$$\alpha_3 = 3C'^2 + B'^2 + 4B'C' + \beta'(B + 2C);$$

$$\gamma_1 = \arccos \xi_0; \quad \gamma_2 = \frac{\beta_2}{(1-\xi_0^2)^{1/2}};$$

$$\gamma_3 = -\frac{\xi_0 \beta_2^2}{(1-\xi_0^2)^{3/2}} - \frac{\beta_3}{(1-\xi_0^2)^{1/2}};$$

$$\xi_0 = \frac{\varepsilon(\omega) - (B+2C)}{C}; \quad \beta_2 = \frac{B'+2C'}{C} + \xi_0 \frac{C'}{C};$$

$$\beta_3 = \xi_0 \frac{C'^2}{C^2} + \frac{B'+2C'}{C^2} C' + \frac{\beta_1}{C};$$

$$\varepsilon(\omega) = \alpha + a^2 (3\pi^2 n)^{2/3} \beta + h\omega;$$

$$\beta_1 = a^2 (3\pi^2 n)^{2/3} k_1 \left(\frac{3}{8} k_1 \beta + \frac{3}{2} \beta' \right).$$

The symbols α, α', β, β', n, k_1 are taken from the work of Vonsovskii[1]. Formula (3.28) can obviously be used for nonferromagnetic metals if $\gamma = 0$ is inserted in it.

In this case, there results a temperature dependence of the same form as in the simplified theory of the photoeffect which does not take account of the periodic potential. The distinction between the simplified view of the photoeffect and the more coherent one is especially noticeable on comparison of the expressions determining the velocity distribution of the photoelectrons [Eq. (3.24)]. This dependence is more complicated than in the simplified theory, which, apparently, is what actually occurs.

If the photoeffect produced by light of frequency much greater than threshold is considered, then the second component of the matrix element, corresponding to the so-called "volume" effect, must also be taken into account.

A comparison of Eq. (3.28) for the photocurrent with the well-known relation determining its temperature dependence shows that the work of emission must be equal to $-\epsilon_0$. This result can be substantiated not only by a formal comparison, but also on the basis of thermodynamic relations[7].

In conclusion, the author expresses his profound gratitude to A. V. Sokolov for a number of valuable suggestions and to S. V. Vonsovskii for a discussion of the present work.

Translated by Brother Simon Peter, F. S. C.
174

SOVIET PHYSICS VOLUME 2, NUMBER 2 MARCH, 1956

International Values for the Thermal Cross Section of Fissionable Isotopes

At the session of August 17* of the International Conference on the Peaceful Application of Atomic Energy, a large amount of declassified data was presented on the effective neutron cross sections of the fissionable isotopes U-233, U-235 and Pu-239. In the low energy region, for which a large number of measurements was reported, excellent agreement was obtained for these isotopes, which play important roles in reactor installations. At the initiation of the Chairman, the scientists of France, Great Britain, the USSR and the USA met after the official session to consider the effective cross sections of absorption and fission of these isotopes by thermal neutrons (with velocities of 2200 m/sec). It was decided to develop a system of international mean values for these effective cross sections. Such values would contribute to agreement of reactor calculations based on these constants. The errors in the mean international values listed here are based on the scatter of reported values and in some instances exceed the errors of particular individual measurements.

	absorption in barns	fission in barns
U-233	593 ± 8	524 ± 8
U-235	698 ± 10	590 ± 15
Pu-239	1032 ± 15	729 ± 15

* Session 17A, August 17, 1955. "The Effective Cross Section of Fissionable Isotopes." Chairman, D. Hughes (USA), Vice-chairman, D. Popovich (Yugoslavia).

Translated by R. T. Beyer
237