Erratum: Electromagnetic structure and scattering of neutrinos in an isotropic medium [Sov. Phys. JETP 66, 890–896 (1987)]

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Zh. Eksp. Teor. Fiz. **95**, 2288 (June 1989)

Our paper contains an error in the evaluation of the neutrino energy losses and the total ν-e scattering cross section in an equilibrium isotropic metallic plasma. The integrand of Eqs. (20) and (22) contains the factor (using the same notation as before)

$$\pi\alpha \int \frac{d^3p_4 f^e(E_4)}{4E_2E_4}\left[1-\frac{(2\pi)^3}{2}f^e(E_2)\right]$$
$$\times\delta(\omega+E_4-E_2)\ \mathrm{Tr}[\hat{p}_2\gamma_0\hat{p}_4\gamma_0],$$

with $E_4 = E_{\mathbf{p}2-\mathbf{k}}$. The above expression is equal to $-k^2\,|\mathrm{Im}\,\varepsilon_l|$, where ε_l is the collisionless dielectric permittivity. We failed to note this fact at the time. As can be seen from our equations, the cross section is also proportional to the factor $|\varepsilon_l|^{-2} = \pi\delta(\mathrm{Re}\,\varepsilon_l)/|\mathrm{Im}\,\varepsilon_l|$, where we have now included the contribution of the electron-ion collisions ($\sim\nu$) in the small imaginary denominator.

Thus, further calculations using the corrected forms of Eqs. (20) and (22) lead to a result without the resonant enhancement of the total cross section and the losses we erroneously found in our paper, and with the integrand multiplied instead by a factor $|\mathrm{Im}\varepsilon_l|/(|\mathrm{Im}\,\varepsilon_l| + \nu/\omega_l) < 1$, where ω_l is the characteristic frequency of longitudinal plasma oscillations.

The differential cross section remains resonant, as stated in our paper, but the effect of neutrino energy loss enhancement in an equilibrium plasma disappears.[1)]

[1)]We are grateful to D. A. Kirzhnits, V. V. Losyakov, and V. A. Chechin for drawing our attention to the possibility of a mistake in our work.

Translated by David L. Book

 0038-5646/89/061309-01$04.00