

Particles spectra and mass composition in the ultra-high energy region in the framework of the Galactic origin of the cosmic rays

Lagutin A.A., Volkov N.V., Raikin R.I., Tyumentsev A.G.

Altai State University, Barnaul, Russia

We examine the possibility for self-consistent description of all the basic features of the observed cosmic ray spectrum in the energy range of $10^{10} \div 10^{20}$ eV within the Galactic origin scenario.

We assume the existence of Galactic sources that accelerate particles up to $\sim 10^{20}$ eV and take into account highly inhomogeneous (fractal-like) distribution of matter and magnetic fields in the Galaxy that leads to extremely large free paths of particles («Levy flights»), along with large contribution to the cosmic ray fluxes observed above $\sim 10^{18}$ eV from particles reaching the Solar System without scattering. The crucial model predictions for the particles spectra and mass composition behaviour in the ultra-high energy region are presented.

This work was supported in part by the Russian Foundation for Basic Research grant No. 16-02-01103 a.