

Abstract Submitted
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The Formation and Assembly of Star Clusters MARK GIOVINAZZI, STEPHEN MCMILLAN, Drexel University — We perform multiple simulations of the early evolution of young star clusters. Astronomers recognize that all stars form in clusters and that over time, the resulting group will dissolve; the life cycle of such a process is contingent upon the initial conditions of the fractal clusters. The first question is how much time is necessary for a given assemblage of stars to reach an effective equilibrium. The second physical effect we study is the degree of mass segregation in the final star cluster. As the system evolves, we observe that heavier stars sink towards the center of the cluster. In both investigations, we modify the following parameters and analyze the effects they have on the resulting time scale for stabilization of the cluster: the number of stars, the fractal dimension of our cluster, the scaling of the initial velocities, and the initial mass distribution of our stars. Each simulation is performed for numerous random realizations of the system and all calculations are continued until the cluster reaches dynamical equilibrium. We find that while neither the number of stars in the system nor the fractal dimension have significant effects on the time to reach equilibrium, the decrease in initial velocities causes the cluster to reach equilibrium faster.

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