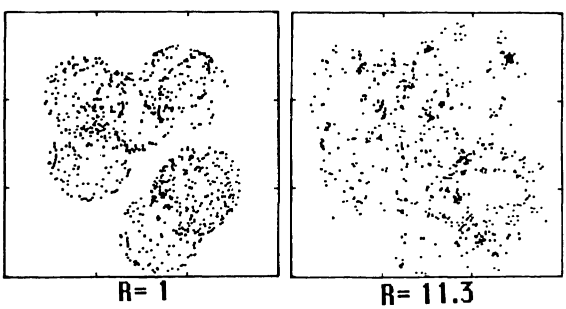
FORMATION OF LARGE SCALE STRUCTURE IN THE EXPLOSION SCENARIO

S. Saarinen[1], A. Dekel[1,2], B.J. Carr[3]
1) Yale Univ. 2) Weizmann Inst. 3) QMC, London

This is a progress report on a study of the formation of large scale structure in the explosive amplification scenario, using N-body simulations. The simulations start when galaxies of the last generation form. The galaxies are distributed at random in expanding shells around random seeds. They start with an expansion velocity 20% larger than the Hubble velocity, in accordance with the similarity solution that was valid before the gaseous shells fragmented into galaxies. The galaxies are treated thereafter as softened point particles that interact only gravitationally, embedded in an N-body background representing inter-shell gas and dark matter (in variable amounts).

Clustering on scales of 2-20 Mpc/h is investigated. Preliminary results indicate that a structure that may resemble the observed one is obtained by the models at an expansion factor, R, of order 10, where the interacting shells produce bound clusters in flattened superclusters separated by voids. Fig. 1. shows a projected distribution of galaxies in one model dominated by dark matter (at R=1 and R=11.3). Fig. 2 shows the correlation function of the galaxies versus the total mass. The functions steepen in time (as in pancake models), in a rate which depends on the amount of dark matter. A bias between the galaxies and the total mass is introduced by the initial distribution of galaxies in shells on top of an unperturbed dark matter, and it survives until R=10. This bias may reconcile the observations with a flat universe. The multiplicity function of clusters and the distribution of voids also evolve in time in a characteristic way, which may be consistent with observations only at a given time, thus providing constraints on the epoch of galaxy formation and on other parameters of the scenario.




(a) (b)

Figure 1.

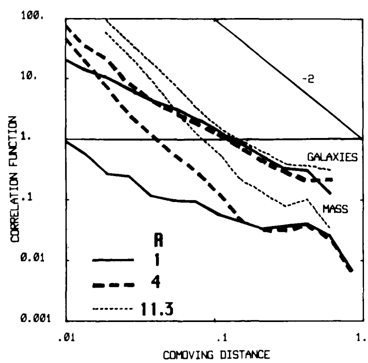



Figure 2.



J. Kormendy and G. R. Knapp (eds.), Dark Matter in the Universe, 286.