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SOUND AND THERMAL WAVES IN A FLUID WITH AN ARBITRARY HEAT-LOSS FUNCTION

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ABSTRACT. The propagation of sound and thermal waves in a nonreacting arbitrary fluid is studied, using the linear approximation. The fluid is assumed to be cooled or heated by non-specified processes, which can be represented by a heat-loss function L (ρ, T). Thermal conduction is taken into account but magnetic fields are neglected. The physical behaviour of acoustic and thermal disturbances is described by three dimensionless parameters, related to the ratios between three relaxation times and the period of a sound wave. The phase speed, and the characteristic scale lengths for damping of sound and thermal waves are found. The condition for sound waves amplification and the corresponding characteristic scale length are obtained. (1985, Ap. J. 289, xx)

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