

A Photometric Distance-Indicator Relation for Low-Surface Brightness Dwarfs

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Recently, dwarf elliptical galaxies have received a great deal of attention and some of the points to be addressed in future investigations include metallicities of the stellar population, structural properties, and the large scale distribution (Caldwell and Bothun 1987; Impey *et al.* 1988; Eder *et al.* 1989). Here we are more concerned with the large scale structure for this class of galaxies. Recent analysis by Eder *et al.* (1989) has indicated that dwarf galaxies seem to trace the large scale structures in the same way as bright ones. Another important characteristic of dwarfs is that they are more populous in clusters than bright elliptical galaxies. The ratio dE/E (dwarf/normal) in Fornax is around 4, and in Virgo 17, which means that if we can define a distance indicator relation for dwarfs with at least the same accuracy as we have for normal ellipticals, we can substantially improve our distance measurement for clusters, thus mapping the large-scale velocity field more efficiently.

We present preliminary results for a new distance indicator relation for dwarf elliptical galaxies, in which total magnitude is correlated with a linear combination of the mean surface brightness, and a color term. The data we used comes essentially from Caldwell and Bothun (1983), Impey *et al.* (1988), and Ichikawa *et al.* 1986. The typical relative error of predicted distances is about 15 - 25 % per galaxy. This new "fundamental plane" for dwarfs seems to work as well as the similar relation for normal elliptical galaxies. Using the new relation for dwarfs we derived a Fornax/Virgo distance ratio of 0.76, comparable with 0.8 found by Caldwell and Bothun (1987). The normal elliptical galaxies in Fornax and Virgo give a ratio of 0.96 when we use the same parameters to define the distance indicator relation. These results are slightly different from the ratio obtained by Dressler *et al.* (1988).

A more detailed version of this work will be submitted for publication shortly.

