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ON THE POSSIBILITY OF AGREEMENT OF MEASUREMENTS ON AES "PROTON"
WITH THE DATA ON SIDEREAL DAILY VARIATION AND WITH DIFFERENT
MODELS OF ORIGIN OF COSMIC RAYS

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WITH THE DATA ON SIDEREAL-DAILY VARIATION AND WITH DIFFERENT
MODELS OF ORIGIN OF COSMIC RAYS

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by L. I. Dorman

S U M M A R Y

Different models are considered of metagalactic and galactic origin of cosmic rays from the standpoint of possibility of their agreement with the following cases:

1. Splitting of spectra of protons and nuclei in the region of particle rigidity $> 10^{11} - 10^{12}$ v according to observation data on satellites of the "PROTON" series;
2. contemporary data on sidereal-daily variation of cosmic rays;
3. distortion of the energy spectrum and of the nuclear composition in interplanetary space.

It is shown that the following cases are difficult to conciliate with the aggregate of the indicated data: a) the different models of metagalactic origin; b) the nonstationary model of galactic origin; 3) the stationary model of galactic origin in the assumption that fragmentation takes place in the interstellar space.

Analysis shows that preference should be given to the stationary model of galactic origin with prevailing generation of heavy nuclei in the initial period of supernova shell formation and fragmentation at diffusion in the shell. The indicated data satisfy also the stationary model of cosmic ray origin as a result of periodic flares of a quasar at Galaxy center, on the condition

.../...

of materialization of preferential generation of heavy nuclei, and that fragmentation takes place basically within a comparatively small neighborhood of the quasar (quasi-stellar object), say, in its shell.

C O N C L U S I O N S

Comparison of the results by Griogrov ET AL with the data on sidereo-daily variation leads to the following conclusions:

1. The usually considered nonstationary model of galactic origin of cosmic rays is beset with a series of important difficulties. A modification of this model removes a large number of them, but not entirely, however. This is why one can hardly consider the nonstationary model as acceptable.
2. A serious difficulty is also encountered by the usually considered stationary model of galactic origin of cosmic rays, in which it is assumed that fragmentation takes place mainly in the interstellar medium.
3. The considered three models of metagalactic origin of cosmic rays also meet with difficulties in the case of complex explanation of the spectrum, of the nuclear composition and of the sidereo-daily variation.
4. The most acceptable seems to be the stationary model of galactic origin of cosmic rays, in which it is assumed that fragmentation takes place in the neighborhood of the sources. Such sources may be type-I and II supernova- and the stormy quasiperiodical processes in the nucleus of the Galaxy. Then it is shown that process of cosmic ray generation must take place only in the initial stage of supernova shell expansion.
5. In order to verify the model under discussion the decisive experiments consist in the measurement of Li, Be B nucleus spectra in the region of high energies, the refinement of the sidereo-daily variation of cosmic rays and the measurement of the ratio Be^{10}/B .

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

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