

The Last Stages of Star Formation in dEs?

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Abstract. A significant fraction of Virgo cluster early-type dwarf galaxies have blue central colours caused by recent or ongoing star formation. A spectral analysis shows that even in their centers, stellar mass is dominated by an old population. These galaxies are an unrelaxed cluster population that possibly formed from morphological transformation of late-type galaxies.

Keywords. Galaxies: dwarf, galaxies: evolution, galaxies: clusters: individual (Virgo)

While early-type dwarf (dE) galaxies are typically considered not to have recent or ongoing star formation, the well known Local Group dE NGC 205 does exhibit central star formation, gas, and dust. We identified 23 similar dEs (Fig. 1; Lisker *et al.* 2006) among our dE sample of 476 certain or possible Virgo cluster members that are covered by the Sloan Digital Sky Survey (SDSS) Data Release 4 (Adelman-McCarthy *et al.* 2006) and are listed in the Virgo Cluster Catalog (VCC, Binggeli *et al.* 1985). These dEs with blue centers (“dE(bc)s”) reach a number fraction of $> 15\%$ among the brightest ($B < 15$) dEs. Their gas content is smaller than that of dwarf irregulars (dIrrs), but somewhat larger than that of “classical” dEs. Since the dE(bc)s are an unrelaxed cluster population, and since even in their centers, young stars make up only a few percent of the stellar mass (Lisker *et al.* 2006), we may be seeing the final stages of the morphological transformation of infalling, formerly gas-rich galaxies, possibly caused by tidally induced star formation in dIrrs (Davies & Phillipps 1988) or similar mechanisms.

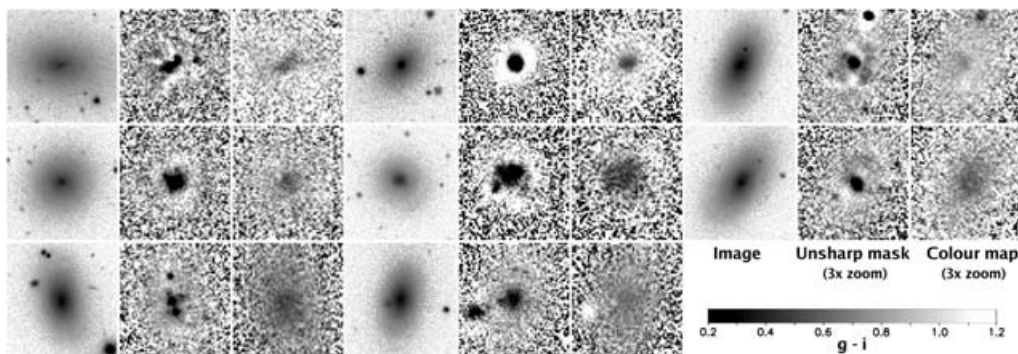


Figure 1. Virgo cluster early-type dwarfs with recent or ongoing central star formation. For each galaxy, the combined image from three SDSS bands (g , r , and i) is shown (left), along with an unsharp mask image (middle) and a $g - i$ colour map (right). The galaxies are, from left to right and from top to bottom: VCC 0170, 1512, 0781, 0173, 0281, 0870, 0021, 1488.

References

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