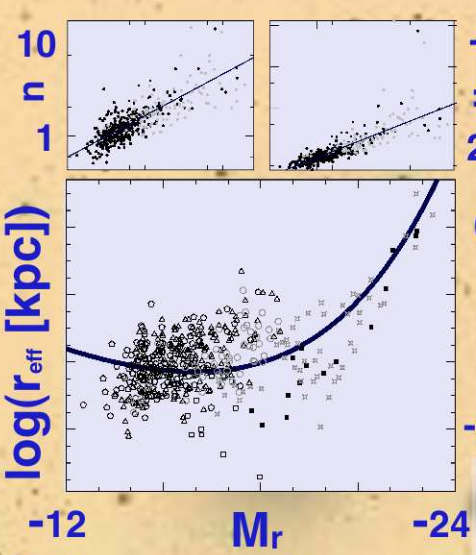
A continuum of structure and stellar content from Virgo cluster early-type dwarfs to giants?

Joachim Janz[1,2,*] & Thorsten Lisker[2]

[1]Astronomy Division, Department of Physical Sciences, University of Oulu, Finland
[2]Astronomisches Recheninstitut, Zentrum für Astronomie der Universität Heidelberg, Germany
*Fellow of the Gottlieb Daimler and Karl Benz Foundation

Structure



Brightness versus Size and the implication of continuously varying light profile shapes

Early-type dwarfs and giants?

Their relation is keenly debated in the course of the last decades and is commonly discussed on the basis of scaling relations. We present the relation between size and brightness and the colour magnitude relation of the early types in the Virgo cluster.

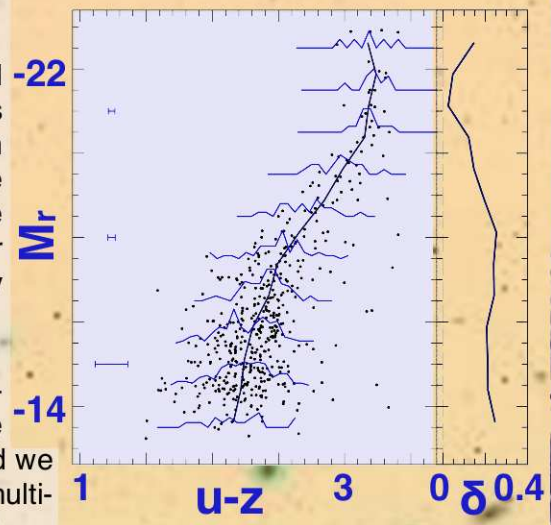
Sample and Data

Our sample is based on Binggeli's Virgo Cluster Catalogue (complete down to $M_B < -13$ mag) and we make use of the homogeneous multi-wavelength imaging data of the SDSS.

Analysis

In both analysed fundamental scaling relations we find deviations from a simple joint behaviour of dwarfs and giants:

Colour



Colour Magnitude Relation and the intrinsic scatter

A curved relation is expected from the known variations of light profiles parametrized with the Sérsic profile *(top panels)*. However, dwarfs and giants depart from this predicted relation *(bottom panel, blue line)* to opposite directions when approaching similar brightness.

The colour magnitude relation is not linear over the whole brightness range. Moreover, the *intrinsic* scatter about the mean relation (measured by the RMS difference of the observed scatter and photometric error) increases towards fainter magnitudes and peaks around $M_r \sim -18$ mag.

no simple joint behaviour

BUT

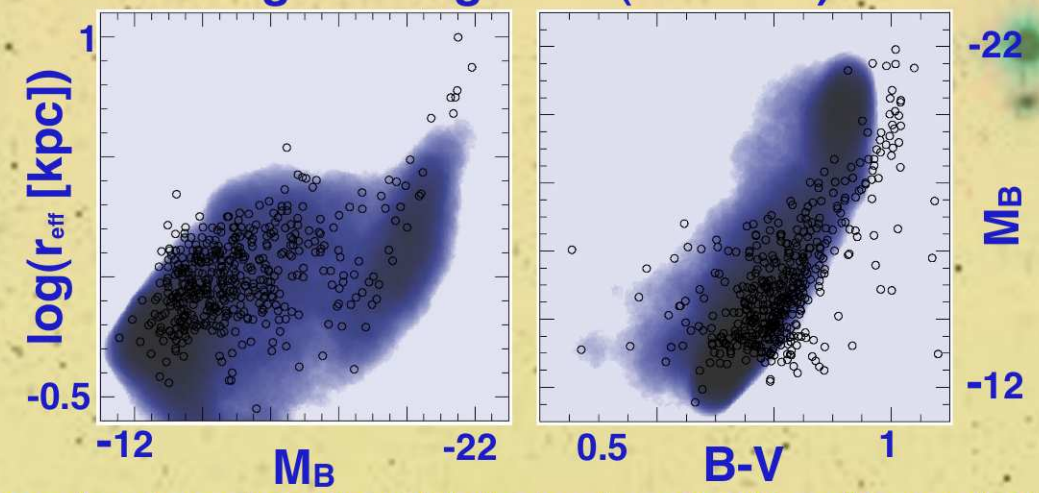
Implication of the complex behaviour?

At first glance, our findings might seem to support the idea of dwarfs originating from transformations of other galaxy types, such as the popular dwarf formation scenarios ram pressure stripping or harassment. Nevertheless, a comparison of the two observed relations to a semianalytic model of galaxy formation in a ΛCDM universe shows a different possibility: even the very same processes shaping dwarfs along with their giant relatives could reproduce the observed complexity.

no simple joint behaviour

BUT

Cosmological Origin for (some of) them?



Comparison to semianalytic model of galaxy formation (Nagashima et al. 2005)

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