Pixel Colour-Magnitude Diagram Analysis of the Fornax Cluster using S-PLUS images (Part II)

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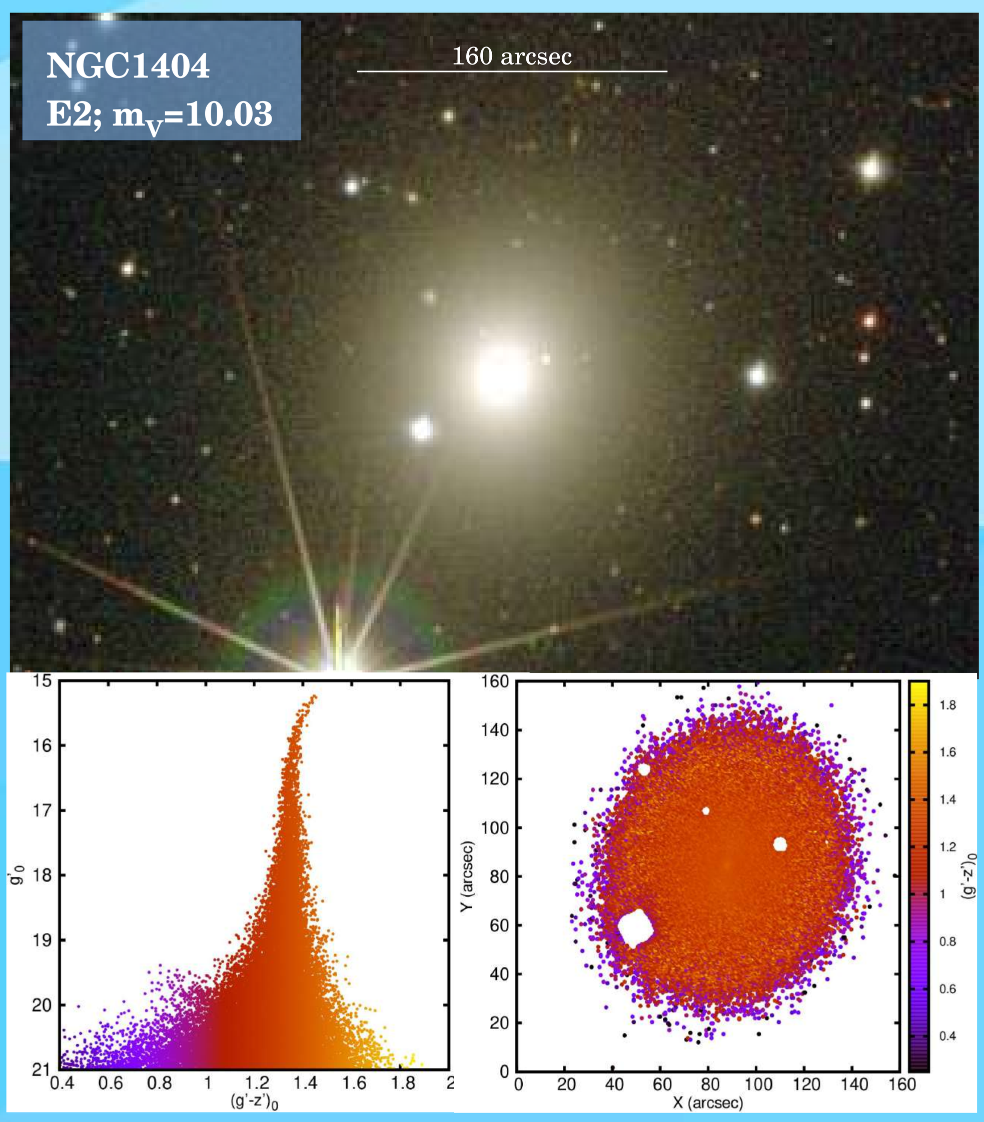
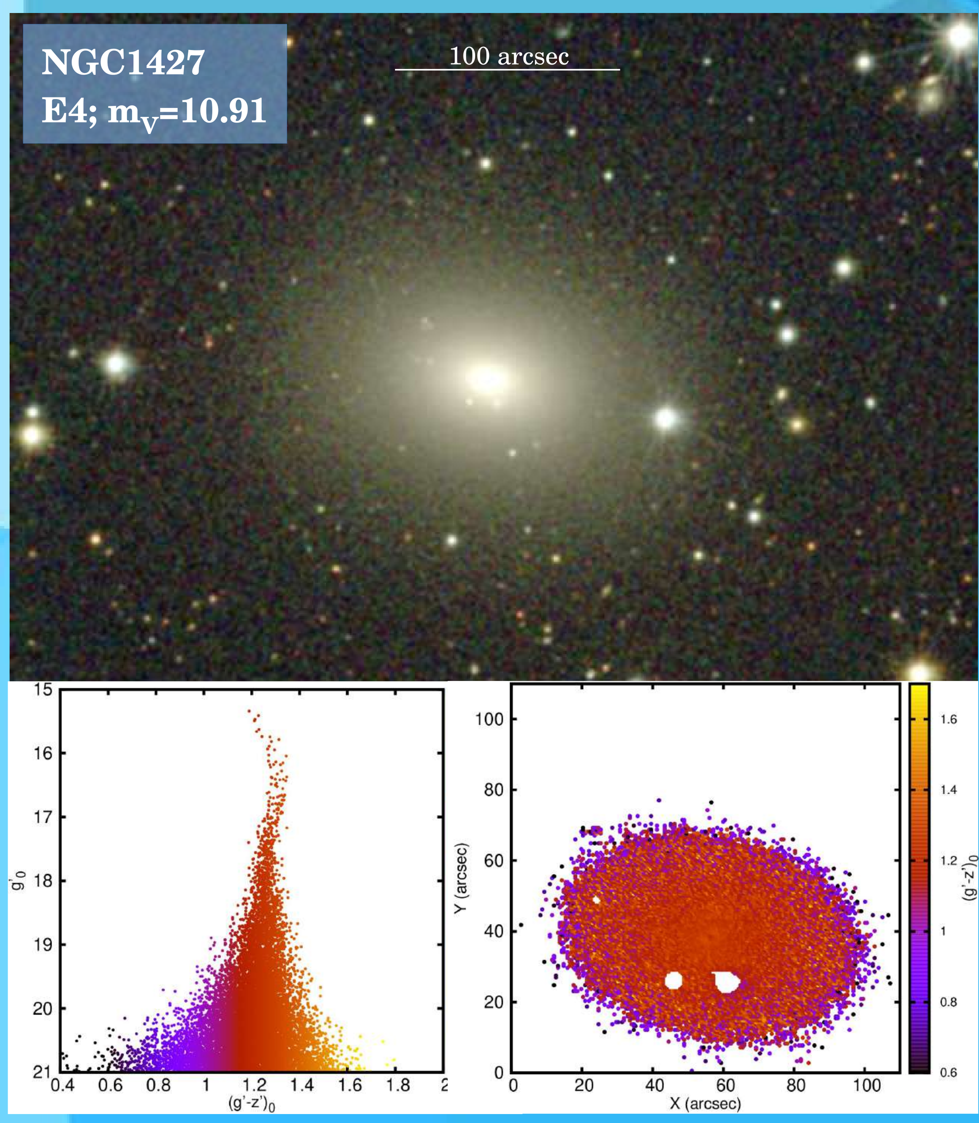
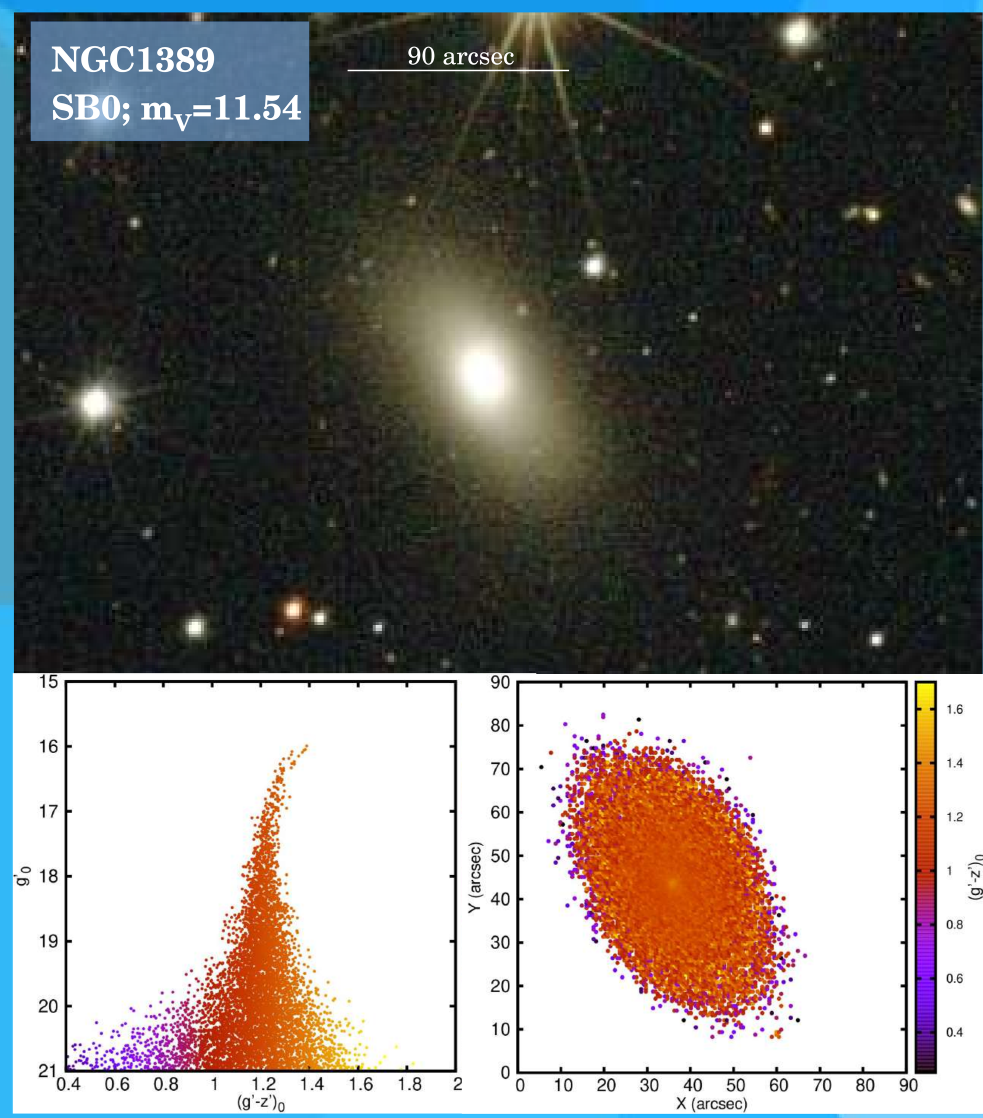






ELLIPTICAL GALAXIES

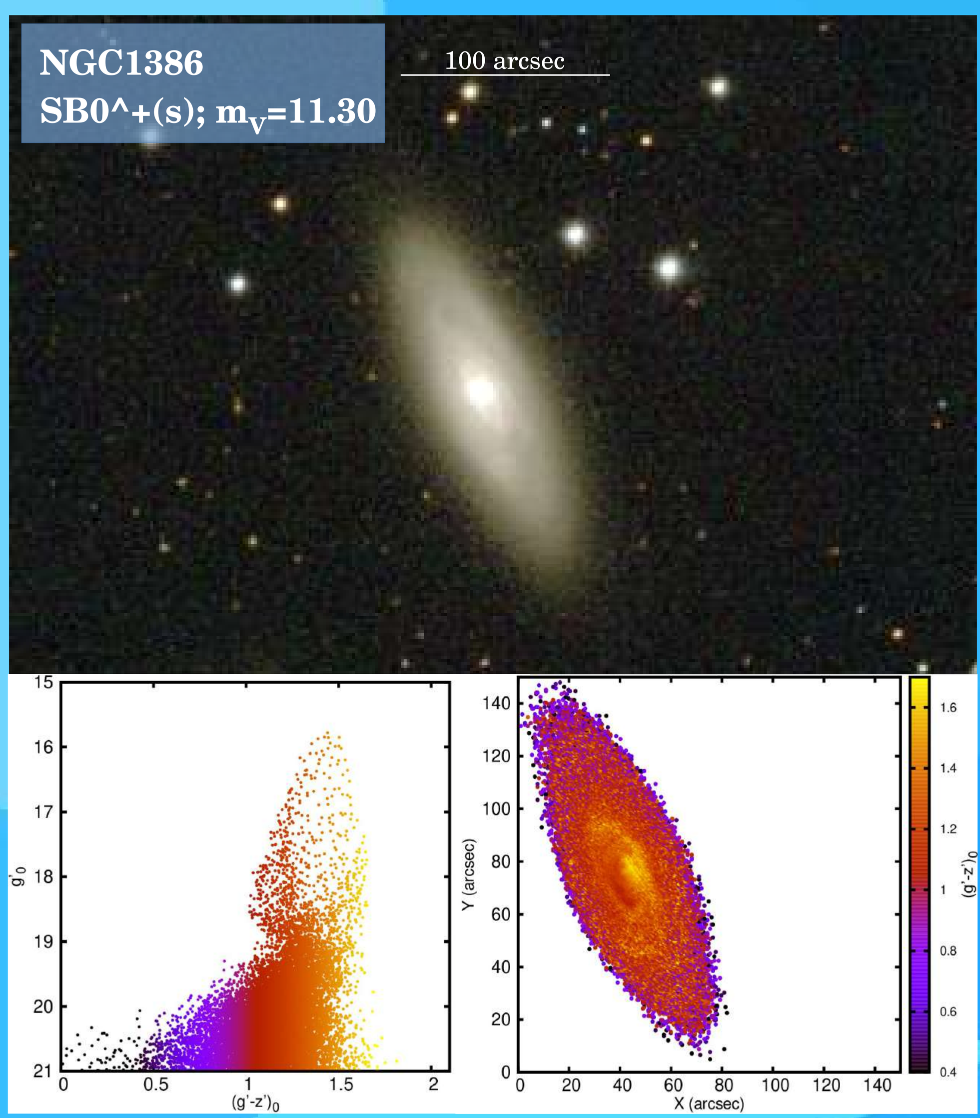
The pCMDs of the ellipticals display a narrow '**main sequence**' in the colour-magnitude relationship. This is expected mainly due to the homogeneity in its structure and stellar populations.

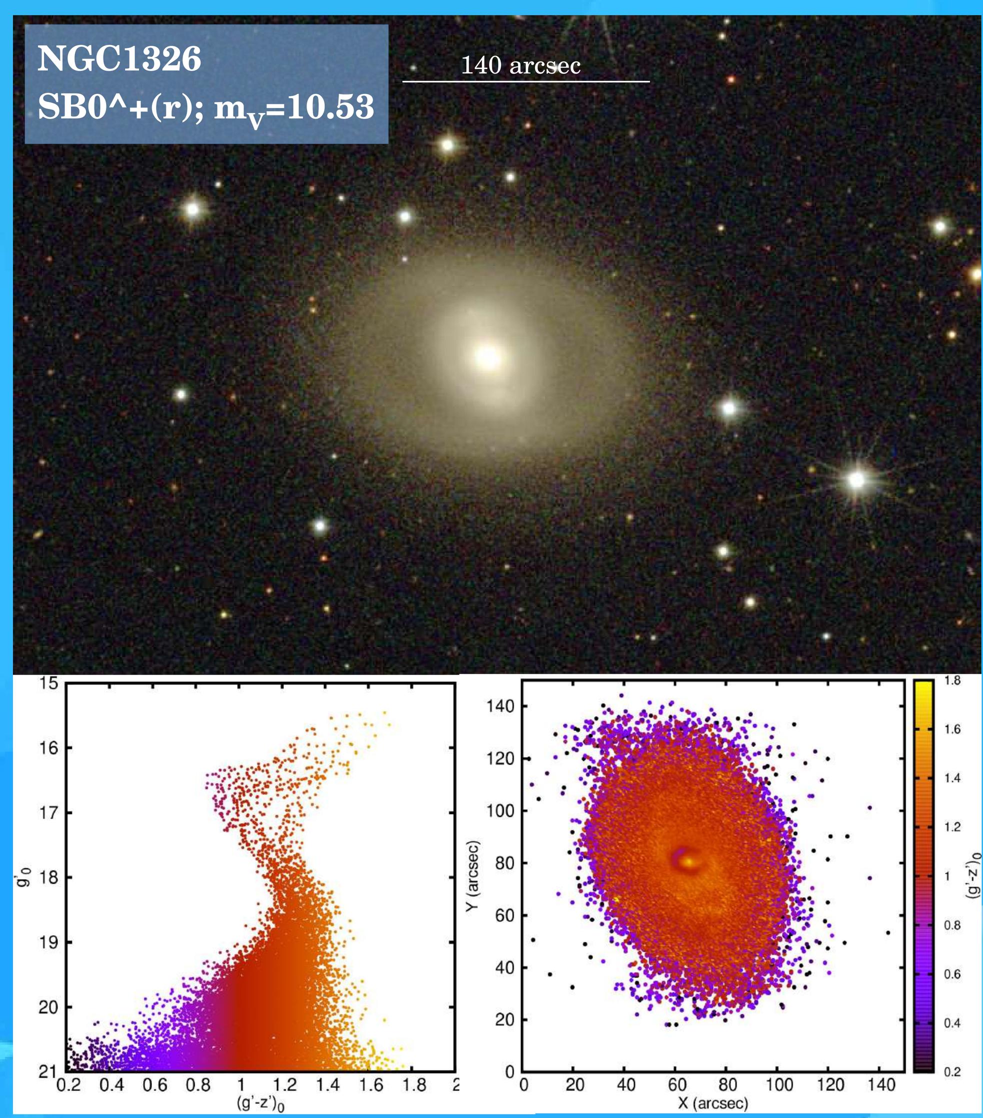
LENTICULAR GALAXIES

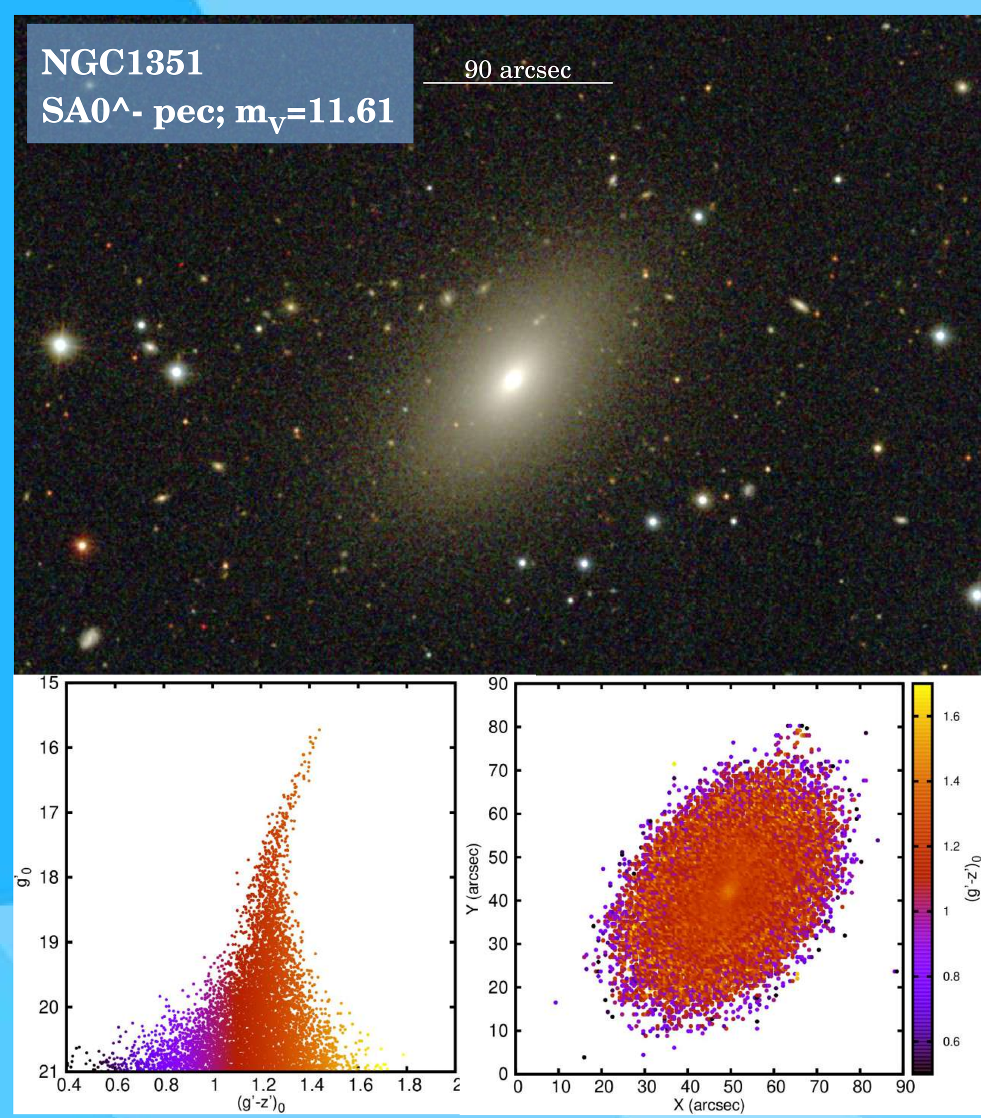
The S0 galaxies show pCMDs with properties resembling those of the ellipticals but with subtle differences. Generally, the spread in colour looks slightly greater than that of ellipticals. This is probably due to the presence of dust, disks and/or rings in these galaxies.

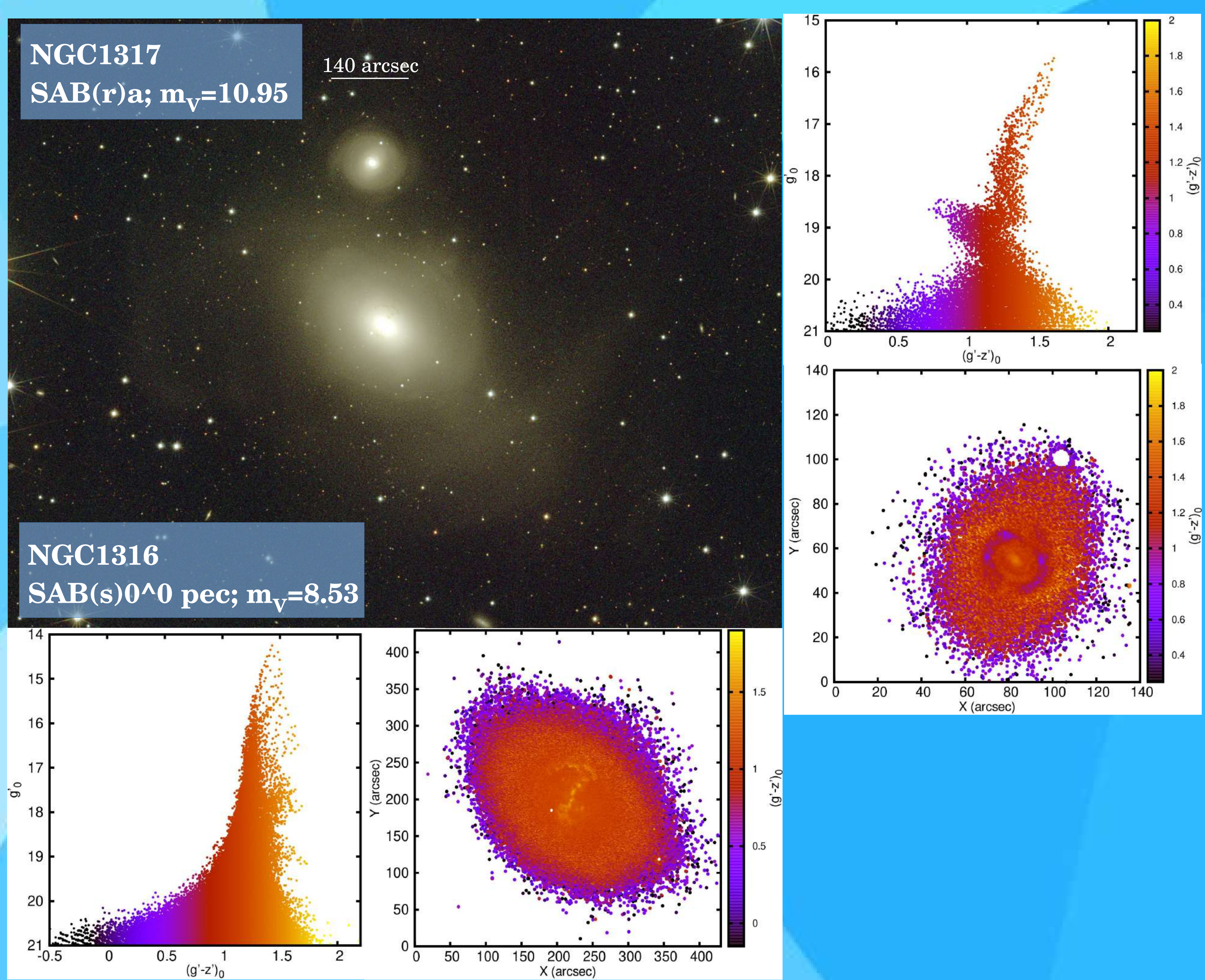
MID- to LATE-TYPE GALAXIES

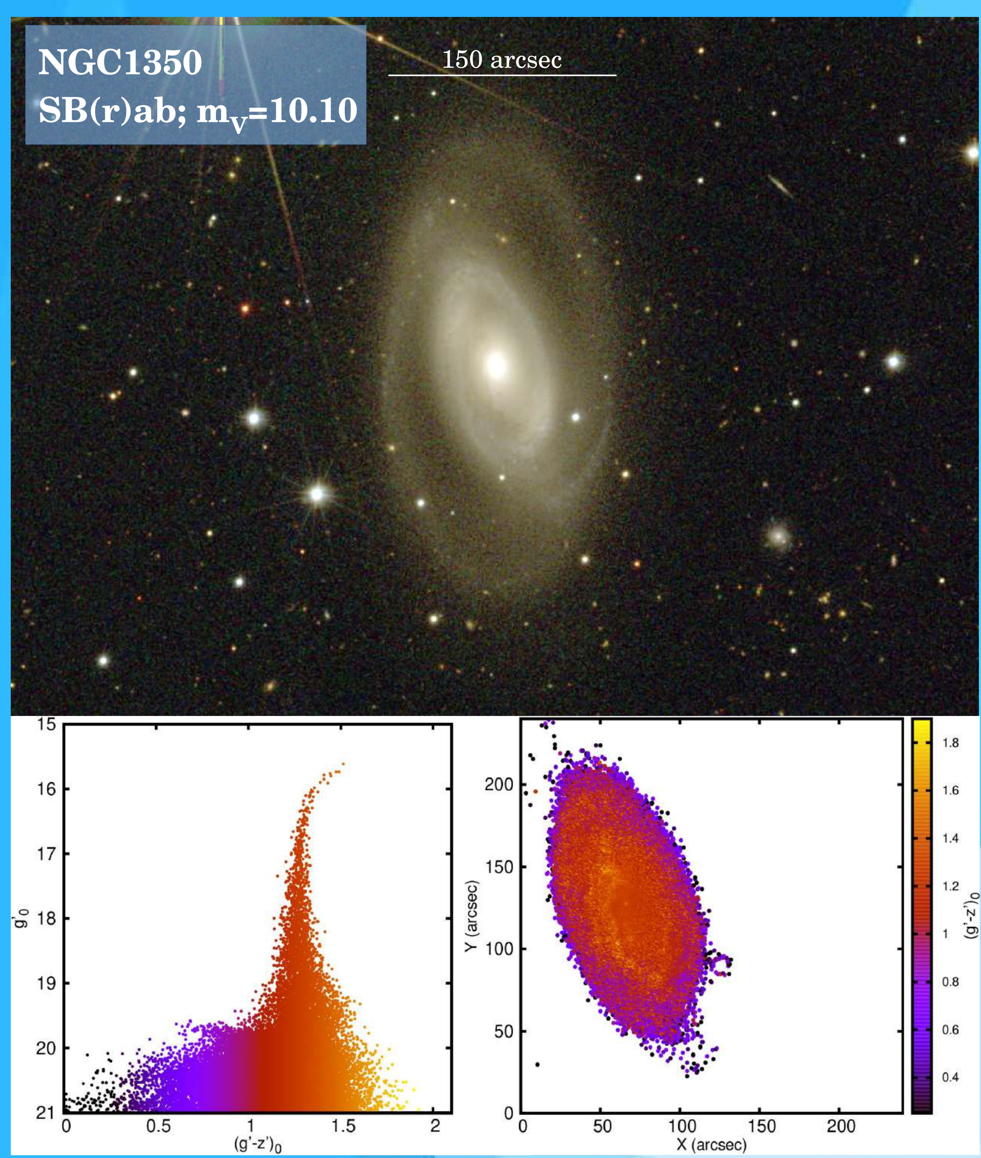
The mid- and late-type galaxy pCMDs differ from that of the early-type galaxies. The average colour position on the pCMD is bluer than that of the early types and has a larger colour gradient. The colour spread is greater than in E and S0 galaxies, showing different structures associated with spiral arms and star-forming regions.

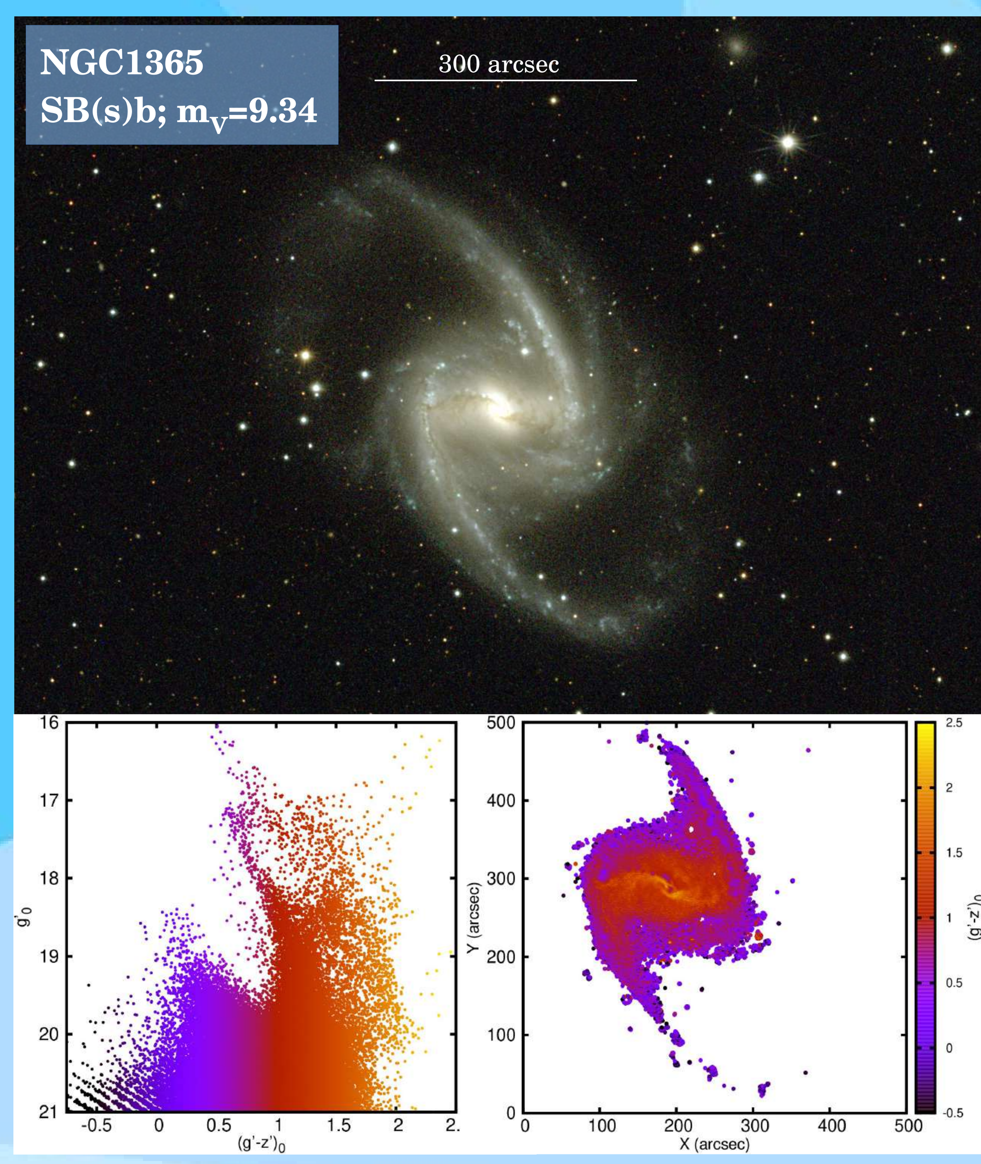






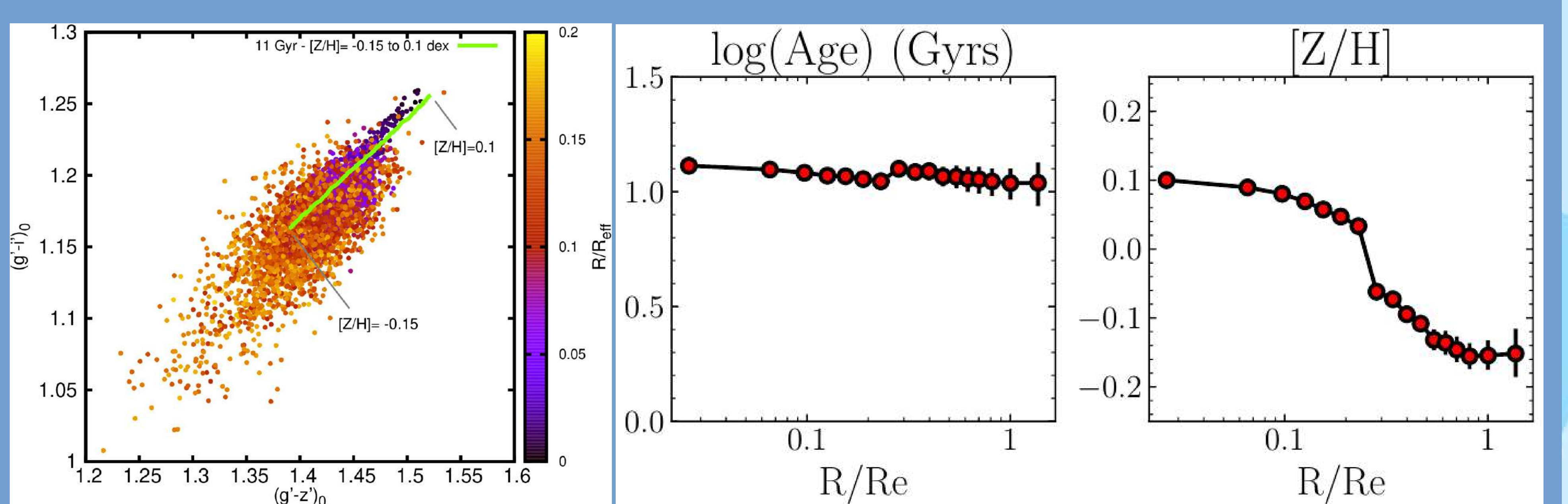






pCCD and Stellar Populations

The use of these pCCDs can serve as a powerful tool to study the stellar population of objects that are not close enough to resolve their individual stars. While the light in the individual pixel may be due to a mixture of different stellar populations, it is a good first step to compare them with simple stellar populations (SSPs), and then try to obtain luminosity-weighted mean properties. Based on this, it is possible to estimate age and metallicity in each pixel by comparing their colours with population synthesis models. While it is known that this type of analysis is affected by the age-metallicity degeneration, the different combinations of filters (broad-band and narrow-band filters) present in S-PLUS, will help to obtain more accurate results. As an example, the pCCD of the central region of NGC1399 is shown together with the good agreement of the PARSEC SSP model of 10 Gyr and metallicities -0.15<[Z/H]<0.1 dex (Bressan et al. 2012). This model was chosen based on the spectroscopic study of Vaughan et al. (2018) (central and right panels).



References

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