

Physical Properties of Nearby Dwarf Elliptical Galaxies

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Abstract. Most dwarf elliptical galaxies except for 'dE,N' galaxies which are characterized by young stellar populations in the nuclear regions are located in the high density environment. The colors and spectra of 'dE,N' galaxies are different from other types, in the sense that they have redder colors with little emission lines. The majority of dwarf elliptical galaxies are younger than 7 Gyr with metallicity larger than $[z/H] = -0.5$.

Keywords. Galaxies, Morphology, Colors, Age, Metallicity

1. Observational data

The present sample of 287 dwarf elliptical galaxies are selected from Ann & Kim (2006). We confined our sample dwarf ellipticals to the galaxies with redshift less than $z = 0.007$. All the observational data except for the morphological types are taken from the SDSS DR4. Since their morphological classification scheme is based on Sandage & Binggeli (1984), the morphology of the dEs are classified into four types: 'dE', 'dE,N', 'dEpec' and 'Im/dE'. We divided galaxies into two groups; the Virgo Cluster dEs and field dEs that include all the galaxies outside the Virgo Cluster.

2. Results and discussion

The mean $g-r$ and $r-i$ colors of dE galaxies are 0.58 ± 0.10 and 0.25 ± 0.01 , respectively, with the reddest galaxies mostly in the Virgo Cluster and the bluest ones in the field. There is no dependence of the Sersic index on the galaxy luminosity and colors, but the Sersic index of 'dE' galaxies is slightly smaller than those of other types.

On-going star formation is believed to be present in about one third of galaxies since they show strong emission lines such as H_{α} , which are thought to be associated with young stellar populations. The field dEs are more likely to have emission lines than the Virgo Cluster ones. Ages of the majority of dEs, derived from Lick indices and the isochrones by Thomas *et al.* (2003), are younger than 7 Gyr with metallicity larger than $[z/H] = -0.5$. The dEs in the Virgo Cluster have slightly high metallicity than those in the field. There is a bimodal distribution of 'Im/dE' galaxies along the local density, which strongly suggests that the 'Im/dE' galaxies are the galaxies that undergo morphological transformation.

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References

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