Understanding the Transformation of Spirals to Lenticulars

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(Johnston, Aragón-Salamanca & Merrifield, 2014, MNRAS, 441, 333)

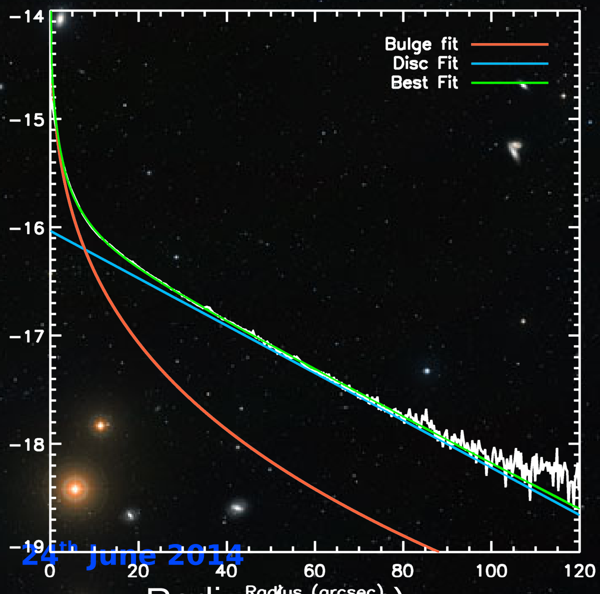
Transformation of Spirals to S0s

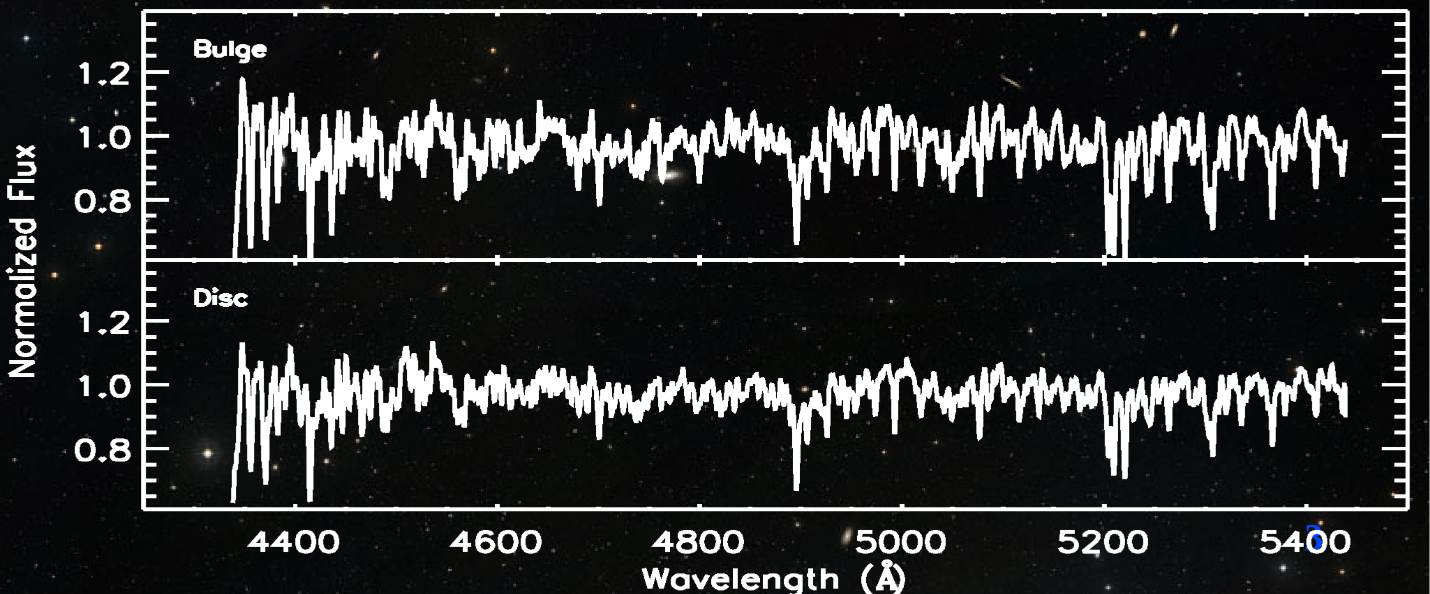
- To transform a spiral into an S0 you need to
  - Quench star formation in the disc
  - Increase bulge luminosity

- But the exact sequence of events leading to the transformation is still uncertain.
- Therefore, we need to study the independent star formation histories of the bulges and discs

Spectroscopic Bulge-Disc Decomposition

- Obtain a good quality long-slit spectrum of a galaxy
- Decompose light profile at each wavelength
- Integrate to get total light of bulge and disc for that wavelength bin
- Plot against wavelength to obtain high-quality spectra representing purely the bulge and disc light.





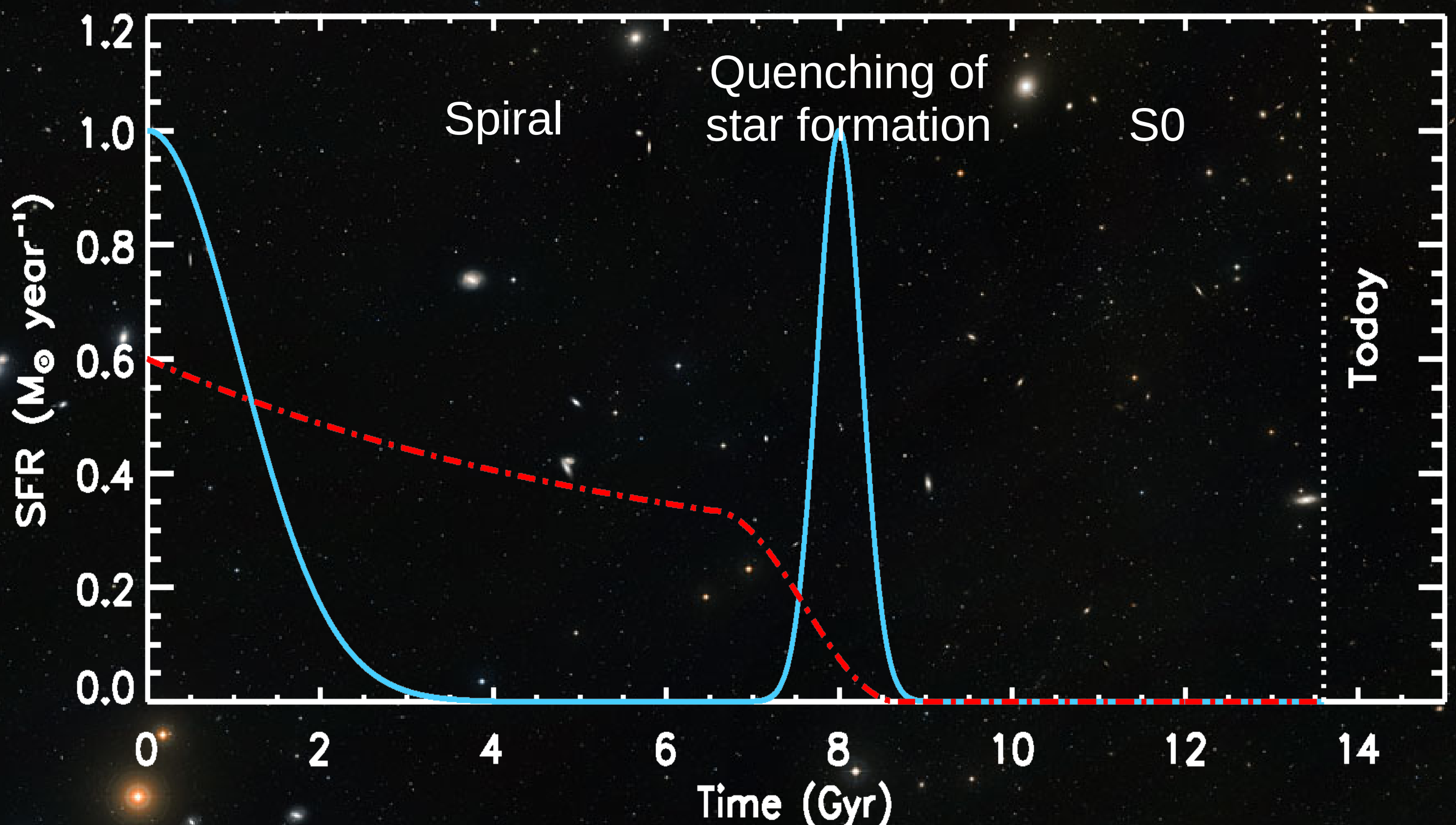
Transformation of Spirals to S0s

1. Disc undergoes continuous SF until quenching begins

2. During quenching, Fe-enriched gas is dumped in the central regions

3. Bulge undergoes a final SF event, using up the dumped disc gas and truncating all SF in the galaxy

4. After all SF has been quenched, the spiral galaxy transforms into an S0



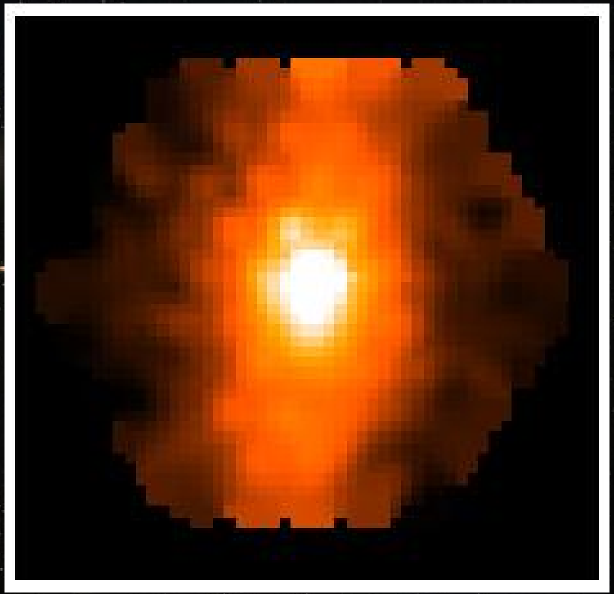
Note:

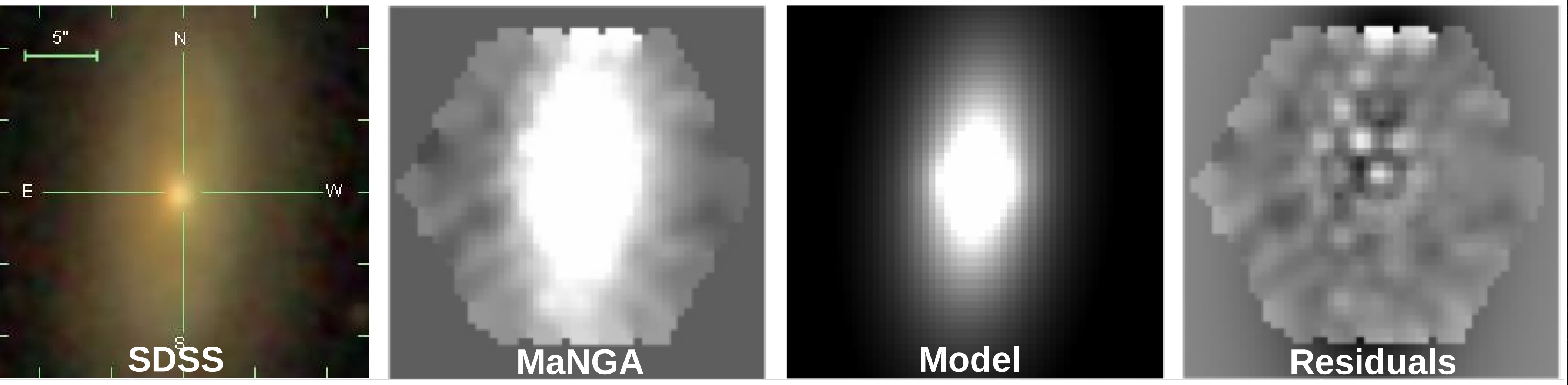
The following results are very preliminary and use many assumptions. They should be considered as a proof of concept only.

PRELIMINARY

Steps to decompose IFU spectra

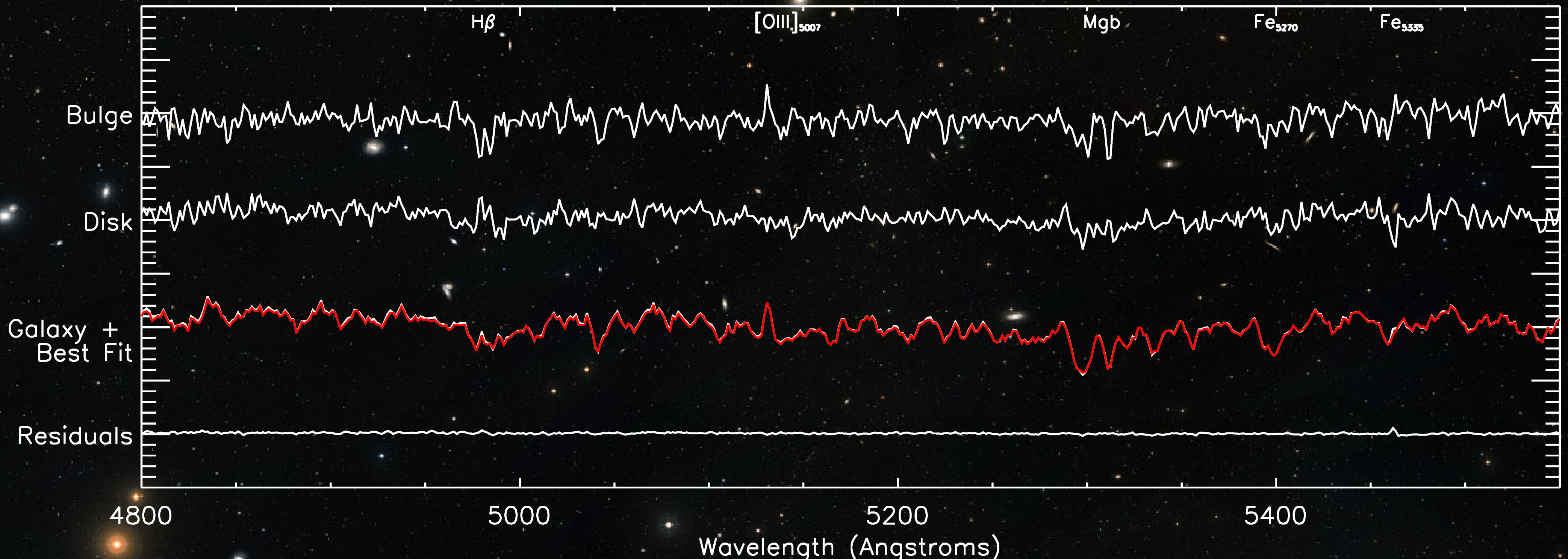
- Bin the data cube into a series of high S/N images, and decompose with GALFITM (Haeussler et al, 2013; Vike at el, 2013) to see how parameters vary with wavelength.
- Print off image slices at each wavelength from the IFU datacube, and decompose with GALFIT (Peng et al, 2002).





Steps to decompose IFU spectra

- Plot the integrated luminosity of each component against wavelength to get its one-dimensional decomposed spectrum.
- Use GALFIT to recreate images of subcomponents at each wavelength, and combine into data cubes for bulges and discs.



Come find me or my poster if you want to know more.