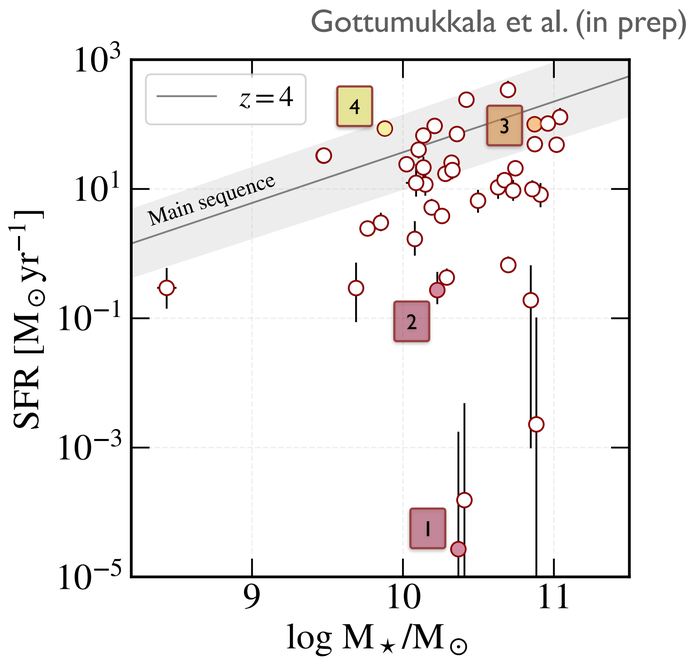


Gottumukkala et al. (in prep)

Photometric colour selection of quiescent galaxies includes spectroscopically confirmed star-forming and dusty galaxies with prominent emission lines in their spectra.

Galaxy main-sequence

Gottumukkala et al. (in prep)



22 out of 42 galaxies are indeed quiescent or post-starburst, but remaining 20 lie on the galaxy main-sequence and are actively star-forming.

Outlook

Expand this study to include SED modelling of star-forming, massive and dusty galaxies at $2<z_{spec}<5$ from various public *JWST* surveys to address the following:

- Recent star-formation histories of massive and quiescent galaxies
- Balmer break and D_n4000 strengths of dusty and quiescent galaxies
- Evolution of continuum properties of the galaxy population up to Cosmic Noon

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