Evolution of Tidally Limited Multi-component Clusters with Anisotropy

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We study the evolution of globular clusters including the effects of velocity anisotropy with tidal cut-off to the multi-mass models. Similar to single-mass models, initially isotropic clusters develop velocity anisotropy in the outer parts, and the amount of anisotropy is much smaller than isolated clusters. We have used two different criteria for the escape of stars from the cluster: energy and apocenter conditions. The low mass components in the outer parts tend to have *radial* anisotropy while the high mass components tend to have *tangential* anisotropy. We have compared our results with multi-mass, King-Michie models. The isotropic King model better fits to the Fokker-Planck results because of tangential anisotropy of the low mass stars. However, it is almost impossible to fit to the multi-mass King models for all mass components. Thus the derivation of global mass function based on the observed mass function in limited range using multi-mass King models could give somewhat erratic results for low mass stars. We have examined how the mass function changes in time.

Specifically, the power-law index of the mass function decreases nearly linearly with the mass of the cluster. This appears to be consistent with the behavior of the observed slopes of mass functions for a limited number of clusters, although it is premature to compare quantitatively because there are other mechanisms in contributing the evaporation of stars from the clusters.