U^{238}, and Cf^{252}). Secondly, the gamma quanta energies depends little on the excitation energy of the compound nucleus prior to fission.

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ZEMPLEN'S THEOREM IN RELATIVISTIC HYDRODYNAMICS

R. V. POLOVIN

Physico-Technical Institute, Academy of Sciences, Ukrainian S.S.R.

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KHALATNIKOV[1] has shown that for a relativistic shock wave of low intensity the theorem of Zemplen and the conditions of mechanical stability, $v_1 > c_1$, $v_2 < c_2$, are applicable provided only that the following inequality holds;

$$\left(\frac{\partial^2 (w/n)}{\partial p^2}\right)_s > 0 \tag{1}$$

(where w is the heat function per particle, s the entropy per particle, n the density of particles measured in the rest system of the particles, and p the pressure.)

These results are also applicable for relativistic shock waves of any intensity. The proof can be done in a similar way to Landau and Lifshitz, (reference 2, paragraph 84,) for the case when the shock adiabate lies in the plane (p, w/n.) In this case, formula (84,6) will correspond to

$$w_2 T_2 ds_2 = {}^1/_2 (w_1/n_1 - w_2/n_2)^2 d(j^2),$$

and the expression

$$1 - \frac{v_2^2}{c_2^2} = (V_1 - V_2)\left[1 - \frac{j^2 (V_1 - V_2)}{2T_2}\left(\frac{\partial V_2}{\partial s_2}\right)_{p_2}\right]\frac{d(j^2)}{dp_2}$$

is replaced by

$$1 - \frac{u_2^2}{a_2^2}$$

$$= \left(\frac{w_1}{n_1} - \frac{w_2}{n_2}\right)\left[1 - \frac{j^2 (w_1/n_1 - w_2/n_2)}{2w_2 T_2}\left(\frac{\partial (w_2/n_2)}{\partial s_2}\right)_{p_2}\right]\frac{d(j^2)}{dp_2},$$

$$j = nu, \quad u = v/\sqrt{1 - v^2}, \quad a = c/\sqrt{1 - c^2},$$

(where c is the velocity of sound, and the velocity of light is taken as unity.) It follows from this that the quantity n/w, as well as the pressure and the density, are increased on the shock wave.

The inequality (1), for the nonrelativistic case, reduces to the well known conditions, $(\partial^2(1/n)\partial p^2)_s > 0$. For a relativistic ideal gas we have

$$\left(\frac{\partial^2 (w/n)}{\partial p^2}\right)_s = \frac{2(2-\gamma)}{\gamma(\gamma-1)}\frac{1}{pn^2}.$$

The last expression is always positive, since the quantity γ is within the interval[3] $1 < \gamma \leq {}^5/_3$.

It should be noted that for an ultra-relativistic ideal gas,[2] $\gamma = {}^4/_3$.

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ON ELECTROMAGNETIC SHOCK WAVES IN FERRITES

A. V. GAPONOV and G. I. FREĬDMAN

Radiophysics Institute, Gorkiĭ State University

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WE investigate the propagation of a uniform plane electromagnetic wave in a medium with nonlinear dependence of the induction **B** on the magnetic field **H**.* We assume to begin with that the