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COMPARISON OF CERTAIN RESULTS OF SIMULTANEOUS MEASUREMENTS
OF SOLAR WIND CHARACTERISTICS ON SPACECRAFTS

"VENERA-3" AND "PIONEER-6"

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SUMMARY

The comparison of some of the results of measurements of solar wind characteristics conducted during radiocommunication sessions with the Soviet probe "VENERA-3" during the period from 16 November 1965 to 7 January 1966 [1] with the published part of the results obtained on the American spacecraft "PIONEER-6", related to the period from 18 to 31 December 1965, attests to their satisfactory agreement.

*
 * *

Reference is made to our own partial measurements carried out aboard Venus-3 (Venera-3) and discussed in [1].

Measurements on Pioneer-6 were conducted simultaneously with the help of two devices: a modulation-type charged particle trap [2] and a quadrispherical electrostatic analyzer [3]. Amongst the published data the average hourly values of directed velocity of solar wind's ion fluxes are available for the indicated period of time according to the data of the trap (or of "Faraday cup" as the authors of [2] designate it) and the concomitant average hourly values of ion concentration [2]. Published also is one of the energy spectra obtained on 26 December 1965 with the aid of the electrostatic analyzer [3].

As is well known from the description of experiments on "Venera-3" ([1] and our own ST-PF-10597), measurements of the energy spectra of solar wind ions were conducted on this craft only during radiocommunication sessions. This is why we utilized only the values of concentrations of ions n and of velocity v averaged by the time interval equal to the duration of one session (usually less than one hour). For v we took the velocity of the "main" component of

5 (*) [SOPOSTAVLENIYE NEKOTORYKH REZUL'TATOV ODNOVREMENNYKH IZMERENIY
 KHARAKTERISTIK SOLNECHNOGO VETRA NA KOSMICHESKIKH APPARATAKH "VENERA-3" I
 "PIONER-6"]

of the energy spectrum (see [1]); $\bar{n}$ is defined as $\Sigma N_i/v_i$, where N_i is the partial flux of ions registered in the i -th energy interval, and v_i is the velocity of protons corresponding to the center of this interval.

The graphs of the mean hourly values of $\bar{n}$ and $\bar{v}$, obtained on Pioneer-6 in the second half of December 1965 are plotted in Fig.1. * Superimposed in same graphs by triangles are the values of $\bar{n}$ and $\bar{v}$ obtained on Venera-3.

As may be seen from trajectory data brought out in [1] and [4], the distance between these space probes in the second half of December 1965 was of the order of $10 \cdot 10^6$ km. Taking account of the mutual position of devices in interplanetary space, the correspondence between the results of determinations of $\bar{n}$ and $\bar{v}$ with the aid of modulation traps of charged particles in our own and in the American experiments may be acknowledged as satisfactory. Represented in Fig.2 is also the energy spectrum of solar wind's ions obtained with the aid of the quadrispherical electrostatic analyzer of Pioneer-6 on 26 December 1965 at 2213 hours U.T. The closest in time corresponding spectrum was obtained on Venera-3 at 1557 hours U.T.

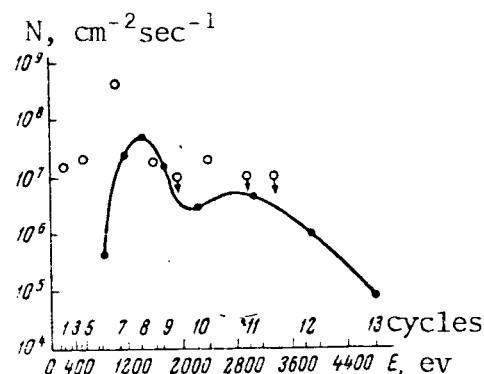


Fig.2

Wolfe *et al* interpret the presence of a second peak in the spectral distribution of the ion flux corresponding to the doubled potential difference on analyzer plates as evidence of the presence in the composition of the flux of helium nuclei (analogous spectra were thus described for the first time by Snyder and Neugebauer during the description of results of measurements on Mariner-2 [5]).

The circles indicate in the same Fig.2 the points related to the spectrum obtained on Venus-3 (or Venera-3) at 1557 hours U.T. on 26 December 1965. The circles with downward point arrow mean that in the given energy interval the flux of ions was less than the indicated value. The analogy of both spectra is evident despite the seven-hour time break. Note that the spectra with a

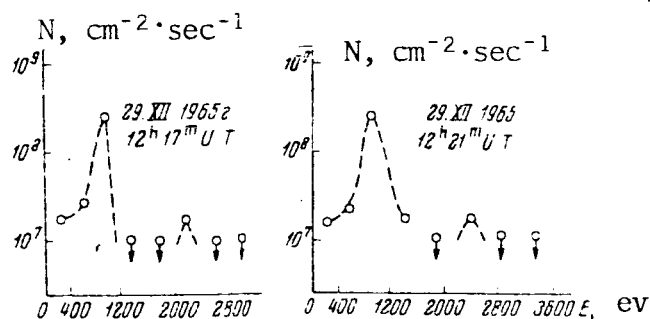


Fig.3

second peak may be interpreted as induced by twice-ionized helium fluxes; they were observed more than once on Venera-3 (examples of such spectra are shown in Fig.3 a and b).

* see Fig.1 on page 3.

On the whole, the comparison of the results of simultaneous measurements of the characteristics of solar wind on "VENERA-3" and "PIONEER-6" attests to their satisfactory agreement.

*** T H E E N D ***

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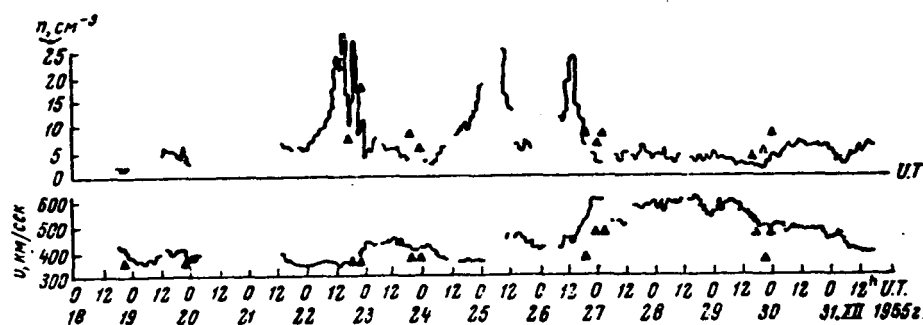


Fig.1