Our results indicate as follows: 1) In the case of negligible diffusion, clusters are tidally truncated to the theoretical tidal radius at a perigalacticon. 2) There is no apparent orbital phase-dependence of the tidal radius for clusters with eccentric orbits. 3) In timescales of moderately efficient two-body relaxation, diffusion processes significantly modify the structure of outer regions such that the limiting radius is likely to be comparable to the tidal radius at an apogalacticon. 4) Galactic tidal torque gives a rise to the isotropy in velocity dispersion of the outer cluster region. For relaxed clusters, the velocity dispersions are likely to be isotropic in the cores, anisotropic in the envelopes, and isotropic near the limiting radii. 5) Stars with direct orbits are less stable so that the prolonged tidal interaction can lead to an apparent retrograde rotation in the outer cluster regions. For anisotropic clusters, the effect of tidally induced retrograde rotation likely to be extended into relatively small radii by stars of highly eccentric orbits.

Successive Merging of Stars in Dense Stellar Systems

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In dense stellar systems, close encounters between stars can lead to mergers if the velocity dispersion is sufficiently smaller than the escape velocity from the stellar surface. Simple theory describing evolution of the mass function in the presence of successive merging is presented. This process transforms low-mass stars into high-mass stars in the 'merging' time scale. Eventually a significant fraction of the stellar system's core mass can be locked into in a small number of high mass stars, provided that stellar evolution is slower than the rate of merging. The mass function becomes a power law when the merging cross section is assumed to be a power law on the stellar mass. The implications of the simple analysis for a realistic stellar system are discussed. However, it is not yet clear whether a central black hole can be formed through this process in nuclei of galaxies because of many other uncertainties.

Spherically Symmetric Radiation Hydrodynamics near Eddington Flux

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Time-independent spherical accretion of gas onto the surface of compact star is studied. The previous, simplified, special relativistic treatment is generalized under general relativity. The flow velocity is allowed to approach the speed of light and the gravitational field can be arbitrarily strong if the field can be represented by the Schwarzschild metric. This general relativistic effects become increasingly important when the flux is near Eddington limit.

Results in current literatures are found to be incorrect in many circumstances. When the flux is sufficiently close to the Eddington limit, the flow velocity increases with decreasing radius far from the compact star, reaches a maximum at an intermediate radius, and decreases at small radii. If the external luminosity (luminosity not related to the accreting gas) is centralized, steady accretion is possible only when the luminosity at infinity does not exceed 76% of the