

A whole lot of nearby galaxies

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An enormous number of galaxies are shown, in the context of their intrinsic and environmental properties.

Description

Each of 25 panels shows a 15×15 grid of galaxy images, sorted by one measured property (the 5 panels on the diagonal) or a pair of properties (the 20 panels off the diagonal).

Each galaxy image is a $40 \times 40 h^{-2}$ kpc² (at the redshift of the galaxy) true-color representation of the Sloan Digital Sky Survey (SDSS; York *et al.* 2000) g , r , and i bandpass images of the sky. The target galaxy lies at the center of each small image.

Beware that the target galaxy at the center of each panel is not always the brightest source visible in the panel.

The RGB images are made with color-preserving nonlinear stretches (Lupton *et al.* 2004, Wherry *et al.* 2004) such that the low intensity parts of the images are a linear, true-color intensity map, and the high intensity parts of the images are true-color color maps with some monotonic intensity information. The image colors have in some cases been slightly affected by Galactic reddening.

The organization of the images is based on five galaxy properties: (1) the absolute (Petrosian) magnitude $M_i - 5 \log_{10} h$ in the K -corrected zero-redshift i band, (2) the rest-frame $[g-r]$ color, (3) the half-light Petrosian central surface brightness μ_i in the K -corrected zero-redshift i band, (4) the concentration $[R_{90}/R_{50}]$ in the observed i band, and (5) the environmental overdensity δ of galaxies surrounding the galaxy in a comoving conical section of radius $1 h^{-1}$ Mpc and radial velocity separation of 1000 km s^{-1} . Details are presented elsewhere (Blanton *et al.* 2005a)

Beware that the photometry, even for very non-circular galaxies, is performed through circular apertures, so that in detail the magnitudes and surface brightnesses have small dependences on axis ratio.

Also beware that some galaxies in very close (*i.e.*, overlapping) pairs have small “deblending” errors which lead to incorrectly assessed surface brightnesses, colors, or concentrations.

At each location in each image grid, the galaxy has been chosen (from among all the galaxies with properties in the range marked by the image edges) randomly from the “low redshift catalog” of the NYU Value-Added Galaxy Catalog (Blanton *et al.* 2005a, 2005b), with probability proportional to contribution to the cosmic luminosity density in the K -corrected i band (*i.e.*, proportional to L_i/V_{max}). The galaxies in this subset of the SDSS are all closer than $150 h^{-1}$ Mpc.

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Impressions and results

Color is a very good predictor for morphology; better even than concentration (a commonly used morphology surrogate).

The reddest galaxies are edge-on disks. Red, non-concentrated galaxies are also primarily edge-on disks.

At fixed color there is no apparent morphology-density relationship, in good agreement with recent quantitative results (*e.g.*, Blanton *et al.* 2004).

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