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Contribution from individual nearby sources to the spectrum of high-energy cosmic-ray electrons

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In the last few years, very important data on high-energy cosmic-ray electrons and positrons from high-precision space-borne and ground-based experiments have attracted a great deal of interest. These particles represent a unique probe for studying local cosmic-ray accelerators because they lose energy very efficiently and rapidly by two dominant processes: inverse Compton scattering and synchrotron radiation. These energy losses reduce the lifetime so drastically that high-energy cosmic-ray electrons can attain the Earth only from rather local astrophysical sources. This work aims at calculating by means of Monte Carlo simulation the contribution from some known nearby sources to the cosmic-ray electron/positron spectra at high energy (above 10 GeV). The background to the electron energy spectrum from distant sources is determined with the help of GALPROP code. The obtained numerical results are compared with a set of experimental data.

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