

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

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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  $\tau$ , the Boltzmann number  $B_0$  (enthalpy flux/radiative flux) and the relaxation time  $\omega t_x$  (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).

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