The electrostatic model of a dark energy and the cosmic ray acceleration

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As a result of the electromagnetic escape of a matter from the singularity the charge separation arises in the -direction for the layers with the different  = const [1]. Beginning with the time of the recombination period, when the electromagnetic expansion was terminated, the electromagnetic energy accumulates which is supported by the charge separation. This dispersed energy has the density that is smaller than the energy density in singularity by a factor of . Making use of the Poisson equation, one can obtain in the electrostatic approximation [2]

 ,, , (1)

where  describes the charge distribution in the Universe, so that  due to the exact Universe electroneutrality. In this case, the most of the energy contribution is connected with the components  and , and  is equal to the like-sign particle charge of the capacitor - Universe. Then equating with the reasonable exactness  to the energy  one can obtain the average electric field =10 , which gives the dominant contribution to the Universe energy. On the other hand, it follows from the equations

, , , ,, (2)

that for the production of the Universe electrostatic energy it is enough a very small part of the total proton number. Presenting the proton acceleration equation in the field  by the account of the pair production and GZK effect with the  years[2,3]

 , (3)

one can demonstrate that the integration (3) results in the limiting proton energy =eV. At the same time even by  the proton energy  eV can be attained. Here we use the following expression for the four-dimensional invariant

 . (4)

It seems quite possible that the presented proton energy values can explain the observed cosmic ray anisotropy for the energy above  eV [4].

References.

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