Assuming $\mu c^2 = 10^8$ ev from the data of the tables we calculated the following values for the "proper lifetime" of a meson (in microsec.):

From Table I and II ($A = 15+34.6$) $\tau_{I} = 3.4 \pm 0.3$
From Table II ($A = 15$) and III ($A = 15+15$) $\tau_{II} = 2.55 \pm 0.4$
From Table II ($A = 15+34.6$) and III ($A = 15+49.4$) $\tau_{III} = 1.65 \pm 0.3$

The τ_{II} value is in excellent agreement with the Rossi and Hall results. Our measurements agree also with Neher and Stever experiments, but differ from the Nielsen, Ryerson, Nordheim, and Morgan results. It was pointed out, however, that in discussing the latter measurements one finds some difficulties.[2] On the other hand, the difference existing in coincidence ratios Denver-Echo Lake, *with* and *without* absorber Σ, are not clear in Rossi and Hall experiments.

Finally we wish to call attention to our results which seem to point out that the ratio $\mu c^2/\tau$ increases with increased altitude and average meson energy.

Further studies are in progress to see if the conclusion of our experiments can be accepted.

* These experiments were made during the winter 1940–41 and we have not been able to publish them until now because of the international situation.
[1] H. V. Neher and H. G. Stever, Phys. Rev. **58**, 766 (1940); B. Rossi and D. B. Hall, Phys. Rev. **59**, 223 (1941); W. M. Nielsen, C. M. Ryerson, L. W. Nordheim, and K. Q. Morgan, Phys. Rev. **59**, 547 (1941).
[2] L. W. Nordheim, Phys. Rev. **59**, 554 (1941).

Electric Fields in Interstellar Space

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In a letter[1] published in *The Physical Review*, Fred L. Mohler has pointed out that an inappropriate value of the collision cross section for atomic scattering of electrons was used in a paper[2] on "Electric fields produced by cosmic rays" by the author of the present letter. It is to be noted that the assumption made in this paper in regard to the composition of the interstellar gas is that there is one electron and one hydrogen atom per cm^3 and not as stated by Mohler. According to Dunham[3] practically all of this hydrogen is ionized.

The formula for calculating the collision cross section suggested by Mohler was taken from a paper by S. D. Gvosdover.[4] It was thought desirable, therefore, to recalculate the previously obtained results with Gvosdover's formulae for mean free path and mobility in a positive column consisting entirely of a mixture of electrons and ions. Under the same assumptions as made in the paper[2] referred to above it is found that the potential produced on a star of radius a as a result of interception or emission of cosmic rays as charged particles all of one sign is given by

$$V = -\frac{2m^{\frac{1}{2}}e^2\gamma}{\alpha(kT)^{\frac{3}{2}}}\frac{A}{a},$$

where m and e are, respectively, the mass and charge of the electron, k is Boltzmann's constant, T is the translation temperature of electrons in interstellar space, α is the ratio of the density of electrons to ions, $4\pi A$ is the total current flow to or from the star in the form of cosmic rays, $\gamma = (\pi/4)\ln(K^2T^2/e^4N_+^{\frac{1}{3}})$ and N_+ is the density of ions in the interstellar gas. This equation for the potential is valid under the condition that $eE\lambda/1.5kT < 2$, where λ is the electron mean free path and E is the electric field in interstellar space. This puts a limitation on the value of A that may be used in the above equation, namely, $A < 10^{21}$ e.s.u. sec.$^{-1}$. That is, Ohm's law is valid only in case $A < 10^{21}$ e.s.u. sec.$^{-1}$. In the case of interception of charged cosmic-ray particles the current flowing to the star is well within this limit and the potential V thus produced on a star of radius equal to that of the sun becomes of the order of magnitude of 10^{-9} volt. For the case of a star emitting charged cosmic-ray particles at such a rate that the current is 10^{21} e.s.u. sec.$^{-1}$ the induced potential would be approximately 3 volts.

[1] F. L. Mohler, Phys. Rev. **59**, 1043 (1941).
[2] F. Evans, Phys. Rev. **59**, 1 (1941).
[3] T. Dunham, Jr., Proc. Am. Phil. Soc. **81**, 277 (1939).
[4] S. D. Gvosdover, Physik. Zeits. Sowjetunion **12**, 164 (1937).

Isotope Effect in the Predissociation Phenomena of the CH and CD Molecules

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In the course of a detailed investigation on the predissociation phenomena in the CH and CD spectra[1–3] the positions of several limiting curves of predissociation could be located in the energy *vs.* $\rho^2J(J+1)$, i.e., energy *vs.* $\rho^2J(J+1)$ schemata of these isotopic molecules. In this way the preliminary results reported in a previous letter[4] became more precise and could be considerably extended, partly by observing the predissociation effects under various pressures in the light source, and partly by observing them on all three excited states of CH and CD.

A careful comparison of the corresponding effects in the CH and CD spectra revealed[5] that the graphs of corresponding limiting curves of predissociation (constructed by adequate allowance of the isotopic corrections to the kinetic energy, i.e., by using $\rho^2J(J+1)$ as abscissa for CD) can be brought in complete coincidence for both molecules only if one sets the equilibrium position of the CD ground state downward about 350 cm^{-1} units in respect to that of the CH molecule. As the electronic isotope effect does not amount to more than a few cm^{-1} units in any band system of CH and CD, the energies in the equilibrium positions of all CD states must be similarly shifted downward about the same value. The result reported is to be regarded as the experimental proof of the suspicion, that even for isotopic molecules the potential curves must not be strictly identical.[6]

It seems that the increase of the dissociation energy of a deuteride just reported is not restricted to the CD