DO PREGALACTIC SHOCKS TRIGGER OR PREVENT GALAXY FORMATION ?

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Shock waves from supernova explosions in early stellar generations are likely to play an important role as a feedback mechanism in all models of galaxy formation. In particular in the explosive scenario, where the large scale distribution of galaxies is attributed to fragmentation of cooling gas in huge shocks expanding in a homogeneous medium.

An aspect usually overlooked in studies of these topics is the importance of an *inhomogeneous* matter distribution. If explosions start in perturbations of a given mass with unusually high density contrast, the shockwaves will expand in a medium full of less evolved density perturbations. When the shock interacts with these perturbations, some of the perturbations will be heated to Jeans stability, others will be triggered to faster collapse, while yet others develop fast enough to avoid any influence from the shock. A calculation of the relevant time-scales in the problem and the resulting fate of density perturbations as a function of the masses, densities and epochs involved are given in the reference below.

An important consequence of the calculations is that large explosions can serve as negative as well as positive feedback mechanisms on the evolution of neighboring density perturbations. A further result is, that the explosive galaxy formation scenario is likely to be more messy than commonly assumed, with galaxies forming in voids as well as in the cooling shells. Dissipationless dark matter, if present, is not influenced by the hydrodynamics of the shock, but is coupled gravitationally to the gas. Some dark halos are likely to be evacuated of most of their baryonic mass, leading to dark ghost galaxies, or at least gas deficient galaxies in voids. The accelerated gas clouds will have a velocity distribution depending on their density contrast at shock passage. In general these lumps lack behind the expanding external shock and occupy the socalled voids.

REFERENCE

Madsen, J., *Mon.Not.R.astr.Soc.* 1987. (In press).

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