EVOLUTION OF DWARF GALAXIES IN HIGH PRESSURE ENVIRONMENTS

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We use 2D hydrodynamical calculations to examine the effect of the external medium on evolution of supernova-driven outflows from dwarf galaxies. Babul & Rees (1992) have suggested a high external pressure may be able to prevent the outflows from escaping beyond the galaxy and that this material, as it cools and falls back into the galaxy, would serve as fuel for a second epoch of star formation. When thermal pressure is dominant, such evolution of the outflows is seen in our simulations and the gas falls back into the galaxy. Babul & Rees, however, did not take into account the possibility that in high pressure environments such as clusters, galaxies are moving and therefore, subject to ram pressure. In our simulations, we find that ram pressure causes the mass shell associated with the outflow to fragment into clumps. These clumps remain in the vicinity of the galaxy for a few tens of million years before being swept away. The distribution of the clouds gives the galaxy in our simulations a characteristic "head-tail" appearance. If the clouds experience star formation during this epoch, we would expect that the light distribution would also show this "head-tail" feature. The tail-like structure is a transient feature that will eventually disappear. We speculate that galaxies observed by Dickinson (1996) in the $z = 1.15$ cluster around 3C324 are such galaxies.

References

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