

NGC 5044-N50: A LINK BETWEEN BLUE COMPACT GALAXIES AND DWARF ELLIPTICALS*

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Abstract

We present new optical observations of the dwarf galaxy N50 in the NGC 5044 Group, showing that this object is probably at an intermediate $BCD \rightarrow dE$ evolutionary stage, after a relatively recent burst of star formation.

The possible connection between dwarf elliptical (dE), dwarf irregular (dI), and blue compact dwarf (BCD) galaxies is matter of sustained interest because of its implications in studies of galaxy evolution at low redshift (Doublie et al. 1999).

In this regard, we present here new optical observations of the dwarf galaxy N50, classified as $dE pec, N/BCD ring$ in the NGC 5044 Group catalogue of Ferguson & Sandage (1990). While its integrated colors are consistent with a fully normal dE , its surface brightness profile shows, on the contrary, some peculiarity compared with ellipticals of similar absolute luminosity (Cellone 1999).

Direct imaging was obtained with the ESO 3.6 m telescope at La Silla (Chile), under sub-arcsec seeing conditions, in the Gunn g, r, i, z system. A ring of bright knots appears surrounding the nucleus, out to a $3''.5$ ($\sim 400 h_0^{-1}$ pc) radius (Fig. 1, *left*).

Fig. 1 (*right*) compares N50 integrated colors (big open dot) with the locus of main sequence stars (“ \star ” markers), and with Buzzoni (1998) 15 Gyr galaxy

*Based on observations taken at ESO Observatory, La Silla (Chile)

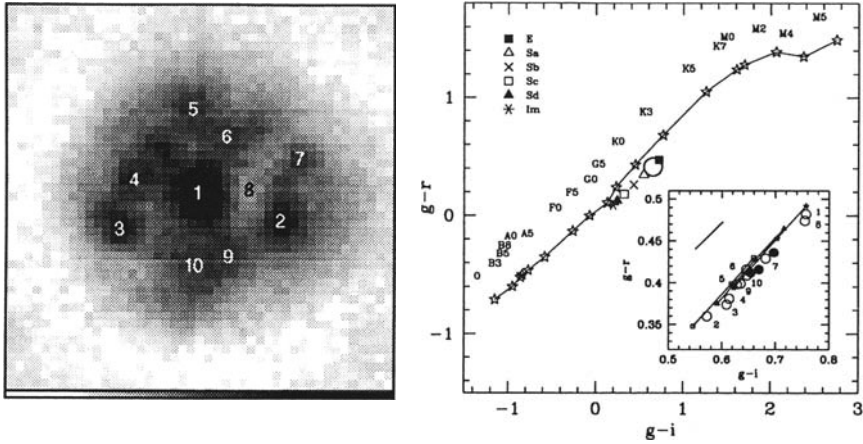


Figure 1. Left: Central $15'' \times 15''$ ($1'' \simeq 110 h_0^{-1}$ pc) g band image of N50 (after subtraction of main component), with knotty structures numbered. Right: Results of Gunn system aperture and selected knots photometry.

models for different Hubble types. N50 integrated colors [i.e. $(g - r) = 0.41$ and $(g - i) = 0.65$] appear to be intermediate between those of E and Sa galaxies, with the main bulk of stars consisting of a 10-15 Gyr old population with slightly sub-solar metallicity ($[Fe/H] \simeq -0.2$). Aperture photometry (solid dots, *insert panel*) and bright knots colors (open dots) match the Buzzoni (1989) simple stellar population models. Ages ~ 5 Gyr are inferred for the bright knots, while a mild radial metallicity gradient is also evident.

This composite stellar population is indeed affecting the morphology of N50 with no significant perturbation of its spectral energy distribution. While this galaxy did likely share much of the nE BCD features, like e.g. in Mrk 996 (Thuan et al. 1985), its current photometric properties rather point to a later evolutionary scenario with the galaxy fading to become a (nucleated?) dE .

References

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