

A Spectrophotometric Investigation of Dwarf Elliptical Galaxies

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Abstract.

Spectrophotometry of compact (M32-like) dwarf ellipticals (dE) and nucleated dwarf ellipticals (dE,N) in the Virgo and Fornax clusters has been used to investigate the stellar populations of these two types of dwarf galaxy and their relation to larger ellipticals.

The compact dwarf ellipticals have colors and Mg line strengths comparable to much brighter ellipticals yet have much lower central velocity dispersions. They have somehow managed to achieve high metallicities without the deep gravitational potentials of larger ellipticals. A striking example is the comparison of VCC 344 (Binggeli *et al.* 1985) with NGC 4472 which have identical Mg strength but their central velocity dispersions differ by a factor of 3-4. The structure of compact dE's has been attributed to tidal stripping by a large neighbor, as in the case of M32 and M31 (King 1962; Faber 1973). Arguments against this process have been presented by Nieto & Prugniel (1984). Tidal stripping does seem implausible in some circumstances where the Mg strength of the dwarf implies that it was as large or larger than its companion or when the dwarf exists in relative isolation as in the case of VCC 1627.

The nucleated dwarfs have relatively low Mg strength, similar to metal-rich globular clusters. Yet their 4000Å break is too small for their Mg strength compared to metal rich globular clusters. This can be interpreted as due to young or intermediate age populations, consistent with previous photometric studies and some limited spectroscopy (Caldwell & Bothun 1987, Zinnecker & Cannon, 1985, Mould & Bothun 1988). At least one dE,N in the present sample has a blue, strong Balmer line population and OII 3727 emission in its inner nucleus and a redder, weaker Balmer line population outside this region. This can be due only to a very young population, perhaps even ongoing star formation and suggests a rather recent origin for the nuclei. The similarity in appearance between the dE,N's and local group member NGC 205 (Zinnecker & Cannon 1985) may extend to their stellar content and star formation histories.

References

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