Rev. Mexicana Astron. Astrof. 12, 340 (1986)

ON THE PROPAGATION OF SMALL DISTURBANCES IN A RADIATING FLUID IN WHICH A GENERAL REACTION PROCEEDS. I. EDDINGTON APPROXIMATION

Miguel H. Ibáñez S.

Departamento de Física
Universidad de Los Andes, Venezuela

ABSTRACT. The propagation of sound and radiation diffusion waves in a fluid, in which a general "chemical" reaction proceeds, is studied. The dynamical effects of the radiation field, assumed to be quasi-static, are neglected, and the Eddington approximation is assumed. The physical behaviour of the above two wave modes is described with the help of three dimensionless parameters: the optical thickness of the fluctuation τ, the Boltzmann number B_o (enthalpy flux/radiative flux) and the relaxation time ωt_x (chemical relaxation time/dynamical time). The phase speed and the characteristic scale lengths for damping of acoustic and radiation diffusion waves are found as well as the condition for sound wave amplification with its corresponding characteristic scale length. These results are applied to a pure hydrogen gas. (1985, Ap. J. in press).

Miguel H. Ibáñez S.: Departamento de Física, Facultad de Ciencias, Universidad de Los Andes, Mérida, Venezuela.