NONLINEAR EVOLUTION OF A THIN MATERIAL LAYER WITH ACRETION

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Abstract

In the radiative stage [1] of blast waves (BW) in supernova remnants (SNR), the radiative cooling of the expanding flow produces the formation of a very thin and very dense cold shell accreting the material of the cold interstellar medium. Disposing of a self-consistent nonlinear equations system for an infinitely thin layer accreting material becomes very relevant in order to study the nonlinear evolution of those wavelength perturbations which are much larger than the thickness of the layer. Nonlinear Rayleigh-Taylor evolution of thin layers, without accretion, has been considered in the past [2]. In this work we have extending such study including accretion and more general ambient conditions. Linear and nonlinear evolution are studied and in particular they are compared with the linear approximation equations derived by Vishniac [3].

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[2] Ott, E. 1972, Physical Review Letters 29, 1429.

[3] Vishniac, E. T. 1983, Astrophys. J., 274, 152.