

Letter to the Editor*Ya. L. AL'PERT*

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THE July 1967 issue of *Uspekhi Fizicheskikh Nauk* (v. 92, No. 3, p. 543) [transl. V. 10, p. 602] contains a letter by V. V. Bezrukikh, T. K. Breus, G. L. Gdalevich, B. N. Gorozhankin, and V. A. Rudakov concerning my 1966 article (V. 90, No. 3, p. 405 [transl. V. 9, p. 787]). The greater part of this letter, in my opinion, calls for no discussion, inasmuch as an attentive reader can readily form his own opinions on the basis of the content of my article. I am also disregarding the style of this letter.

I do wish, however, to call brief attention to the following:

1. The letter cites as a self-evident fact the reputedly demonstrated faultiness of the results of satellite investigations of the ionosphere, obtained by myself and my co-workers at coherent frequencies. These topics were already discussed in the literature by K. I. Gringauz, S. M. Rytov, Ya. Yu. Kravtsov, and V. A. Rudakov (*Geomagnetizm i aéronomiya*, V. 5, No. 4, 1965 and V. 6, No. 3, 1966). I find the criticism of these authors incorrect, based on an incorrect approach to the methods of research at coherent frequencies, and too narrow an approach to the treatment of experimental data.

In a word, the gist of the problem is as follows. The difference of the Doppler shifts of two coherent radio-wave frequencies measured in these experiments depends in principle both on the local value of the electron density and on its mean integrated value. Both terms enter on par in the corresponding equations. Under various conditions, either the two terms are commensurate or one exceeds the other. A complete method for the reduction of the experimental data should consist of a determination of both quantities. We were the first to do so and are continuing to do so successfully to this day.

2. It is also advantageous to emphasize the importance, in my opinion, of the considerations advanced in my review concerning probe measurements with satellites. The determination of the potential of a body in the plasma around the earth and the determination of the particle densities and fluxes are mutually interrelated. Formulas inappropriate for the measurement conditions are still frequently used for the reduction of the experimental data. In my opinion, this is the cause of a number of incorrect conclusions drawn by K. I. Gringauz, V. V. Bezrukikh, V. D. Ozerov, and R. E. Rybchinskii (published in 1961 in the collections *Isskustvennye sputniki zemli* [Artificial Earth Satellites] Nos. 6 and 12 and in other journals), obtained just by probe measurements. These results contradict in fact the physical notions concerning the plasma around the earth. Their erroneous nature is confirmed by numerous experimental data, only some of which are cited in my review (Figs. 1 and 2). The results of work not cited there (V. V. Bezrukikh and K. I. Gringauz, *Issledovaniya kosmicheskogo prostranstva* [Outer Space Research], Nauka, 1965, p. 177) apparently also contradicts the data obtained by the authors in 1959.

**From the Editors**

In publishing this letter by Ya. L. Al'pert, the editors conclude the discussion of his article "The Outer Ionosphere and Its Transition to the Interplanetary Medium," deeming a continuation of this discussion inadvisable.

Translated by J. G. Adashko