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The electron spectrum from annihilation of Kaluza-Klein dark matter in the Galactic halo

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The Kaluza-Klein (KK) particles, which are the feasible candidate for the dark matter, produce electrons and positrons when they annihilate in the Galactic halo. When the electrons and positrons propagate in the Universe, their direction is randomaized by the Galactic magnetic field, and energy is reduced by some energy loss mechanisms. We calculate the electron and positron spectrum expected from KK particle annihilation to be observed at Earth, taking account of propagation effects in the Galaxy.

We assume the lightest KK particle (LKP) in the mass range from 500 GeV to 1000 GeV is the dark matter consisting of the Galactic halo, and we treat the particle spectra from LKP annihilation which include electron-positron component from two-body decays and "continuum" emission. We calculate the effects of diffusion and energy loss in the Galaxy, and analyze the resulting spectra. These spectra strongly depend on the LKP mass and will be compared with recent observational data taking account of energy resolution of detectors. We can set some constraints for the boost factor of dark matter concentration in the Galactic halo. In addition, we will discuss the recent result on positron fraction based on our calculation.

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