OBSERVED DYNAMICAL PARAMETERS OF STAR CLUSTERS IN THE SMC

E. Kontizas and M. Kontizas

Observatory of Athens, University of Athens

The dynamical study of the SMC clusters is very important for many reasons. (a) The disk "blue" clusters are more massive and older than the galactic open clusters whereas the "halo" red clusters are less massive and younger than the galactic globulars (Kontizas, Danezis, Kontizas, 1982; Kontizas and Kontizas, 1983). (b) All clusters show density profiles that fit the available theoretical models (King, 1962) giving evidence of relaxed systems, even for the young clusters with evolutionary ages 10^6-10^8 yr. The relaxation mechanism has to be reconsidered for the SMC and possibly in connection to the metal abundance. (c) The ellipticities of young and old SMC clusters have shown that there is no obvious age-ellipticity dependance and that the SMC clusters are statistically more elliptical than the clusters of the LMC and our Galaxy (Frenk and Fall, 1982, Kontizas et al, 1984).

The tidal radii, masses, relaxation times and the $^M/_L$ ratios of 43 clusters have been derived by means of star counts on plates taken with the 1.2 m U.K. Schmidt Telescope in Australia (Kontizas, 1984). The "red" halo clusters have tidal radii and concentration parameters comparable to those of our galaxy whereas the young "blue" clusters have diameters much larger than those of the mean values of the galactic open clusters.

The derived ellipticities of 25 clusters have shown that there is not statistically significant correlation with age or integrated magnitude (Van den Bergh, 1981 ; Kron and Kron, 1983).

For the LMC clusters Van den Bergh (1984) has suggested that the correlation age-ellipticity, reported previously, results from the fact that the blue LMC clusters are, in the mean, brighter than the old red LMC clusters.

The ellipticities of the disk SMC clusters are plotted versus their masses in Fig. 1. From this diagram it can be seen that there is a linear correlation of mass-ellipticity. The halo clusters are not considered since their derived masses have been found within two values

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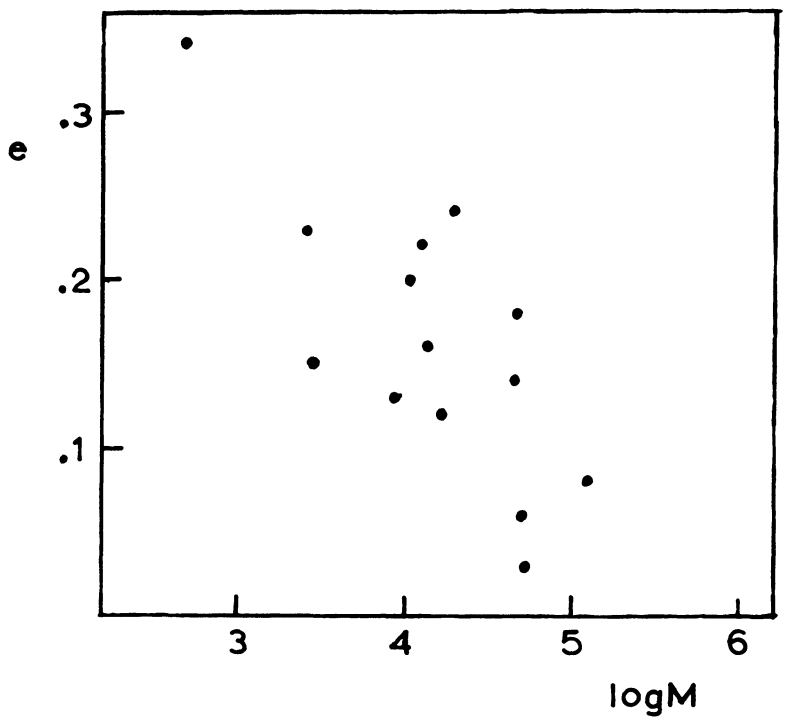

Fig. 1. Ellipticity-mass relation for the disk SMC clusters.

M_{max} and M_{min} (Kontizas, 1984).

A preliminary investigation of the orientation of the major axes of all the 25 studied clusters has shown that there is a preferable direction within 30°. The orientation of the major axes and the mass-ellipticity relation permit us to suggest that rotation should be considered as an important mechanism of the clusters' flatness.

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