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AUTHORS: Klymyshyn, I. A. and Kravchuk, A. L.

TITLE: Increase of radiation intensity before a shock wave reaches the surface of a homogeneous medium

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TEXT: It is assumed that the shock wave moves with constant velocity and the energy F radiated from a surface unit of the front is independent of time. The amount of energy $J(u)$ radiated from $u = -\infty$ to u, when the wave reaches an optical depth $(u_0 - u)v$, is computed by integrating the probability function given by V. V. Sobolev; $u = t/t_1$, t_1 being the average duration of a quantum in absorbed state; v is the dimensionless velocity of the wave:

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$$J(u) = \frac{F}{v^2(1 - a^2)} \left[Q_1 e^{-(u_0-u)v\sqrt{\alpha_1}} + Q_2 e^{-(u_0-u)v\sqrt{\alpha_2}} + Q_3 e^{-(u_0-u)v\sqrt{\alpha_3}} \right] \qquad (9)$$

Here $a^2 = 1 - \lambda$, λ is the relative amount of scattered energy, α_1, α_2, α_3 are the roots of

$$(a^2 + x^2)^2 + v^2x^2(1 + x^2)^2 = (x^2 + \alpha_1)(x^2 + \alpha_2)(x^2 + \alpha_3) \qquad (7)$$

Q_1, Q_2, Q_3 depend on these roots, and on v and a. Simplified expressions are obtained for several special cases. If the velocity

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is 100 km/sec and the density $n = 10^{12}$ cm^{-3} brightness increases e times in 10^{-5} sec near spectral line frequency. The above expression does not apply to rarefied media if the frequency is near that of a spectral line. The authors thank Professor S. A. Kaplan for the formulation of the subject of the paper.

ASSOCIATION: L'vivs'kyy derzhuniversytet im. Iv. Franka (L'viv State University im. Iv. Franko)

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