

THE BECKER-DOERING (B-D) AND LIFSCHITZ-SLYOZOV-WAGNER (LSW) EQUATIONS

JOE CONLON

ABSTRACT. The B-D equations describe a mean field approximation for a many body system in relaxation to equilibrium. The two B-D equations determine the time evolution of the density $c(L,t)$ of particles with mass L , $L=1,2,\dots$. One of the equations is a discretized linear diffusion equation for $c(L,t)$, and the other is a non-local constraint equivalent to mass conservation. Existence and uniqueness for the B-D system was established in the 1980's by Ball, Carr and Penrose. Research in the past decade has concentrated on understanding the large time behavior of solutions to the B-D system. This behavior is characterized by the phenomenon of "coarsening", whereby excess density is concentrated in large particles with mass increasing at a definite rate. An important conjecture in the field is that the coarsening rate can be obtained from a particular self-similar solution of the simpler LSW system. In this talk we shall discuss the B-D and LSW equations, and some recent progress by the speaker and others towards the resolution of this conjecture.

UNIVERSITY OF MICHIGAN